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gether with clay stowed from bottom digging. An examination of these blinded cross cuts and room ends, in which stoppings are built, does not reveal any perceptible short circuiting of air; nevertheless there can be no question but that a loss is occurring in many such places. In the face of such a situation it is an interesting problem, considering the cost involved, to know just how far to go in order to remedy the difficulty.

In a paper written by Mr. Tonge and read before the Manchester Geological and Mining Society in 1906, he speaks of a case where 105,000 cu. ft. of air per minute delivered at the fan resulted in only 73,000 cu. ft. per minute reaching the working districts, a loss of 31 per cent; 9,800 cu. ft. per minute were accounted for as being unavoidably lost at certain doors, but the balance of the loss, 23,000 cu. ft., could not be found although diligently hunted for, as he puts it. He does not state the water gauge under which the above loss was made, but does say that assuming a 20 per cent air loss with 1 in. water gauge, a loss of 44 per cent would occur with a 5 in. water gauge. It looks as though the loss that would be unavoidable in Princess colliery, due to the abnormally high water gauge required to give the necessary air, will necessitate an attempt to ventilate this colliery by means of underground booster fans in series, in addition to a surface installation. With workings situated as far from the air-shafts as at Princess, and having a limited cross-section of intake, and return air-ways, there seems to be no other remedy in order that the required volume may be obtained at a pressure sufficiently low to ensure against abnormal leakage, and other consequent difficulties that would arise. The nature of such an installation will be more or less new to Cape Breton mines, but this method is resorted to in other places, as at Hulton Collieries, England, where three underground units, working in series through one down-cast and one up-cast shaft, supply air to three mines.

The pumping problem at Princess colliery is comparatively simple. The old workings to the dip of the shaft are practically dry, and what little water is made from the pit to the face is handled by six small pumps, lifting about 50 gallons per minute, from one to the other, and discharging into the sump at the bottom. At this point a Jeansville pump with a capacity of 500 gallons per minute is located.

This pump was installed in 1902, taking the place of the original Cornish pumping plant erected when the shaft was sunk. It discharges about 300,000 gallons during a 14 hour shift, this being the rise water let into the lodgment through the barrier from the old Queen pit workings, together with the small quantity mentioned before as coming from below.

A new duplicate motor driven installation is now under consideration to take the place of the "Jeansville", as the cost of maintenance on this old pump is becoming too heavy.

In conclusion, the author feels that, while much has been written here which undoubtedly is reiterating ordinary mining practice, as we know it under general conditions in Cape Breton for the past decade, yet a description of operations at Princess colliery from the beginning up to the present was permissible, inasmuch as this mine has been a pioneer in submarine working, and furthermore will in all probability continue to be the pioneer in deep mining for some years to come. Any out of the ordinary phases of operations encountered during development, and there are a few, mentioned here, must be of more or less interest to the profession at the present time.

WORK OF THE GEOLOGICAL SURVEY IN THE MACKENZIE RIVER BASIN.

The Geological Survey has sent four field parties to investigate further the oil and other mineral resources of the Mackenzie river region. The parties are in charge of Dr. D. B. Dowling, Dr. G. S. Hume, Dr. M. Y. Williams and Mr. E. J. Whittaker.

Dr. Dowling will make a detailed examination of the succession and fold structure of the Devonian sediments in the Fort Norman district, where oil was obtained last August by the Imperial Oil Company, and where much additional drilling will no doubt be done this year. He fill follow closely the results of drilling in order that this information may be applied to advantage in the similar underground exploration which is likely to be undertaken in other parts of the Mackenzie basin.

Dr. Williams, Dr. Hume and Mr. Whittaker will begin a systematic mapping and study of the geological formations on each side of the Mackenzie between Great Slave Lake and Fort Norman, with a view to supplying maps and information regarding the depth and form of the oil-carrying rock formations. As the Mackenzie river is the great highway through the region, it seems most likely that future prospecting for petroleum will extend southward along it.

Dr. Williams and Dr. Hume will jointly explore the country on either side of the Mackenzie, from Fort Simpson downstream. Mr. Whittaker will devote his attention similarly to the section from Great Slave lake downstream.

The Topographical Surveys Branch of the Department of the Interior will co-operate in this work by making a careful survey of the Mackenzie river from Great Slave lake downstream, controlled at intervals of about 150 miles by astronomical stations.

The foregoing information has been given for publication in the "Journal" by the courtesy of the Director of the Geological Survey.

IMPERIAL OIL COMPANY'S PLANS.

On his return from Edmonton, Mr. A. M. McQueen, vice-president of the Imperial Oil Company, gave the following statement to the Toronto "Globe":—

"We hope to arrive this year at the stage at all our locations in Alberta and Saskatchewan that will either prove or disprove the existence of oil in commercial quantities. We are drilling thirteen wells outside of the far north, with four at Fort Norman and one at Great Slave Lake, in addition."

Mr. McQueen said that the company's airplanes had been much delayed in their service to Fort Norman through accidents at the outset and now, by reason of the risks, the company was fitting pontoons to each plane in case of necessity of descending on water. One plane had been left at Fort Simpson to be repaired after the first fight toward the north, and the other recently left Peace River, carrying a geologist and a surveyor for the company. The necessity for carrying pontoons reduced the man-carrying power of the planes considerably.

Mr. McQueen said that the number of prospectors going to the Fort Norman field was not as great as had been expected, but there was now a considerable traffic by the water route.

The Study of the Fuel Problem of Canada

A Suggestion in Response to the Open Letter of the President of the Canadian Institute of Mining and Metallurgy.

By the Editor, from the June "Bulletin".

THE President of the Institute has invited individual expressions of opinion on three inter-related difficulties that accompany the current stage of national development.

The general problem is complicated by world conditions, the future variation or duration of which no man can forecast. These are, in the main, results of social changes, racial movements, war, and the abolition of old conceptions of time and distance by invention.

Some of the causes of adverse exchange, railway deficits, and shortage of material supplies, are ascribable to these indeterminate factors, but this phase is without bounds, and certainly incompressible into a letter to the BULLETIN. It is mentioned merely to indicate the temporary character of many of our national difficulties, and to lend weight to an assumption that is here ventured, namely, that much of present Canadian financial disability is due to an arrested development, and to a capital expenditure that was made in expectation of an increase in population and wealth that has not materialised. The war has been the principal cause of this arrestation.

The writer, not being either a railwayman or a financier, but only a coalman, inclines to the belief that the difficulties of the railways and of our trade exchanges are temporary only, except insofar as they arise from fuel insufficiency.

This, unfortunately, is an inherent disability of Canada's geographical and national status, but it has been, and will be, a major factor in permanence of railway deficits and in weakness of our exchanges.

A consideration of the President's letter will reveal that, although he has covered the whole ground of national economic independence, population, incidence of business between East and West, and taxation and exchanges, the burden of his presentation is a disclosure of the difficulty Canada is meeting in making herself an independent manufacturing and commercial entity, while retaining national self-government, *in face of an insufficiency of fuel at moderate cost at points of necessary maximum use, in our present stage of development.*

Therefore, it is fair to assume that the most fruitful line of enquiry will be directed towards remedying this admitted fuel insufficiency.

Canada has slowly awakened to the menace of her fuel problem, but at this time is probably more alert to its dangers than ever before.

Long consideration of the problem, and much thinking aloud, has strengthened the writer's belief that no palliation of this country's difficulty is quickly possible, and that relief can only come as a result of the concentration of a number of our best minds upon the problem for a long period.

The course of the enquiry of the parliamentary fuel committee has shown how difficult it is for non-technical men to wrest the essentials of a problem that is in large part technical out of the smother of irrelevant considerations that attend this period of transition and unrest. The assistance of the Institute and other technical bodies in Canada has not been asked by this Committee. The evidence of witnesses has been conflicting, and will be found incapable of being assessed except by engineers of ripened experience. Snap judgments, temporary considerations, personal fads, bias of various kinds, arising from local, provincial and technical affiliations and governmental exigencies, all enter into and vitiate any enquiry into the fuel supply of Canada, *if that enquiry is temporary in its purview.*

The Fuel Controller, Mr. C. A. Magrath, in his final report in 1919, summarised excellently the things that need to be done to assist our fuel insufficiency, but he was unable to suggest the agency through which his recommendations should be carried out further than to recommend that the technical problems involved should be referred to the Honorary Advisory Council.

This body has, in the meantime, made real progress in investigating possible improvements in methods of utilizing lignite and peat, and, under a recent Act of Parliament, will doubtless make more rapid progress.

The fuel problem of Canada is, however, at least as much one of economic and political independence as of technical research.

But for our national frontiers we should have no fuel problem.

Technical research is therefore only one consideration.

The federal interest in the fuel question is complex, and we have not yet evolved in Canada what may be termed the pure federalist, that is to say, a school of thought free from fiscal doctrinism, from provincial affiliations, and from national predelictions entirely absolved from any other interest than that of Canada. How can we obtain a symposium of minds that will give us this single viewpoint?

The problem of fuel supply is inherent in Canada's organism. It is perpetual in its duration and in large measure ineradicable. No single remedy will serve. Many things, many men, must be considered, competently, judicially and maturely.

How can such continued study be given?

Some of the questions relating to our fuel problem which urgently need to be studied, may be mentioned, merely to indicate how great is the field for consideration, and how foolish it would be to attempt a snap judgment, or to recommend any one "cure-all". These questions are, in part:

a. *Extent of Reserves.*

This question is of importance (so far as coal is concerned) only in the two most extensively-worked fields of Vancouver Island and Nova Scotia. In both fields the time has arrived, and gone by, when scientific search should be instituted for hidden coalfields, and for a recapitulation of calculations on the basis of economically recoverable coal.

b. *Use of inferior coals and oilshales, peats and hydro-electric power.*

c. *Economies in use of bituminous coal.*

:-: EDITORIAL :-:

The Mineral Industry in 1919

The most important tendency of the year 1919 in regard to the mineral industry of Canada is the interest taken by American capitalists in our mineral deposits. Our trade relations with the United States have attained large dimensions, having increased from $559,000,000 in 1913 to $1,227,896,000 for the year ending March last. This increased intimacy, combined with the immensely wealthy status of the United States today and the discount on the Canadian dollar that makes purchases in Canada so advantageous to the United States buyer, is causing a projection of United States capital and business organizations into Canada that is without parallel in the history of the two countries. United States interests, moreover, have not been debarred from extra-territorial investments, as United Kingdom interests have been until very recently. For good or for evil it is certain that a large proportion of the war profits of the United States are being invested in Canada, and the mineral industry is receiving a good share of this investment.

Compared with 1918—a truly wonderful year—the production in Canada of the so-called "war minerals" such as copper, nickel, chrome, and in a lesser degree of zinc, lead, asbestos, will show a decline in 1919—but by no means such a decline as might have been reasonably expected under the circumstances. At the close of the year it has become evident that the arts of peace will cause a legitimate and salutary demand for metals such as nickel, copper, zinc and lead, and minerals like asbestos, with which Canada is generously—and in some instances preponderatingly supplied.

Gold mining has been hampered by labor shortage, and the difficulties of mining gold when the only remnant of the gold standard of monetary values is the fixed price of the metal itself. Some relief to the gild miners seems overdue. No tampering with the selling price of gold itself is possible without disaster, but relief from taxation and possibly some assistance in the form of a bonus may commend itself to government. The recommendations of the committee recently appointed by the Canadian Mining Institute to study this puzzling subject will be awaited with much interest.

Silver is today of much greater value than "the stones in Jerusalem" and is indeed of greater selling value than it has ever been since it was first appraised by Solomon the King. Silver at $1.33 per oz. means great prosperity for our silver mines, and it has the effect in practice of making lean ores rich—temporarily so, at all events. There is also the comforting probability—comforting to Cobalt, that is—that the prevailing high selling price of silver is not an ephemeral thing, but bids fair to continue until the world's credits once more inspire confidence. The high favor in which silver is held seems to be a reflex of the virtual disappearance of gold coin as a medium of ordinary commerce, and will presumably continue until the days return when gold coin circulates as it used to before the Germans let loose the wrath of men and the foolishness of kings.

The most disappointing thing about the year's mineral record in the coal production, which, notwithstanding all the lessons of the war, despite a premium of 10 per cent on New York funds, and the recent warnings of the Fuel Controller, actually showed a decline of 2½ million tons from the miserably inadequate figures of 1918. All cause for congratulation on the progress of Canada's mineral industry is offset by our failure to produce a reasonable modicum of our consumption of coal, and by a continuance of the expensive, demoralizing and totally unnecessary luxury of importing United States coal at an annually increasing rate.

It is reported the Canadian Manufacturers' Association has appointed a committee to enquire into the possibility of decreasing our coal importations by increasing Canadian production. This influential body could not have undertaken a more necessary duty, nor one likely to prove more beneficial to Canada if the subject is enquired into by competent persons. We would add that the supplying of Canada's coal needs for her own coal mines or from the coalfields of the United States is not altogether a matter of relative delivered cost of coal; it is not—as has been asserted—a purely economic matter. The matter has some economic bearings—in its effect on Canada's exchange credit and internal employment for example—but its importance lies chiefly in the fact that a country which unnecessarily depends upon a neighbor for an indispensable necessity of life and national growth may find itself in the humiliating position of a beggar, if indeed Canada is not already in that position.

In 1917 the Dominion Coal Company alone had a programme of seven millions tons per year. Twelve years later the whole province of Nova Scotia can produce but a little more than five million tons.

Alberta has more coal than any single state in the American union, and far more coal than the rest of Canada put together. Yet it is accounted a matter for congratulation when that province produces six million tons in one year, and even that really unsignificant production has not been maintained.

It cannot be demonstrated that either Nova Scotia or Alberta have ever supplied coal to that portion of Canada which comes within their proper sphere of distribution. There has never been in Canada any concrete exemplification of the desire of any government to expand the use of Canadian coal in Canada because it was a Canadian product.

Protective tariff have their uses, but we need something more than an expedient which merely serves to lessen some of the economic advantages possessed by the United States in the matter of coal importation into Canada.

We need an active interest in the national aspects of coal supply by our government—provincial and federal—some appreciation of the fact that if we do not develop our coal resources sufficiently at least to put us in a position of respectable national independence and defence there may some day be no necessity for these same governments, who will have been superceded by their economic—and therefore logically and ultimately—their political masters.

Until our domestic coal supply to some extent approximates to our industrial importance, our national fabric of finance and industry is an inverted pyramid, resting upon a development of our coal resources that is perilously inadequate—and so entirely inexcusable, because so entirely unnecessary.

The further utilisation of Canada's water-powers, the use of peat as a fuel. the use of the Souris lignites in gas-producers and other possible aids to the solution of one fuel problem are all matters of proper and even hopeful enquiry, but they can at their best be only partial aids, and the solution to the fuel problem will be found in the adequate development and the extension of the zones of distribution of the bituminous coals of Nova Scotia, Alberta and British Columbia.

The Armenian Mandate

Our esteemed contemporary, the "Engineering and Mining Journal" has had two editorials dealing with the proposal that the United States should take upon itself the mandatory supervision of Armenia. A convincingly large number of perfectly good reasons are given why the United States should not mix itself in that delightful hodgepodge of racial complexity and religious differences which centre around a region where tradition says that Noah undertook his preliminary post-diluvian prospecting. Our contemporary properly assesses the great difficulty of holding "the turbulent mountainous country of the Armenian republic and the wild republics between it and Russia." It is intimated that Britain has reaped such rewards from this war that she ought herself to assume the duty that the United States is counselled to avoid. The "Engineering and Mining Journal" says: "The situation is clearly nothing less than the result of a diplomatic move made by France and England—England, who as a result of this war has extended her flag over German Africa, Persia, Palestine and Mesopotamia, and much besides."

Why "England"? Living alongside us, a New York journal should know that there is a place called Canada which did its share in the war — and did it right early. And there are other nations, the Scots, the Irish, the Welsh, who are not properly included in the territorial term of England; and there is Australia, New Zealand, South Africa, India, and many many other places who sent their men to the ends of the earth to fight for England. Yes, but not more for England than for their own birthplaces. Does the belief still survive in New York that "England" is a grasping imperialistic entity, gifted with diabolical diplomatic ingenuity, who entered the war for what she could get out of it? It does not yet appear to have been understood in some circles that when Canadians fought in Palestine, Australians in Gallipoli and Mesopotamia, South Africans in German Africa, and New Zealanders on the Suez Canal, that a world miracle had taken place, and that "England" territorially considered, became but one nation among many.

The plea that the United States should avoid European entanglement because such entanglement may mean heavy responsibility, is unworthy of a nation that boasts itself today richer in money, greater in population and less impoverished and decimated by the recent war that any country that took part in it.

If the plea is entered that such responsibility should not be undertaken because the rewards are incommensurate, it conflicts with the oft repeated statement that the United States did not enter the war with any desire for territorial aggrandisement, but to make the world safe for democracy.

If the mandatory expedient is now found unsuitable, it might be enquired who suggested it?

As to the sacrifices made by the British peoples, we do not recollect that they are in the habit of advertising their losses, but they have been enumerated in moving words by citizens of the United States who

lived and worked, and in some cases, died, alongside our men.

We do not thing the "Engineering and Mining Journal" is quite fair in its appraisal of British aims, nor in its appraisal of the feeling of the majority of the citizens of the United States, who after all were a unit with Canada in the fight that ended in 1918, and can be trusted to assume that proportionate share of the burdens of world reconstruction—in some large European countries not even commenced—which will fall upon the shoulders of a populous, wealthy and idealistic people that counts itself not the least of the Christian democracies of the modern world.

DR. W. G. MILLER HONORED BY GEOLOGICAL SOCIETY.

Dr. W. G. Miller's many friends will be glad to hear of his election as Second Vice-President of the Geological Society of America at the Society's Annual Meeting held in Boston recently. Dr. Miller's reputation is one that is steadily growing, and his newest honor, combined with his selection as Canada's representative on the Imperial Mineral Resources Bureau, emphasise that the good opinion of Dr. Miller held by the mining profession in Canada, has now become an international one.

The Editor wishes the readers of the Canadian Mining Journal a happy and prosperous New Year.

If any of our friends and advertisers issue pocket-diaries, such as we remember in pre-war times, the Editor will be glad to receive one.

PERSONALS

Mr. E. P. Mathewson, who was in Toronto for some time as general manager of the British America Nickel Corporation, is now practising in New York as consulting metallurgist. His address is 42 Broadway. Mr. Mathewson is one of the leaders in his profession. He contributed largely to the success of the Anaconda Copper Co., by his work in Montana when he was in charge of the metallurgical works of the big company.

Mr. J. B. Tyrrell of Toronto is in London, England. He expects to return about the end of January.

Mr. F. C. Sutherland of Toronto has returned from London, England.

Mr. C. H. Hitchcock of Sudbury is spending the holiday season at Los Angeles.

Major Pelletier of the Overseas Development Company is at the Gabrielle Mine, Rice Lake District, Manitoba, making arrangements for the resumption of operations.

Mr. R. E. Hore has returned to Toronto after examining gold properties in the Rice Lake district.

Port Arthur Notes

Instructions have been received by the Mining Recorders throughout the northern districts of Ontario, from the Hon. Harry Mills, Minister of Mines, to extend for another year the relief against loss of forfeiture of rights, in the case of men interested in mining claims, who enlisted at home, or overseas. This relief has been continued from year to year since 1917, and now extends, in the case of men who have not yet obtained their discharge, until January, 1921.

The fact that we have no private assayers here is found to work great inconvenience, expense and hardship on prosecutors. The nearest assay office is at Winnipeg. It takes a week to get results from there. From Toronto, or Cobalt, it takes ten days. Express charges are high, and often prohibitory to the prospector. This tends to make samples too small to be representative or fair. Port Arthur is the centre of a vast and varied mineral field, extending for several miles, east, west and north.

A branch of the Provincial Assay Office here would not only be a boon in itself, but would immediately create a large volume of business. Prospectors that would not send samples to far distant points, at considerable expense, would gladly take them to such an office, hundreds of assays would be made, where none are made now, and the country would get the benefits of results. The equipment and housing would cost very little. It is more than probable that from the first the office would be self supporting. The list of economic minerals is long: iron, gold, silver, sulphur, molybdenum, zinc and copper, marls and clays.

The reported perfecting of a process for the manufacture of molybdenum high-speed steel, by Prof. John Oliver Arnold of Sheffield University, Eng., has caused considerable interest here, where several well known and valuable deposits of molybdenite are owned. These deposits are at Loon, and in Conmee township, near Port Arthur, at Jackfish, and at Long Lake, on the Canadian National Railway.

New Incorporations

Among the new mining companies recently incorporated are the following: Premier Gold Mining and Exploration Co., New Liskeard, Ont., with an authorized capital of $2,000,000, the incorporators being J. W. Elliott, A. A. Sproul, F. W. Ferguson; Federal Mining Co., Limited, Port Arthur, with an authorized capital of $40,000, the incorporators being F. S. Wiley, C. F. Gibbs and E. M. Turville; the Wachman Mining and Milling Co., Ltd., Dryden, Ont., with an authorized capital of $500,000, the incoporators being H. P. Cooke, R. H. Moore; the Iowa Canadian Mining Co., Limited, of Dryden, Ont., with an authorized capital of $40,000, the incorporators being H. P. Cooke, H. V. Cooke and R. H. Moore; the International Pyrite Company, Toronto, with an authorized capital of $1,000,000, the incorporators being C. A. Smith, A. H. Pace and J. G. Adair.

Princeton, B. C.

It is announced that the mining camp at Copper Mountain and the Mill Camp at Allenby of the Canada Copper Corporation will be closed down temporarily. Work at the mine and the mill is reported to have reached the point where little more can be accomplished before the completion of the railway from Allenby to the mine site.

The Mining Industry in the Province of Quebec in 1919

By THEO. C. DENIS.
Superintendent of Mines of the Province of Quebec.

Although it is too early to give definite figures of output regarding the mineral production of the Province of Quebec during the year which is coming to a close, everything points to an appreciable decrease as compared with 1918. From all appearances the diminution will bring the total value of the production to the vicinity of 16 million dollars instead of the 18¾ millions of the previous year.

Practically all the items which appeared in the list of production for 1918 will show decreases, with the exception of some of the structural materials. Several of these decreases will be very appreciable, particularly in the case of the so-called "war materials", such as pyrites, molybdenite, chromite, magnesite, quartz and silica, which all found applications in the manufacture of war materials. However on the whole it is believed that the Quebec Mineral Industry has felt the effects of after -war conditions less than most other parts of North America. The industrial and social unrest, which is now so marked throughout the world has been much less noticeable in our province, than perhaps anywhere else in Canada. There have been no general strikes, no undue exigencies on the part of labour. Troubles such as those which paralyzed, for various periods, the economic and industrial life in many parts of the world have not disturbed the comparative equanimity of the Quebec population. It is not easy to determine why the Province is freer of troubles during the critical period of readjustment to pre-war conditions, but one of the reasons is certainly the fact that the people of Quebec appear to have confidence in the judgment and the advice of the "directing" classes, and they seem to remain indifferent to the insinuative, and often plausible, urgings of theorists who have panaceas to bring about the advent of utopian conditions and of the millenium.

A Typical Vein Formation Near Lac de Montigny, Showing Interbanded Quartz With Schist and Granite. Total Width Mineralized Zone is Over 80 Feet.

Asbestos.

Reviewing the principal ones of our mineral products, it is gratifying to note that Asbestos has not suffered from the cessation of hostilitie, and that the figure of production for 1919, will not be greatly inferior to those for 1918, which was a most prosperous year, as the value of the asbestos shipped was nine million dollars. The value of the production for the first six months of 1919 was $4,471,359. Asbestos alone, for the last few years, has represented nearly half of our total yearly production, and all points to a continued prosperity, for the uses of this mineral are taking greater extension, and the mines are in excellent condition. With depth the contents of asbestos in the rock seem to increse rather than diminish; in 1918, the yield of asbestos per ton of rock mined was 117.3 lb., whereas in 1917 it had been 108.7 lb. Large reserves of serpentine have been blocked out, and on the whole the future of asbestos mining in the Province is very reassuring.

In the report of Mining Operations for 1918 mention was made of a discovery of asbestos in Gaboury township, east of Ville-Marie, in the district of Temiscamingue. A short examination of the occurrence was made by an officer of the Quebec Mines Branch, and it was found that there is the possibility of the existence of quite an important development of serpentine rock which in several places is asbestos bearing. The contact was followed for more than half a mile and it is probable that the serpentine extends over a length of a mile and a half or more, whereas the width could not be determined, the serpentine underlying a wide depression, of half a mile between the banks. Of course this can only be regarded as a potentiality, as it is some eight or nine miles from a highway and some 25 miles from Ville-Marie on Lake Temiscamingue.

Copper-Sulphur Ores.

The production of copper-sulphur ores, which item takes second place in our list of "Products of the Mines", did not fare as well. With the signing of the armistice the strenuousness of manufacture of explosives greatly relaxed, and Spanish pyrites reappeared on the United States market. The Eastern Township mines which produce ores used in the manufacture of sulphuric acid, the cinder of which is subsequently treated for the extraction of copper, keenly felt the reaction. The Eustis mine stopped hoisting in April, and was closed during the

greater part of the year. However the concentrating mill was kept running, at less than half capacity, on the old dumps. At the other mines, the Weedon, the Huntingdon, activities were greatly diminished.

Magnesite.

The Quebec magnesite industry, which obtained such a good start during the war, the production having advanced from a value of $2240 in 1914 to $1,016,764 in 1918, has had a much smaller year in 1919, as compared with the previous one. The operating companies took advantage of the quietness of the market to get ready to produce the dead-burned magnesite at lower costs. The Scottish Canadin Magnesite Company is completing a sintering plant at their Calumet quarry, and have stopped clinkering their product at the cement works at Hull. The latter makeshift entailed a haul of 70 miles for the crude magnesite, of two tons of the raw stone to produce one ton of dead-burned. In the future the dead-burned magnesite will be shipped from the quarry. The sintering plant, comprising crushers, ball mills, rotary kilns and accessories is built for a daily production of 70 tons a day of dead-burned. The North American Magnesite Company is also installing a 40 ton plant, at Calumet, which will be ready in three or four months. In the meantime they are continuing to produce dead-burned magnesite at the Montreal works of the Canada Cement Company.

The Quebec Magnesite has given eminent satisfaction to all the users, of which the list is very long. They comprise, among numerous others, the Carnegie Steel Co., Bethlehem Steel Company; Jones and Laughlin; Algoma Steel Company; Steel Company of Canada. It is regrettable that the U. S. House of Representatives has lately passed a bill imposing duties on magnesite entering into the United States, as follows:—crude magnesite ½c. per lb; calcined and dead-burned ¾c. per lb; brick ¾c. per lb; and 10% **ad valorem.** Although this tariff is not yet effective, owing to the U. S. Senate having postponed indefinitely the consideration of the bill, the measure hangs like a Damoclean sword over the Quebec magnesite industry.

Molybdenite.

The molybdenite production, in 1919, was only a small fraction of the previous year's. This substance which appears to have been strictly a "war-mineral" has keenly felt the effects of the cessation of hostilities. The molybdenum market is taking a long time to readjust itself to peace conditions. However, in the last two or three months, there has been a revival of interest shown in this metal, the rumor being that it had found new applications in the automobile industry.

Chromite.

The chromite industry has suffered much less than was anticipated. Three companies have operated during the greater part of the year, and have produced ore, improved their mining plants and methods and developed considerable ore reserves.

Upper Harricana Gold Area.

Prospecting and development work was carried on actively on the gold deposits of the Upper Harricana region in the Abitibi district. A small production of gold is reported. The field is very promising, and should, in time, become an important factor. Unfortunately gold mining under the present conditions, is not attractive to investors. Unlike all metals and other commodities, the price of gold remains fixed at $20.67 an ounce, while the cost of its production has increased to such an extent, owing to the raise in the cost of labour and supplies, that the margin of profit has considerably narrowed.

Zinc.

The Zinc Company, Ltd., operted their mine in Montauban, Portneuf county, throughout the year. They also reopened their oxide plant which had been closed down for a year and a half.

Further development work was done by the Federal Zinc and Lead Company, on their property in the region of the head-waters of the Cascapedia river. This field, which shows all the signs of becoming an important producer of lead and zinc, has been handicapped by the lack of transportation facilities. It is situated some fifty miles from the railway, and the only connection is a lumber road, which at certain seasons is quite impassable. This being remedied by the construction of a road, on which the company has a large gang of men working at present, which will be used for hauling ore by tractor. The Federal Zinc and Lead Company will erect a concentrator and a small lead furnace plant in the spring, and it is expected that shipments of ore and of pig-lead will begin within a year.

Building Mateials.

There has been a slight revival of activity in the production of building materials, but the figures for 1919, while showing an improvement as compared with the previous year, will still be below normal. This is due to the fact that the high price of labour and of supplies has greatly restrained building operations. However the need of new constructions, especially dwelling, is becoming acute, and although the cost of building may be forty per cent higher than before the war, it may be forecast that a period of great building activity is setting in and will continue for some time.

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*See description of this area in issue 15th Oct. 1919 p. 765, by Prof. A. Mailhiot.

SMELTING OF MAGNETITES.

Those who were present at a discussion on smelting British Columbia magnetites which took place at the concluding session of the C. M. I. meeting in Vancouver recently, may be interested in the following brief, but sufficient letter:

The Editor of Mining nd Scientific Press

Sir—In your issue of December 6 is a communication from F. H. Mason in which he says that "the bulk of the accessible ore on the Pacific Coast is magnetite, which cannot be reduced by ordinary blast-furnace practice without an addition of more reducible iron ore".

This is so diametrically opposed to the fact of furnace practice that it cannot be permitted to pass without denial.

DWIGHT E. WOODBRIDGE.

Duluth, December 8.

A Historical Review of the Silver and Gold Production of Northern Ontario

By J. A. McREA, Cobalt.

A Comparison of Gold and Silver Fields.

For the reason that silver was first produced in Cobalt in 1904, and that up to that time the province of Ontario had not been an important producer, it is perhaps well to deal only with Ontario's precious metal history beginning with 1904.

Thus, in dealing with the fifteen years just ended, these facts stand out conspicuously:—In 1904 the province of Ontario was not an important producer of precious metal. The output of gold and silver up to that time was a little or no consideration among the industries of the Province. The discovery of silver in Cobalt rapidly elevated the silver mining industry to one of first class importance and by 1911 the Cobalt camp reached the maximum output of 31,507,791 ounces during the year. Up to that time the gold output was decidedly small and in 1911 amounted to only $42,625.

It is a remarkable fact that in 1912, which year marked the downward trend in the production of silver in the province, the gold mining industry came into prominence by exceeding the million dollar mark for the first time in Ontario's history. Since that time, the decline in silver and gold mines amounts to approximately $25,000,000 a year.

During the part fifteen years the silver mines of Northern Ontario have produced approximately 303,724,172 fine ounces of silver valued at $181,570,561. The gold mines have produced 2,872,680 fine ounces valued at $59,389,508. The combined production of gold and silver from this district, during the fifteen years just ended amounts to 306,596,852 fine ounces valued at $240,960,069.

In analizing the present status of the precious metal mining industry in brief, I will turn first to the Cobalt and Gowganda districts and deal with the silver mines.

The Silver Mines.

During the year 1919 a total of 34 mines contributed to the silver output. Of these 30 were Cobalt companies, three Gowganda and one South Lorrain. The heaviest producer was the Nipissing with a record of close to 3,000,000 fine ounces. The total output of silver from the silver mines may be estimated at approximately 11,000,000 ounces for the year just ended, and having a value of about $12,210,000 owing to the product being marketed at an average of over $1.11 an ounce. For the purpose of comparison a table of figures is presented herewith. In reference to these figures it should be pointed out that the last summer's labor strike caused a total suspension of operations for 47 days at all the mines added to which was several weeks of lost time in putting the mines in shape to resume. This resulted in reducing the year's production by perhaps 2,000,000 ounces or about $2,400,000.

THE SILVER OUTPUT OF COBALT.

Year	Average Price of Silver	Ounces	Value
1904	57.2	206,875	111,887
1905	60.4	2,451,356	1,360,503
1906	66.8	5,401,766	3,667,551
1907	67.5	10,023,311	6,155,391
1908	52.9	19,437,875	9,133,378
1909	51.5	25,897,825	12,461,576
1910	53.5	30,645,181	15,478,047
1911	53.3	31,507,791	15,953,847
1912	60.8	30,243,859	17,408,935
1913	57.8	29,681,975	16,553.981
1914	54.8	25,162,841	12,765,461
1915	49.69	24,746,534	12,135,816
1916	65.66	19,915,090	12,643,175
1917	81.41	19,401,893	16,131,013
1918	96.78	18,000,000	17,400,000
1919	111.29	11,000,000	12,210,000
Grand Totals		303,724,172	$181,570,561

In the order of their importance, the present prooducing silver mines are the following, it being kept in mind that some of the mines are producing almost an equal amount of silver and that they are difficult to classify with exactness:—

Nipissing Mining Corporation, Kerr Lake, O'Brien, Coniagas, McKinley-Darragh, Miller Lake O'Brien, Temiskaming, Beaver, Crown Reserve, La Rose, Trethewey, Hudson Bay, etc. Other properties from which a limited amount of silver was produced during the year includes the Peterson Lake, Silver Cliff, Foster-Cobalt, Adanae, Chambers-Ferland, Right of Way, Edwards and Wright, Pittsburgh-Lorrain, Keeley, Reeves-Dobie, etc. A number of other properties were opened up during the year, including the Nipissing Extension (formerly the Farah property) and the Lumsden.

Everything considered, there is more activity at present in the silver area of Cobalt as well as Gowganda and Elk Lake than for a good many years. That production during 1920 will be well maintained appears to be quite certain; particularly so provided the current high quotations for silver continue.

Outstanding Developments.

Developments of importance during the year include the followings:—During the first half of 1919 the Nipissing encountered an exceedingly rich shoot of ore in the "Little Silver" vein. At the Beaver Consolidated, considerable high grade ore was encountered, as well as a large amount of mill rock, and the management has decided to begin at surface and work the mine all over again. On the rown Reserve a high grade discovery was made early in December which promises to yield about $140,000 in addition to current production from mill rock. The Temiskaming also encountered a number of high grade ore shoots. These developments among others helped to strengthen the physical condition of the camp as a whole.

Important Transactions.

During the year the Mining Corporation of Canada purchased a controlling interest in the Buffalo Mines. The Northern Customs Concentrator Company purchased that part of the Chamber-Ferland Mine lying east of the railway. The Northern Customs also secured a lease on the Silver Cliff and operated the property successfully. The Mining Corporation during the last quarter of the year purchased a lease on the Foster-Cobalt property. The Lumsden mine was purchased by C. L. Campbell of Montreal and arrangements are being made to develop it. The old Farah property was taken over by the Nipissing Extension and is being worked. In the Gowganda field the Castle property of the Tretheway Company produced encouraging quantities of high grade ore.

THE GOLD MINES

On the Eve of the Gold-Mining Era in Northern Ontario

Everywhere in Ontario where gold mining has reached important proportions there is manifest a degree of optimism greater than ever before in the North.

As a result of the magnitude of the developments recorded, enthusiasm, well justified and permanent has been created. The year 1919 has marked the period of readjustment. In that time the gold mining industry has regained its pre-war status, even exceeding it. The output for 1919 is estimated at $10,500,000, which is the highest record in Ontario's history.

And now, as 1920 comes in, and it is found that the gold mines in the aggregate have ore reserves amounting to around $100,000,000 actually in sight and with untold millions in potentialities; the careful observer is compelled to confess to a genuine thrill at the immensity of the gold mining industry.

From the forest fastness in which ten years go it was not known that commercial gold ore bodies occurred, there is at present being produced a steady stream of yellow metal, now estimated at at least a million dollars every thirty days and steadily increasing in volume. According to the trend of developments the year 1920 is expected to result in something like $14,000,000 being produced, and this record to be still further increased before the maximum is reached.

The producing gold mines of Northern Ontario include the following:—Hollinger, Dome, McIntyre, Lake Shore, Kirkland Lake, Teck-Hughes, Dome Lake, Davidson and Argonaut. The dividend payers include the following: Hollinger, Dome, McIntyre, and Lake Shore.

In addition to the above producing mines, the following is a fairly complete list of the other gold mining operations:—Wright-Hargreaves, Ontario - Kirkland, Canadian-Kirkland, Clifton-Porcupine, Associated Goldfields, Miller Independence, Kennedy-Boston, Peerless, Boston-McCrea, Bourke's Mines, Murray-Mogridge, Gold Reef, Keora, Big Dyke, Northwoods, Gold Centre, Skead Gold Mines, Catherine Gold Mines, Matachewan Gold Mines, Nelson property, Robb-Clemens, etc. This summary is not inclusive of the West Shining Tree district where considerable activity is taking place.

The dividend record of the gold as well as the silver producing mines follows, and offer some idea of the magnitude of the net profits being realized. It will be noted that with total production of $240,960,069 in gold and silver produced during the past 15 years, upwards of $100,000,000 has been paid in dividends. Of the total production the silver mines accounted for $181,570,561 while the gold mine produced $59,389,508. By the middle of the current year the total output of gold and silver from the Northern Ontario mines will have exceeded a quarter of a billion dollars. The dividend record follows:—

THE SILVER MINES.

Company	During 1919		Total
Nipissing Mining Co.	$1,800,000	.....	$20,340,000
Coniagas	300,000	.....	9,540,000
Kerr Lake	840,000	.....	8,850,000
La Rose	.....	.....	7,221,433
Crown Reserve	.....	.....	6,190,847
McKinley - Darragh	269,723	.....	5,639,258
Mining Corporation	622,618	.....	4,876,316
Buffalo Mines	350,000	.....	2,637,000
Temiskaming	.....	.....	2,075,000
Hudson Bay Mines	.....	.....	1,940,250
Seneca Superior	.....	.....	1,582,211
Trethewey - Cobalt	.....	.....	1,151,998
Cobalt Townsite	.....	.....	1,042,259
Beaver Consolidated	.....	.....	650,000
Wettlaufer Silver Mines	.....	.....	637,465
Cobalt Lake	.....	.....	465,000
Peterson Lake	.....	.....	462,036
Right of Way Mining Co.	.....	.....	325,644
Silver Queen	.....	.....	315,000
Cariboo - Cobalt	.....	.....	275,000
Right of Way Mines	.....	.....	265,038
Penn - Canadian	.....	.....	256,443
Casey - Cobalt	.....	.....	203,249
Cobalt Central	.....	.....	192,845
City of Cobalt	.....	.....	139,324
Aladdin - Cobalt	.....	.....	50,000
Closed Corp. (estimated)	700,000	.....	3,700,000
Grand Totals			

THE GOLD MINES.

Company	In 1919		Total
Hollinger Consolidated	$1,720,000	.....	$15,476,000
McIntyre - Porcupine	541,542	.....	1,624,627
Dome Mines	100,000	.....	1,600,000
Porcupine Crown	.....	.....	780,000
Tough - Oakes	.....	.....	391,123
Lake Shore	100,000	.....	200,000
Rea Mines	.....	.....	12,000
			$20,083,752

GRAND TOTALS.

	1919		Total.
Silver Mines	$4,882,341	.....	$81,003,616
Gold Mines	2,461,542	.....	20,083,752
	$7,343,883	.....	$101,087,368

In addition to the foregoing, the following dividends were declared in December, payable during the opening month of 1920, and which figures bring the grand total up to $102, 135,013 in dividends from silver and gold mines:—

Dividends declared in Dec. 1919, payable in January 19200:—

Nipissing	10 %	.....	$600.000
Temiskaming	4	.....	100,000
Dome Mines	2½	.....	100,000
McKinley - Darragh	3	.....	67,430

The Position of Manitoba in the Mining Industry

By R. C. WALLACE, Commissioner for Northern Manitoba.

Until the year 1912 agriculture was the only industry in the Province of Manitoba which attracted attention within the Province or without.. The Province had been settled by a population which was attracted in the first instance by the magnificent soils of the Red River Valley and which later scattered into Southern Manitoba and into Northwestern Manitoba where equally rich soils were discovered and cultivated. Because of this resource and because of its strategic position as a distributing centre, the City of Winnipeg had rapidly grown up to serve as a nucleus and stabilising factor to the agricultural industry of the Province and the West. The addition, in 1912, of a very large territory extending to the Sixtieth Parallel of latitude and to the Hudson Bay, attracted the attention of latitude and to the Hudson Bay, attracted he attention of the people in Manitoba to the possibilities of resources other than agriculture. As Manitoba is now constituted it is unlikely that more thon two-fifths of the total area will be productive from the point of view of agriculture. The possibilities of the remaining three-fifths are mainly in mineral wealth, more particularly in gold, copper, silver, lead, zinc and iron.

The Rice Lake District.

Immediately before the extension of the boundaries of the Province, in the latter part of 1911, there was discovered within the older part of the Province and east of Lake Winnipeg, in the district which is now known specifically as the Rice Lake district, quartz veins carrying high values in gold. As this area is not more than a hundred miles distant from Winnipeg, interest became keen, prospecting was active, and many other veins were discovered in the same area. Development work was continued until the outbreak of war but this work was seriously hampered by the transportation difficulties, which are, in Northen Canadian Territory, always serious, but in this particular case more formidable than usual. Notwithstanding this a great deal of work was carried on, machinery was shipped in over the ice in winter, and in all some eight or ten properties were developed to the hundred-foot level. With the outbreak of war work practically ceased. It is true that prospecting went on more or less intermittently during the four years of war and the area extended from Rice Lake to Gold Lake, Long Lake, Long Lake and northwards into the Hay Lake country. In this latter area discoveries were made of a somewhat different type which gave promise of proving up more extensive ore-bodies than can normally be expected where quartz veins are the typical carriers of the gold ores. Since the conclusion of war, however, interest in this area has immediately come back and there are to-day mining companies representing fairly large holdings which are making arrangements for continuation of mining on properties already partially developed or for the underground prospecting of new properties. With this there will be a united effort to obtain some means of transportation which may be available both summer and winter. At the present time practically all the heavy supplies and machinery are sent in over the winter road to camps. In Summer it is necessary to transport in part over Lake Winnipeg and in part by the Bad Throat River or the Hole River, on either or which several portages have to be encountered. A serious endeavour will be mde to obtain from the Government authorities a summer road so that it may be possible without delay to reach the district in either summer or winter and to transport into the district the freight and supplies which under the best of management, cannot be entirely looked after during the winter season. Much interest is being taken in the development work which is now being planned throughout the whole area.

Northern Manitoba.

In 1914 another area, (in this case within what is strictly known as Northern Manitoba, that is, the new territory added to the Province in 1912) was opened up. The building of the Hudson Bay Railway northeasterly towards the Bay, attracted prospectors into a belt of greenstone lying directly north of The Pas and some sixty miles distant from that centre. On the eastern end of this belt there was discovered at Herb Lake, quartz veins carrying high values in gold. Again in 1915 a discovery was made in the western extremity of the belt within Manitoba and in fact practically on the boundary line of a large low-grade deposit of copper of mixed sulphides of copper, iron and zinc. The significance of this discovery was soon realized and a large amount of money has been spent during the subsequent years in diamond drilling the Flin Flon property with the result that twenty million tons of ore, averaging approximately ten dollars under present prices of silver and copper, has been blocked out. Immediately after the discovery of this property and within a distance of three and a half to four miles. another property was discovered containing a lens of very high-grade copper ore. This was taken over by the Tonopah Mining Company of Nevada, and the Mandy Mine, as it was named, was operated under a subsidiary company and has already produced copper to the value of $2,500,000. This copper was transported forty miles by team, a hundred and thirty miles by barge and twelve hundred miles by railway to the Trail Smelter at British Columbia. Notwithstanding the heavy expense connected with this method of transportation, the ore, which averages over 18 per cent in copper, returned handsome profits to the operators. On the larger property, the Flin Flon, negotiations are proceeding with an Amerien corporation and it is expected will be concluded in 1920. Owing to the heavy capital expenditure, including the erection of a two-thousand ton smelter on the property, negotiations, as may be expected, proceed somewhat slowly and only after full details have been obtined on the property and on all matters connected with its operation. When the deal is completed a railway will be built from The Pass to the property, seventy-five miles along, and stimulus will be given to the development of all the properties in the district. In the Herb Lake area after the initial discoveries of gold on one property, the Rex, after machinery had been installed ore was milled and bullion to the extent of $27,500

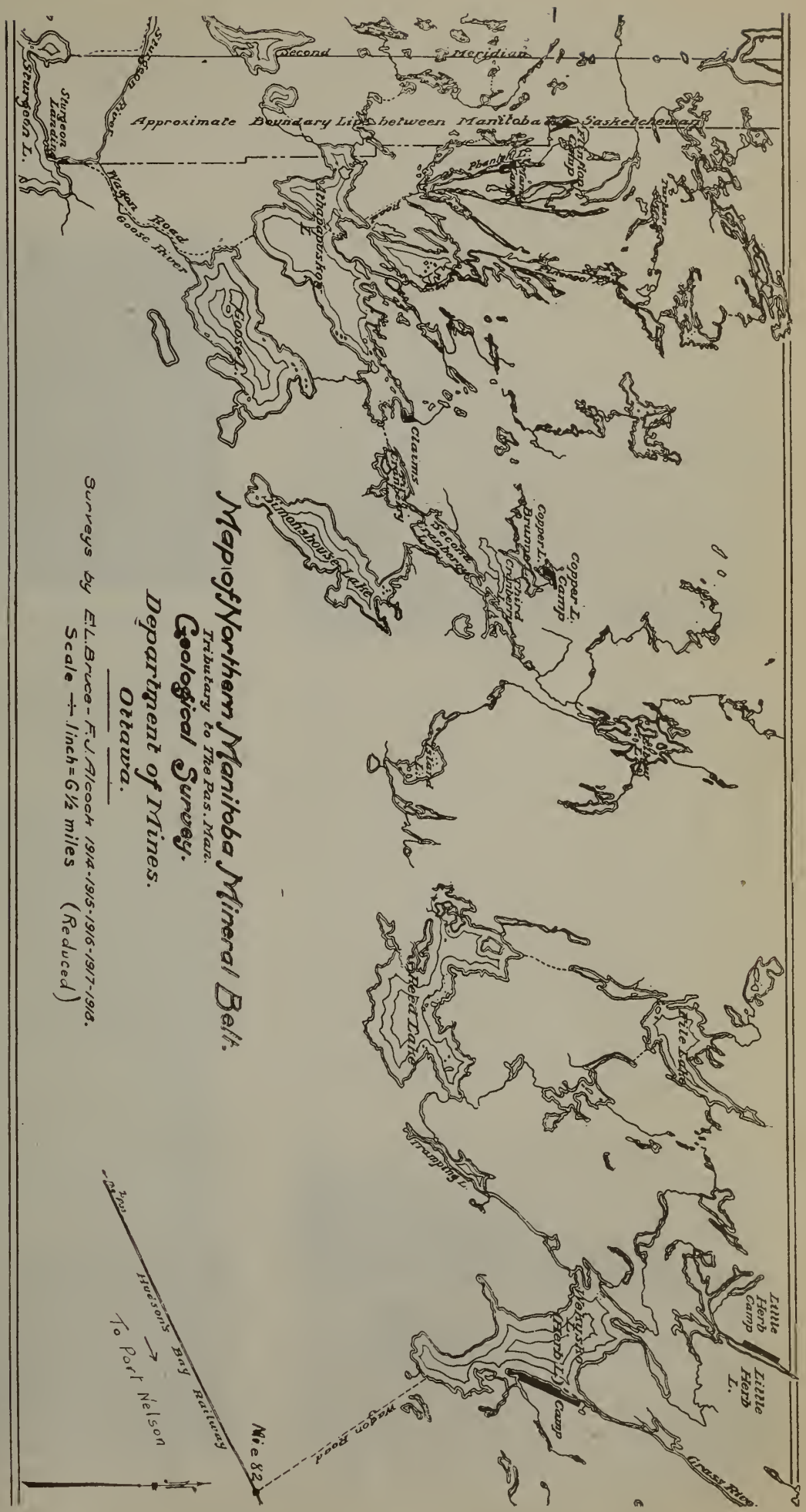
was extracted before it was necessary to close down owing to untoward labour conditions and the influenza epidemic. Here also, and in the Copper Lake district in the centre of the area, several properties will be developed during the winter. A rather sensational discovery of gold in the Copper Lake area attracted the attention of practically the whole mining world to this mineral belt during last summer.

Other Mining Activities of Manitoba.

There are other areas throughout the Province where prospecting has been done and there are places where mining machinery has been erected. In the Star Lake district immediately east of Winnipeg where a certain amount of development for gold was carried out prior to the War, molybdenite and scheelite were discovered during the time of the war and development would have reached the stage of production had not the conclusion of the War seriously affected the prices of molybdenite and tungsten. Immediately north of Lac du Bonnet and some forty miles south of the Rice Lake district there are indications of ore bodies sufficiently rich in copper and in nickel to be operated at a profit. When the Hudson Bay Railway is extended to the Bay a very large territory will be thrown open on the west coast of Hudson Bay as far north as Chesterfield Inlet, to the prospector and mining companies.

Structural Material.

For several years before the discovery of the precious metals in Manitoba, the staple structural materials had been mined and had found a ready market. The Manitoba building stone, which is quarried thirty miles east of Winnipeg, is recognized to be one of the



superior building stones of Western Canada and has been used practically from Coast to Coast. The gypsum deposits from the north-east shore of Lake Manitoba supply a market of the three Prairie Provinces and there are reserves sufficient for the needs of the next hundred years. A Portland cement industry was established several years ago, the raw materials being obtained from the eastern shores of Lake Manitoba and from the clays in the neighborhood of Winnipeg. The manufacture of brick was an industry of very considerable importance and widely distributed throughout the Province, both surface clays and under lying shales being utilized as raw materials. There is no doubt that during the next few years there will be a very insistent demand for building and structural materials and there is no doubt that these industries, which were naturally severely affected by war-time conditions, will flourish to an extent unknown before the War.

The results of investigation, prospecting and mining during the last seven years are reflected in the changed attitude of the Country in general and of the mining world in particular, to the Province, hitherto unknown to mining men, the Province of Manitoba is now looked upon as one of the great possibilities during years of rapid expansion and exploitation which now face the industrialist and the financial man.

MANITOBA CORRESPONDENCE

Transportation

The revival of interest in the Rice Lake district, Manitoba, brings up again the transportation problem. The gold discoveries are in the area east of Lake Winnipeg, a portion of Manitoba that has no railways. At present the only feasible way to take in supplies and machinery is by teaming over the winter roads. There are two routes. The shorter one, by Fort Alexander, has not yet been put in shape for use, but is commonly regarded as the preferable one. The few teams that went to the mines in December hauled supplies from Riverton and Manigotogan.

Riverton is at the north end of a branch line of the C.P.R. on the west side of Lake Winnipeg. From here there is an excellent sleigh road across the lake to Manigotogan via Hecla, about 40 miles. From Manigotogan to Gold Lake there is a road through the forest. This road is about 36 miles long and is good for the greater part. It is unnecessarily long, however, and a better shorter road will probably be cut out when the various parties interested get together.

The road via Fort Alexander to Gold Lake is much shorter than the Manigotogan route. Owing, however, to the unusually heavy early snowfall the muskeg portions have proved a great obstacle, as the muskeg does not freeze readily under the snow. In consequence the road has not been passable for teams during December, although in excellent shape for dog trains. When the Fort Alexander route is in use the

Prospectors at Rice Lake, N. Man.

Canadian National Railway branch line to Victoria Beach will be used to reach the district. A 14-mile winter road connects Mile 69 on the C.N.R. with Fort Alexander, a Hudson Bay port. From the Fort to Gold Lake is 44 miles. Once the muskeg is frozen this should be an excellent winter road.

Gabrielle

It is expected that development work will soon be resumed at the Gabrielle Mine, Rice Lake. Mr. J. B. Tyrrell of Toronto examined this property a few months ago and reported that the veins examined deserve careful and thorough exploration. He has recommended that the two shafts be deepened to 100 ft. His sampling of surface exposures showed ore of good width and value. Major Pelletier is at present at the property getting necessary information in preparation for the work to be done.

On the Winter Road to Rice Lake, N. Man.

The Gold Pan Mine, Rice Lake, N. Man.

Gold Pan

The Gold Pan workings have been pumped out and one machine is in operation. Mr. Gordon McTavish, secretary of the operating company, visited the property recently. The Gold Pan has some very rich ore in the vicinity of the shaft. This shaft is 265 ft. deep, and the vein looks well in the lower workings. Development to date has all been close to the shaft.

Pan Extension

The Pan Extension Gold Mines Co., Ltd., has raised funds which will enable the company to proceed at once with development work on the properties near the Gold Pan Mines. Machinery for shaft sinking has been purchased and arrangements are being made to take in supplies and commence work. Mr. J. A. Borthwick has been appointed superintendent and he will leave Winnipeg shortly for the property, where work on the construction of the necessary camp buildings will be begun as soon as possible.

Turtle Lake

During the past summer a number of discoveries were made in the vicinity of Turtle Lake, a few miles west of Gold Lake. Arrangements have been made for the development of some of these claims.

New Companies Formed

The Mammoth Mining Corporation, Ltd., capitalized at $5,000,000, has applied for a charter for operating in Manitoba mining areas.

The Bonanza Mining Corporation, capitalized at $2,500,000, has applied for a charter. The applicants are interested in properties in the vicinity of Little Rice Lake.

Panning Gold at Rice Lake.
"The pure quill."

The Marigold

The Marigold Gold Mining Co. will begin work shortly on its claims in Rice Lake District. This company has five claims: The Marigold, Gold Fly, Gold Star No. 1, Antique and Ione. Most of the prospecting work so far done has been on the first two claims.

Northern Manitoba Mining and Development Co.

This company's property consists of five claims adjoining the Rex property in the Herb Lake district, Northern Manitoba. It is 21 miles from mile 82 on the Hudson Bay Railroad. There is a wagon road of 11 miles to the lake. Boats are used for the remaining 10 miles.

"The Cook and the Mate and the Captain bold, and the Crew of the Brooklyn Mine" Rice Lake, Man.

There is a shaft 125 feet deep and the vein is said to continue strong and well defined at that depth. Arrangements have been made for the cutting of wood for fuel and mine timber this winter and mining and milling machinery will be taken in early in 1920. The North Canada Exploration Co. of Winnipeg has undertaken the financing of the company and will equip, develop and manage it. The Exploration Company has agreed to spend $60,000 on the property.

The directors of the Northern Manitoba Mining Development Co. are: Robert Kerr, president; Major A. Bingham, H. S. Johnson, J. P. Gordon, W. H. Bunting, G. R. Bancroft and C. B. Morgan.

The directors of the North Canada Exploration Co. are: J. F. Caldwell, president; W. F. Hull, Ward Hollands, Capt. George B. Hall, Richard Bingham, T. E. Redman and Robert Kerr. C. W. Chappell is secretary and treasurer.

RIP VAN W. AWAKENING

The east is awake! The evidence say you? Here it is; fresh from the page of the Canadian Mining Journal, a sane and reputable organ not given to exaggeration or brain storm: "The growing importance of Manitoba is reflected in the rise of the combined curve of the Prairie Provinces and the Yukon, but the scale is too large to show how Manitoba is making up for the falling off in the Yukon gold production." This estimable journal then goes on to say: "We venture to forecast that some day the value of the coal production of Alberta alone will exceed the value of the mineral production of any other single province of Canada, unless maybe, it shall be British Columbia." Thus the west cometh into its own.—Manitoba Free Press.

COAL OUTPUT DURING 1919.

By JOHN McLEISH.

Chief of the Dept. of Mineral Statistics, Ottawa, in the Toronto "Globe".

Canada's coal production during 1919 has probably been about 13,000,000 tons. This is rather disappointing when compared with the 1918 figures, for it shows a reduced output of about 13 per cent. Strikes chiefly, also lack of tonnage for the transportation of coal, thus cutting down the market, together with minor causes, have been responsible for the falling off. Another noteworthy feature of the year's showing is that Alberta, which in 1918 wrested from Nova Scotia the laurels for production, slumped badly during 1919. Indeed at the end of October it had only produced seven-tenths as much as the Province by the sea, and the indications were that this ratio of loss would be pretty well maintained until the end of the year.

This reduction in output is disappointing for the further reason that during the war, and in spite of the fact that thousands of experienced miners were overseas, the production of coal advanced steadily, as the following figures show:

	Tons.
1919	13,637,529
1915	13,267,023
1916	14,483,395
1917	14,046,597
1918	14,979,926

Of course it was the increased production in Alberta that made this possible, the output in that Province having gone from 3,683,015 tons in 1914 to 5,-927,816 tons in 1918.

A Serious Loss.

The effect of a loss of at least 2,000,000 tons on the year's coal production was a serious matter, and the resulting situation was accentuated by the strike among the bituminous coal miners in the United States. Last year, even with a production of practically 15,-000,000 tons, Canada had to import over 21,000,000 tons during the financial year that ended on March 31st, 1919.

The appended tables tell the story of the year's production, and they contrast it with the production for 1918:

MONTHLY PRODUCTION OF COAL IN CANADA BY PROVINCES, 1919.
(Short Tons.)

Month.	N.S.	N.B.	Sask.	B.C.	Alta	Total Canada.
January	503,152	21,674	27,877	240,199	491,247	1,284,149
February	407,122	15,999	23,900	182,454	419,335	1,048,810
March	421,696	13,800	25,975	209,524	497,673	1,168,668
April	457,237	12,359	15,829	183,635	318,554	987,614
May	453,338	11,796	18,409	181,003	264,260	928,806
June	434,029	12,641	19,024	124,098	40,596	630,388
July	462,471	13,179	17,839	151,024	55,045	699,558
August	478,561	14,936	22,016	164,501	146,585	826,599
September	498,703	12,834	30,042	226,096	499,014	1,209,709
*October	537,947	14,471	30,000	245,000	579,500	1,406,918

* The Alberta and British Columbia returns are based on carefully-prepared estimates.

MONTHLY PRODUCTION OF COAL IN CANADA BY PROVINCES, 1918.
(Short Tons.)

Month.	N.S. (b)	N.B. (b)	Sask. (c)	B.C. (c)	Alta	Total Canada.
January	506,961	24,004	37,890	242,767	610,439	1,422,061
February	435,926	22,155	41,182	216,657	468,738	1,184,658
March	441,771	25,388	18,119	227,472	427,251	1,140,001
April	463,065	22,953	16,331	223,359	386,831	1,112,539
May	473,504	23,624	21,947	227,361	418,811	1,165,247
June	380,857	23,783	23,480	229,288	503,312	1,260,720
July	489,395	18,886	29,266	227,467	550,782	1,315,796
August	516,218	28,611	24,433	231,200	558,374	1,361,736
September	494,113	24,277	25,899	147,689	537,593	1,229,571
October	586,904	18,064	31,706	211,548	555,502	1,403,724
November	478,584	17,806	38,616	176,616	444,372	1,155,892
December	451,264	18,661	38,080	207,165	510,811	1,225,981
Totals	5,818,562	268,212	346,847	2,568,589	5,972,816	*14,977,926

* Includes 2,900 tons produced in the Yukon district.
(b) Bituminous. (c) Lignite.

MINERAL PRODUCTION IN CANADA DURING 1919 WITH A COMPARISON OF PREVIOUS YEARS

Compiled from the records of the Division of Mineral Resources and Statistics, Ottawa. 1919 figures approximate.

	1913	1917.	1918	1919.
Coal short tons	15,012,178	14,046,759	14,997,926	12,500,000
Gold value in dollars	$ 16,598,923	$ 15,272,992	$ 14,463,689	$ 16,275,000
Silver—ounces	31,845,803	22,221,274	21,383,979	13,500,000
Copper—pounds	76,976,925	109,227,332	118,769,434	81,500,000
Nickel—pounds	49,676,772	84,630,280	92,507,293	43,000,000
Lead—pounds	37,662,703	32,576,281	51,398,002	50,000,000
Zinc—pounds	7,069,800	64,655,713	38,083,175	38,000,000
Pig Iron—short tons			1,195,551	920,000
Steel Ingots and Castings	1,128,976	1,170,480	1,873,708	1,020,000
Electric Furnace Steel (included in above)		13,691	119,130	(?)15,000
Total Value of Mineral Production in Canada—not a total of foregoing figures	$145,634,812	$189,646,821	$211,301,897	$167,000,000

Mining in British Columbia During 1919

By Our Victoria Correspondent

A Year of Preparation for the Future

One of the Provincial Government Mining Engineers, in commenting on the progress of the mining industry in British Columbia during 1918, observed that, from the viewpoint of production, it was a period of "marking time," but, if looked at with an eye to the future, "it had been one of the most eventful and encouraging twelvemonths in the history of the Canadian Northwest."

This about sums up the situation. From figures available from the various producing properties for part of the year there can be no doubt that in respect of most of the chief economic metals there has been a distinct shrinkage as regards output. It is possible that the estimates made of the production from the last date on which authentic statistics were to be obtained to the end of the year will be proven at fault. Consequently it is not improbable that final information will not indicate so considerable a decline in the production of gold, silver, copper and lead.

It is unnecessary to more than draw attention in passing to the world's market conditions as compared with those of the previous year as unquestionably having been responsible, in a large degree, for the 1919 results. These, however, were augmented by local occurences having the effect of retarding production. As to copper, it need only be said that the Phoenix Mines and the Grand Forks Smelter were closed entirely by the Granby Consolidated Mining & Smelting Co. some months ago. To this may be added that the same Company, the largest copper producer of the Province, owing to labor troubles and for other reasons, is estimated to have turned out nearly 10,000,000 lbs. less of the metal at its Anyox plant. When the war ended the Consolidated Mining & Smelting Company had a surplus of lead so that it is not surprising that a material drop in the quantity of the output is indicated. There is some satisfaction, under the circumstances, in being able to show that the East and West Kootenays, evidently, have topped the 1918 mark substantially in regard to the zinc output. It is to be noted, however, that the Sullivan Mines, the greatest single zinc producer of the Province, still is limping along as the result of a strike of its miners and it is possible that this will to some extent upset calculations.

With reference to the precious metals, while the outlook is bright as to silver, the opening of the Salmon River Section of the Portland Canal District, where is situated the Premier Mine, being sure to be felt next year, the returns thus far received do not reflect the general revival of interest in all properties carrying this metal. The chief cause of this is found in the situation in the Slocan Mining Division, where the Standard, which has been shipping only zinc concentrates, to instance one of several properties, has ceased production. The withdrawal of this large producer, and of others of the area, from the actively producing class has not been neutralized in its effect by the contributions of the new northern section, as yet comparatively small, or by those of scattered but numerous small shippers, which are starting in a small way throughout all the mining districts, the incentive, of course, being the high price of silver. Of gold it is sufficient to say that the handicap confronting those engaged in its production elsewhere applies with equal force in British Columbia, although, notwithstanding high costs, more placer ground is being taken up in the Cariboo and in little prospected parts of the Far North, and there is lode mine development underway of a promising nature in several districts.

Generally 1919 does not appear to have been a record breaker by any means as to production. It has, however, been exceptional in the interest displayed in mining; in the development that has been initiated with splendid results; in the discovery of a new mineralized zone having rare possibilities; and in the encouragement the year's achievements have given all interested in the industry. The fact that the production seems to have dropped is forgotten in contemplation of the sure foundation that is being laid for the future.

Estimate of Total 1919 Production of B. C. Minerals

(Exclusive of Coal)

An estimate of the Mineral Production of the Province of British Columbia for 1919, with that of 1918 for comparative purposes, is subjoined:

	1918	1919	Comparison
Gold oz.	180,674	150,050	30,624 (dec.)
Silver oz.	3,498,172	3,261,267	236,905 (dec.)
Copper lb.	61,485,754	46,546,815	14,936,939 (dec.)
Lead lb.	43,899,661	17,804,470	26,095,191 (dec.)
Zinc lb.	41,772,916	43,649,700	1,876,784 (inc.)

Estimate of Mineral Production by Districts

Estimated production for 1919 and comparison with that of 1918 by districts as defined by the Mineral Survey & Development Act:

No. 1: Comprising the Mining Divisions of Bella Coola, Queen Charlotte, Skeena, Portland Canal, Naas River, Atlin, Stikine and Liard. George A. Clothier, Government Mining Engineer.

	1918	1919	Comparisons
Gold (placer) Atlin and Liard Mng. Divisions	$ 219,000	$ 189,000	$ 30,000 (dec.)
Gold (lode) oz.	47,993	59,729	11,736 (inc.)
Silver oz.	415,280	905,685	490,405 (inc.)
Copper lb.	30,198,782	20,670,685	9,528,097 (dec.)

No. 2: Comprising the Mining Divisions of Omineca, Quesnel, Cariboo and Peace River. J. D. Galloway, Government Mining Engineer.

	1918	1919	Comparison
Gold oz.	5,385	5,700	315 (inc.)
Silver oz.	84,125	90,000	5,875 (inc.)
Lead lb.	123,568	100,000	23,568 (dec.)
Copper lb.	643,843	12,000	631,843 (dec.)
Zinc lb.	313,112	300,000	13,112 (dec.)

No. 3: Comprising Mining Divisions of Clinton, Lillooet, Kamloops, Ashcroft, Nicola, Vernon and Yale. R. W. Thomson, Government Mining Engineer.

	1918	1919	Comparison
Gold oz.	3,288	3,200	88 (dec.)
Silver oz.	negligible	6,600	6,600 (inc.)
Copper lb.	531,000	520,000	11,000 (dec.)
Magnesium Sulphate tons	150	650	500 (inc.)

No. 4: Comprising Mining Divisions of Grand Forks, Osoyoos, Greenwood and Similkameen. P. B. Freeland, Government Mining Engineer.

	1918	1919	Comparison
Gold oz.	53,654	33,000	20,654 (dec.)
Silver oz.	227,244	203,000	24,244 (dec.)
Copper lb.	9,940,125	3,990,000	5,950,125 (dec.)
Lead lb.	47,738	34,500	13,238 (dec.)
Fluorite tons	170	650	480 (inc.)
Limestone tons	2,000	16,300	14,300 (inc.)

No. 5: Comprising the Mining Divisions of Golden, Windermere, Fort Steele, Revelstoke, Lardeau, Ainsworth, Slocan, Slocan City, Trout Lake, Nelson, Arrow Lake and Trail Creek, generally referred to as the East and West Kootenays. A. G. Langley, Government Mining Engineer.

	1918	1919	Comparison
Gold oz.	51,020	35,771	15,249 (dec.)
Silver oz.	2,650,918	1,945,982	704,936 (dec.)
Lead lb.	43,728,355	17,669,970	26,058,385 (dec.)
Copper lb.	1,685,299	1,354,130	331,169 (dec.)
Zinc	41,459,804	43,349,700	889,896 (inc.)

No. 6: Comprising the Mining Districts of Alberni, Clayoquot, Quatsino, Nanaimo, Victoria, Vancouver and New Westminster.

	1918	1919	Comparison
Gold oz.	5,565	3,200	2,355 (dec.)
Silver oz.	116,425	110,000	6,425 (dec.)
Copper lb.	18,475,013	20,000,000	1,524,987 (inc.)

All of the above for 1919 is production of the Britannia Mines, Ltd., Howe Sound.

Approximately 600 tons of Manganese Ore has been shipped from the "Hill 60" property, near Cowichan Lake, Vancouver Island.

Coal Production During 1919—Slight Decline—Due to Labor Troubles

The coal production for the Province of British Columbia for 1919 is expected to show a decline of approximately 94,640 tons, the total for this year being estimated as being approximately 2,412,548 tons, as compared with 2,578,724 tons in 1918. In glancing at the figures which, it should be remembered, are made up of a combination of what is known of the output of the various collieries up to the end of the month of October and an estimate of that of November and December, it will be found that the collieries of Vancouver Island are the only ones which show an increase, with the exception of the Telkwa Colliery, northern British Columbia, the production of which is inconsiderable. This result is the more satisfactory in view of the fact that the larger companies lost considerable time during the Summer for various reasons and that one of the mines of the Canadian Western Fuel Company was closed down for a period. While the increase was not great, about 32,459 tons, it indicates that the trend is upward, forecasting which is commonly believed is imminent, namely, a more intensive development of the coal fields of the Island in the future. The decrease in the production of the Crow's Nest Coal Field, amounting to about 171,722 tons, was expected, as the mines of the Crow's Nest Pass Coal Company were unproductive for a period early in the year as a result of a strike.

Following are the detailed figures:

Coal Production 1919

Coal Creek	229,615	
Estimated	80,000	309,615
Michel	128,547	
Estimated	44,000	173,547
Corbin	54,980	
Estimated	24,000	78,980
Total Crows Nest Pass District		561,142
Telkwa	1,340	
Estimated	400	1,740
Nicola-Princeton District		
Middlesboro Collieries Co.	62,780	
Estimated	20,000	82,780
Fleming Coal Company	32,380	
Estimated	6,000	38,380
Merritt Collieries		1,037
Coalmont Collieries	9,266	
Estimate	800	10,066
Princeton Coal & Land Co.	15,133	
Estimate	4,400	19,533
Total for District		150,996
Vancouver Island		
Canadian Western Fuel Co.	526,171	
Estimate	110,000	636,171
Canadian Collieries, Comox	456,588	
Estimate	90,000	546,588
Canadian Collieries, Extension	189,218	
Estimate	36,000	255,218
Canadian Colleries, South Wellington.	69,005	
Estimate	14,500	83,505
Pacific Coast Coal Mines, Ltd.	55,149	
Estimate	10,000	65,149
B. C. Coal Mining Co., Jingle Pot	29,739	
Estimate	7,000	36,739
Nanoose Collieries Co.	17,303	
Estimate	8,000	25,303
Granby Cons. M. S. & P. Co.	56,235	
Esimate	24,000	80,235
Total Vancouver Island		1,698,670
Total for Nicola-Princeton District		150,996
Total for Crows Nest Pass District		561,142
Total for Northern (Telkwa) District		1,740
Total for Vancouver Island District		1,698,670
Total for Province		2,412,548

Comparison

	1918	1919	Decrease	Increase
Vancouver Island	1,666,211	1,698,670		32,459
Nicola-Princeton	179,179	150,996	28,183	
Crowsnest Pass	732,864	561,142	171,722	
Telkwa	470	1,740		1,270
	2,578,724	2,412,548	199,905	33,729

	Coal made into coke	Coke made
Coal Creek	20,915 tons	13,271 tons
Michel	74,718 tons	46,831 tons
Cumberland	33,710 tons	20,225 tons
Granby, Estimated ..	24,000 tons	14,000 tons
	152,343 tons	94,327 tons
1918		
Coal made into coke ...	276,479	188,967

Decrease—94,640 tons

Northwestern District Has Some Remarkably Promising Mines

Summing up the outstanding features of the mining situation in his District, at the close of 1919, G. A. Clothier, Government Engineer for the Northwestern Mineral Survey District, refers to the far-reaching effects that may be expected from the fact that the American Smelting & Refining Company has become interested in the Premier Gold Mining Co., Salmon River. He speaks, too, of the wonderful showing made by the Taylor Engineering Company on the Dolly Varden Mine, Alice Arm, and of the *immense potentialities* of the Kitsault Valley. Other impressive facts to which attention is drawn are the 25 per cent increase in the production of gold in the district and the remarkable jump in silver output amounting in quantity to 120 per cent and in value to even more comparatively.

It is the opinion of Mr. Clothier that 1919 has been a crucial year for the mining industry in this Province, and especially for the northwestern section. Prospected areas have been thoroughly examined and investigated by the most competent mining engineers in the profession, many of them representing the

(*Continued on Page* 18.)

A New Map of the Stewart District of British Columbia.

—by courtesy of Mining & Scientific Press.

Operating Plant.

THE KIRKLAND LAKE DISTRICT OF NORTHERN ONTARIO.

Gold was first discovered in the Kirkland Lake District about eight years ago and since that time aggressive development has brought some properties not only to the producing stage but has also placed them in the dividend paying class. The Tough-Oakes was the first mine in that district to become a producer and eventually a dividend payer, but becoming involved in legal complications was forced to suspend operations for some little time. However, last spring work was resumed and carried on with excellent results as to the uncovering of ore bodies until the camp was tied up on account of a strike which continued for eighteen weeks. An amalgamation of the Tough-Oakes, the Burnside and the Sylvanite properties has

Operating Plant.

Beaver Consolidated Mines, Ltd., Cobalt, Ont.

been contemplated but as yet a deal has not been perfected. In the meantime other properties have been doing excellent work and the record made by the Lake Shore Mine spells success. The Teck-Hughes, one of the oldest operating mines in the Kirkland Lake district, is also producing regularly. The Kirkland Lake Gold Mining Company, which has one of the finest and most up-to-date plants in the North Country, has just entered the producing class. Their development, which carries them to a depth of 700 feet, has proven up one of the richest lodes of ore yet discovered. At the Wright-Hargraves, where a great deal of development work has been done, the completion of a 200-ton mill this fall, for which they are now getting the machinery and material in, will bring another producing mine into this camp.

Kirkland Lake Gold Mining Co., Kirkland Lake, Ont.

(*Continued from Page* 15.)

strongest mining and financial companies on the continent. That their verdict has been favorable is shown in the number of properties taken under option and the amount of capital expended in preliminary development work.

Discussing the Portland Canal District, with particular reference to the Salmon River Zone, Mr. Clothier expresses the opinion that it will take at least another season to conclusively prove which of the properties now under development will make the mines. There, however, will be no fact of capital to facilitate the demonstration. The chief cause of the keen interest displayed is attributed to the phenomenal development of the Premier Mine, the results of which confirm the general opinion of Mining Engineers who have examined it, viz., that it will become one of the great gold-silver producers of the continent. The fact that the American Smelting & Refining Company has purchased a 40 per cent interest in it for $2,000,000, after exhaustive examinations by their engineers, demonstrates the position it has taken in the mining world. This transaction, it is ventured, should assure the complete investigation and development of the entire section. Mr. Clothier proceeds to outline present conditions at the Premier Mine, stating that there is a first class sleigh road to the property from the beach; that further equipment is being added this winter to carry on development on a large scale; that a snow tractor will be tried out for haulage; and that an adequate equipment of teams and sleighs are on the ground ready to move ore as soon as snow conditions permit. All ore is to be extracted from the upper tunnel. Development will be continued in No. 2 Tunnel and a compressor plant installed at the mouth of the Plate Tunnel for its further advancement. This tunnel has been driven 600 feet towards the showing in the upper tunnel and, it is expected, will be continued in the hope of picking up the ore shoot on this level, giving about 600 feet depth.

Mr. Clothier mentions other properties under development in the Salmon River area as follows:

The property of the Bush Mines, Ltd., situated about a mile further up the valley from the Premier. Work consists of two open cuts across a mineralized belt having a width of about 100 feet. Some tunnel work. The cuts demonstrated that there were possibilities of ore shoots on the foot and hanging walls. On the hanging wall there are about six feet of altered greenstone containing small stringers and patches of high grade silver sulphides, the whole averaging low grade.

The Spider Group, on the East Fork of Cascade Creek, bonded first to Messrs. Trite and Wood, owners in the Premier Mine, but who failed to exercise their option, the property reverting to the original owners, Messrs. Hamilton and Larsen, of Stewart, B. C. Some very high grade silver ore was found in a small vein but development has not been extensive enough to warrant predictions. The claims now are under option to W. A. Meloche, representing Belgian capital, and work will commence in the spring. The same investor has options on three other groups, which will be explored when weather permits.

The Mineral Hill Group, in the same section, has been under development all summer and work is being continued this winter. There are several fine showings of high grade ore on the surface and several hundred feet of underground work have been driven under these showings. While the results have not been favorable as far as the uncoverig of high grade ore is concerned, the probability of proving a sufficient tonnage of milling grade ore to warrant the installation of a concentrator are good. The property is under bond to Messrs. Welch, Fetter, Carlton and associates of Seattle, Wash.

The E. Pluribus and Laura, of the Big Missouri Group, adjoining Mineral Hill. This property was optioned by Sir D. D. Mann. Nine or ten holes were drilled by diamond drill this summer. A tunnel was driven 30 feet and is being continued. The results of the drilling are not known but it is assumed that they were satisfactory as it is proposed resuming drilling on other portions of the property next year. The Big Missouri has been examined by many engineers and the general opinion it that, with proper metallurgical process for the ore, it would make one of the biggest producers of the country.

The Unicorn Group, lying north of Mineral Hill, has been opened up by considerable surface work. The open cuts show good looking ore.

The 49 Group, in the same district, is under bond to S. Silverman and associates. A good camp has been established, the necessary lumber and material being packed by horse from the beach. A tunnel is being driven diagonally across the big ore showing, cropping on the 49 Claim, which should develop a large tonnage of milling grade ore as well as some shoots of high grade. A new vein on the Occidental Claim is being explored with a tunnel which now is in about 50 feet, showing from a foot to three feet of shipping ore. There is a considerable surface showing north of the latter which has not yet been touched but which should develop a big tonnage of at least milling ore.

It is prophesied by Mr. Clothier that there will be much work done up the Bear River Valley next year. In this connection he mentions the Lakeview property, on Glacier Creek, at which a camp has been built and development is underway; the George Copper Mines Property, at the head of Bear River; the Red Top Group, just across the river from the George, and which has been bonded. It also is predicted that there will be prospecting on the Nass River Slope of the Coast Range, opposite the mineralized zone within which the Premier and other properties are situated. Samples of ore assaying up to 600 ounces in silver were brought in from that country this fall and the prospectors, as soon as they had the ore assayed, bought supplies and returned. They have built winter quarters and are driving a tunnel on the vein.

On Observatory Inlet, the Granby Consolidated Mining & Smelting Co., Ltd., has not had as prosperous a year as heretofore, chiefly because of labor and other troubles. The plant was closed for a portion of the year and as a result the output will fall short of that of 1918 by about 10,000,000 lbs. of copper. The production this year will be about 20,000,000 lbs., compared with over 29,000,000 in 1918. The tonnage mined is approximately 655,000 tons against 857,000 tons last year. This means, with copper at 20c per lb., a shrinkage of about $2,000,000 in the production for the district this year, which will be made up only partially by the shipments from the Premier and the Dolly Varden and the increase in output of the Belmont Surf Inlet Co. The total decrease will be about $1,250,000.

Alice Arm Section

Turning to the Alice Arm Section, it is observed by Mr. Clothier that the development of the Dolly Varden, the returns from the shipments it has made this summer; the ore proven by diamond drilling on the Wolf property, also belonging to the Taylor Mining Company; the opening up of such promising properties as the North Star, Tiger, Toric, Muckateer, Moose, Last Chance, Vanguard, Homestake and others prove conclusively the potentialities of this section.

Credit is given Major A. W. Davies, who has charge of operations for the Taylor Engineering Co., for his aggressiveness in putting the property in shape for shipping. Work was commenced in July and several thousand tons of ore had been shipped by the end of September. To accomplish this the railroad has to be completed for three or four miles, a tramway built from the mine to the railroad, power plant installed, ore bunkers built at the upper and lower terminals of the tram, a big bunk and cook house erected at the mine, and the mine itself put in shape for stoping.

Other properties mentioned are the Last Chance, on Trout Creek, and the Tiger Group, across the Kitsault River from the Dolly Varden, which are being diamond drilled. The Muskateer Group, adjoining the Tiger, which showed some very high grade in an open cut, and on which a contract has been let for 200 feet of tunnel work. The Climax, Moose and North Star Groups, the latter having been under development all summer and from which were shipped 30 tons of ore to the Granby Company's Smelter.

Referring to the Illiance River Section, Alice Arm, the activity of the United Metals Co., the owners of the Silver Bell Group and the Monarch Group, are noted. All are spoken of encouragingly. It is said that on the Silver Star Claims, lying across the creek from the United Metals, a tunnel was started on the vein last season. The vein was crosscut at the mouth of the tunnel, disclosing an exceptionally fine body of ore about 12 feet wide at that point.

In regard to the placer mining operations in the Dease Lake District, an account is given of the work of George Adams, of Atlin, B.C., who secured an option on the holdings of the Thiber Creek Mining Co. Finding the plant in bad shape through dis-use he repaired the flume and cleaned up a considerable area of old bed rock in order to move his sluices up to an advantageous position. He then washed an old piece of bed rock that had been partially cleaned up and which he was given to understand would yield good returns. He was badly disappointed in getting only 40 ozs. but decided to open a new pit on his own judgment of the lay of the bed rock. From this he cleaned up $14,000. He now is planning extensive repairs and improvements and will take up the enterprise next season on a large scale.

The Atlin District has had a very dull year, owing to the lack of labor and the increased cost of production gold. The total placer yield for 1919 will be approximately $175,000, compared with $218,000 last year.

The Granby Company is continuing drilling on the Ecstall River Property and the work will be proceeded with next year.

The Belmont Surf Inlet Company have had a very successful year, judging from their output, which will exceed last year's by about $120,000. This increase is made up of 3,750 ozs. of gold, about 1,000 ozs. silver and 220,000 lbs. copper.

Middle Interior and Kamloops

An increase in the production of silver and a decline in that of copper, gold and coal is predicted by R. W. Thomson, Government Mining Engineer, in discussing the mining industry of his district comprisig the middle interior of the Province with the City of Kamloops as its centre. He looks to the future optimistically, however, for the following reasons:

1st.—Activity in connection with the Snowstorm Group of Mineral Claims in the Highland Valley Section, Ashcroft Mining Division.

2nd.—The Whitewater Limonite occurrences in the Clinton Mining Division.

3rd.—The work in connection with the development of the Aspen Grove Copper Occurrences in the Nicola Mining Division.

4th.—The Ladner Creek Gold Bearing Argillite Belt in the Yale Mining Division.

With reference to the Snowstorm Group it is stated that diamond drill operations were started about the middle of January 1919 by the B. C. Department of Mines. Work was carried on through the summer under contract by the International Diamond Drill Contracting Company of Spokane, Wash., using a machine cutting a seven-eighths inch core. Eight holes were put down at dips varying between 30 and 60 degrees and running in lengths between 400 and 1125 feet, aggregating a total of 5,736 feet. The country rock is of a granitic nature with occasional indications of copper mineralization on the surface, but no particularly large well defined ore bodies showing. Out of the eight holes put down six passed through mineralized zones which indicated bodies of commercial ore not represented on the surface. In all the holes three typical rock formations were passed through which, in the absence of technical classification, are described as follows:

1—Granitic country rock.

2—Dark colored, fairly fine grained porphyritic rock, with white porphyrites. Cores show well defined contact with granitic country rock not represented on the surface to any extent.

3—Mineral bearing rock, grey to dark colored, some places sericitic, mineralized with chalco pyrite bornite (erubescite) and in places specular iron. Where mineralized usually carries considerable pale green epidote. Looks like an altered basalt or diabase. This formation is shown by drill holes to be much more extensive than is indicated on the surface.

From the results obtained to date on the Snowstorm Claims the statement is justified that there are very extensive ore bodies going to considerable depths and of commercial value.

Limonite Deposits on Whitewater River

Wm. M. Brewer's report on the Limonite Ore Deposits of the Taseko (Whitewater) River is quoted to show that there would appear to be a large body of mineral of commercial value available. The importance of this is emphasized inasmuch as the mineral is what British Columbia has needed to flux with the magnetites of the Coast in the ordinary blast furnace. An Iron and Steel Industry, therefore, becomes practical, the only question being the provision of transportation from the deposits to the Pacific Great Eastern Ry. This problem is discussed by Mr. Thomson, using Mr. Brewer's observations as his basis. The Department of Mines intends taking up the whole question of the extent and quality of the deposits as

soon as the weather permits in 1920. The Geological Survey of the Dominion Government is expected to send one of its geologists into the district to investigate and prepare a further report. Other engineers will consider the transportation phase of the situation.

Considerable interest attaches to the Aspen Grove District by reason of the fact that operations now are underway which will determine whether or not all of the numerous low grade copper showings of this vicinity have sufficient body to justify the statement that a real mine can be developed. During the autumn of 1918 options were taken on a large number of claims (approximately seventy-five) by strong financial interests represented by Joseph Errington. During the past summer Mr. Errington has had very thorough geological and petrographical investigations carried out in connection with the geology and rock genesis of the district. As a result it was decided to thoroughly explore the field by diamond drilling and no time was lost in starting. Two drills have arrived for this work, a camp has been erected including an assay office.

Ladner Creek runs south easterly to the Coquihalla River which it joins about sixteen miles above Hope. This creek traverses a series of argillites which are ascribed generally as belonging to the Cache formation. This argillite belt appears to be of considerable width and extends north westerly to Siwash Creek on which the Emigrant Mine is situated. The Emancipation Mine on the north slope of the Coquihalla Valley also is situated on the same belt. Numerous occurrences of quartz either of lenticular or vein conformation are present throughout this whole argillitic formation and a number carry gold values of commercial importance.

The Pioneer Mine, Cadwallader Creek, is mentioned as the only producer of importance in the Lillooet Mining Division. Up to the end of the month of October the recovery was approximately 2450 ounces of gold. This is the property reported recently to have been acquired by the Mining Corporation of Canada. In the same section the Lorne Mine, the Ida May and other properties are under development.

The Iron Mask Mine, Kamloops Mining Division, has been working steadily throughout the year and its production is placed at the same as 1918, namely, half a million pounds of copper. The Lydia Group, Queen Bess Mines Co., Ltd., the Copper King and Camp McLeod Group and the War Colt Group are mentioned as having been developed to a considerable extent, although output was negligible.

Work on the Donohoe Mines, Stump Lake, is mentioned in connection with the Nicola Mining Division. The workings of the Joshua Shaft have been unwatered to below the 400 foot level, exposing considerable bodies of ore ready for stoping. A small shipment of ore has been made and it is the intention of the management to continue shipping the better grade ore, at the same time installing a new concentrating plant. The Mary Reynold Mine in the same section has been opened up by R. R. Hedley, development consisting of: deep open cutting, 60 feet; tunneling, 140 feet; drifting, 74 feet; raising, 30 feet. There has been a shipment of 97 tons and 33 tons are in transit.

District No. 4

Commenting on conditions in District No. 4, comprising Mining Divisions of Grand Forks, Greenwood, Osoyoos and the Similkameen, it is stated by P. B. Freeland, Government Mining Engineer, that there have been no new discoveries of note during the past year, probably because prospectors are scarce and large areas are covered by Crown Granted Mineral Claims. The latter ground has been neglected by reason of the fact that the owners seem to have lost interest and newcomers generally avoid such sections. Some of these, Mr. Freeland observes, are well mineralized and though the ores are somewhat complex, the present facilities for power, transportation and new methods of concentration, might make them attractive to capital, providing an area large enough for operating purposes could be acquired at a reasonable figure. The mining industry as a whole in the District is said to be affected by a "marking time" period, during which experimentation is going on to demonstrate the possibilities of ores which hitherto have been too complex for self smelting.

The Copper Mountain Group of Mineral Claims on Copper Mountain. Canada Copper Co., Ltd., is referred to as one of the largest mines of the section. Approximately twelve million tons of low grade copper-gold ore have been blocked out. Active operation has been delayed because of the strike of workmen employed on the construction of the railway between Copper Mountain and the town of Princeton. The 2,000 ton concentrator at Allenby, B. C., which is to treat the Copper Mountain ores, is practically complete. It is probable that the railway will be finished in the early part of 1920, when the mine will commence operation.

The Granby Consolidated Mining & Smelting Co.'s mines at Phoenix produced 142,546 tons of low grade copper-gold ore from January 1st to June 18th, 1919, when the mine closed down on account of a strike at the coal mines of Fernie, which created a shortage of coke at the smelter. This mine has continued closed up to the present time. The cessation of mining at Phoenix has reduced the output of copper in the district to practically nil, and also cut down the production of gold and silver to a considerable extent. It has been reported that mechanical means may be resorted to in the concentration of the ores remaining in the mines at Phoenix.

One of the year's outstanding events has been the development and construction of the Rock Candy Mine and Mill on Kennedy Creek near the north fork of the Kettle River by the Consolidated Mining & Smelting Co. of Trail, B. C. In the mine the following development was done: Drifting, 170 feet; crosscuts, 25 feet; open cuts, 20 by 15 feet. The mill, built about two miles north of Lynch Creek Station on the Kettle Valley Ry., has a capacity of 100 tons a day. The concentration of fluorite is accomplished by screening and depreciation of material in kilns, heated with oil flares.

Some activity has been manifested on Wallace Mountain, Beaverdell, where several new leads of high grade silver-lead ore were discovered. Further development on the Rob Roy opened up two new leads of high-grade silver ore.

A 75-ton ball mill and oil flotation plant is in course of construction at the Carmi Mine, Carmi.

In spite of the high price of platinum, only a few ounces of the metal have been placered in the Tulameen.

There will be a decline in the production of all minerals except Fluorite.

District No. 5

That section of British Columbia most developed as to its mineral resources, and from which comes a very large proportion of the provincial output, is included in what is known as District No. 5. This embraces the East and West Kootenays and many of the best known Mining Divisions. Within its boundaries are the Trail Smelter of the Consolidated Mining & Smelting Company, the Slocan, Rossland, Nelson and other mining centres of note, as well as the Crows Nest Pass Coal Field.

A. G. Langley, Government Mining Engineer, is of the opinion that the production, within the District confined, of gold, silver, and lead will show a decline in 1919 as compared with the previous year. Zinc production has been maintained principally by the Sullivan Mine, the output of which would have been considerably greater had it not been for a strike called by the One Big Union, which resulted in the property closing down on September 12th last, and the "walk out" of over 200 men. The balance of the zinc produced in the District is derived from the mines of the Slocan and Ainsworth Divisions. This is in the form of concentrates from the silver-lead-zinc ores and invariably carries high silver values. As the Trail Smelter has not been accepting zinc ores until quite recently, the bulk of this material has been shipped to the United States, which is possible only on account of the silver content. Since the closing of the Sullivan Mine, the Consolidated Mining & Smelting Co. has been confronted with the alternative of closing down its zinc plant or buying custom zinc. The latter course was chosen and recently, it is reported, zinc ores have been purchased in the Slocan.

The Slocan Mining Division is the largest silver producing area in the Province so that the output of silver can be guaged by its activities. Although information regarding shipments is not yet to hand, it is considered safe to predict that the production will show a decline as against 1918. One of the reasons for this is the depletion of high grade ore in the Standard Mine at Silverton which is past years has been by far the largest shipper. The comparative inactivity at the Galena Farm, Van Roi and Hewitt properties will have its effect as will the fact that the Surprise Mine, the largest shipper in 1918, probably will show a falling off in the value of its output. The Queen Bess is in the same position. These statements, however, are based on surmise, the ore having been sent to the United States and the figures being unavailable at the time of writing. Active development is being carried on at all these properties and it is confidently expected that the lull in production indicated will be of short duration.

There is likely to be a decrease in the production of lead for the same reasons as have been recited in connection with silver.

The principal source of gold production in latter years has been the Rossland Camp. During the year the output has been somewhat curtailed as the Consoldiated Mining & Smelting Co. had to confine its attention to the highest grade ore, owing to high costs. To remedy these conditions the Company has decided to install a large concentrator either at Rossland or Trail, the probability being that the former will be the site.

There also will be less copper production as the Rossland Camp is the chief source of supply in this district.

Generally speaking metalliferous mining in District No. 5 has been handicapped by shortage of labor durin gthe first months of the year. Since the advent of winter the conditions have improved in this respect. The only properties that have been troubled with strikes are the Sullivan and the North Star in East Kootenay. The North Star, which employs only a few men in comparison with the Sullivan, was not closed long but the Sullivan still is affected. The slight decreases in the prices of lead, zinc and copper did not have any serious adverse influence while the unprecedented rise in silver not only will enhance the value of the silver-lead deposits not being worked but will tend to renew interest in many of th eprospects and old properties which have been lying idle for some years.

The completion of Clarence Cunningham's 150 ton Concentrator at Alamo, the erection of a 100 ton Mill at the Noble Five Mine and the decision of the Consolidatedl Mining & Smelting Company to install a 1500 ton Concentrtor marks an active year in mill construction work and a new ear in the metallurgical history of the district. All these mills are designed for the treatment of ores by flotation; the existing mills were designed for water concentration and have had flotation units added.

The fact that the mineral production probably will sho wa decrease for 1919 is no reason for pessimism as to the new year. With the new mills in operation, and in view of the development which now is being carried out, the outlook is bright for an increase in the output of gold, silver, lead and zinc in 1920. Further, with the Sullivan Mine running at full capacity, and an increase from the Rossland Camp, which conditions may be expected, these increases are certain providing labour trouble does not intervene.

North Eastern District.

The North Eastern Mineral Survey District (No. 2), in charge of J. D. Galloway, Government Engineer includes all that vast territory lying off the Coast and to the North. Mr. Galloway predicts that the total production during 1919 will compare favorably with that of the previous year. The output of placer gold will show an increase owing to the greater activity in the ariboo and Quesnel Divisions. The production of Silver Lead and Zinc is mostly from the Silver Standard Mines at Hazelton. This Mine has had a satisfactory year with about the same production as in 1918. The Copper production will be considerably lower than before owing to the Rocher de Boule Mine hving been closel down all year.

Mr. Galloway goes on to speak of the activity of the Kitselas Copper Company in the Skeena River Section, considerable progress having been made in the development and the equipping o fthe Cordillera Mine. The Kleanza Company also is referred to, it being explined that this concern was organized to keep up mining and lumbering at Usk, and that, in this econnection, a hydro-electric plant is being developed and a large sawmill erected on Kleanza Creek. The Golden Crown Group has been acquired by the Kleanza Company and a crew of men has been kept constantly at work. Two quartz veins have been stripped. They carry values in gold and copper. These will be further opened by means of drift tunnels but this work will be postponed until power is available. After outlining the accomplishments of the management of the Silver Standard Mine, Hazelton District, during 1919 and

giving its plans for 1920 it is stated that Hudson Bay Mountain properties have been showing up well and that, while there has been na production, this may be looked for shortly. The Skeena Mining & Milling Company, holding the Victory nd Coronado Claims, is one of the active companies. It has purchsed the machinery for a hydro-electric power plant and for a 50 ton water concentrating mill. The ore consists of galena and zinc blende occurring in a gangue of siliceous rock.

There has been a material advance in mining in the old Cariboo District. The production up to the present has been almost entirely placer gold but the development of claims now taking place give fair promise of lode production. A considerable revival of interest also is taking place in placer mining and a number of new properties have been taken up and are being equipped. The production of placer gold in 1919 will show an increase, it being estimated that about 5500 oz. were recovered. Near the town of Barkerville the most important happening has been the development of the Gold quartz properties on Prosperpine Mountain. If, as is expected, the development proves satisfactory a new area of mining will be opened up in the Cariboo and quartz mining will receive attention where it has been popularly supposed the only possibilities were in placer. The groupes of claims now being tested are typical of many quartz showings and if these prove successful others undoubtedly will be developed. The showings on these properties are quartz veins varying in width from a few feet up to twenty feet and carrying small quantities of pyrite, arsenica, pyrites and smaller amount of galena. The main valuable metal content is gold which is apparently associated with the iron sulphides. The distribution of the gold values is quite irregular and much development will be required to determine the average gold tenor of the veins as a whole or in workable portions of the vein. It is apparent that when any considerable body of the quartz is considered the average gold vlue will be low, but it is expected that it will prove sufficient to mine and mill on a large scale and still leave a margin of profit. In other words low grade mine is the possibility for these properties.

In the Quesnel Section the Lightning Creek Gold Gravels and Drainage Co. has been engaged chiefly in construction, repair work, and Keystone drilling. A new shaft was started in the Fall. It will be sunk through the stream gravels and is for the purpose of opening up the deep channel of Lightning Creek, where drilling has shown good values on bedrock. Shafts have been sunk on this property before but have been lost owing to the heavy water pressure. The plant now is well equipped with pumps to handle a large flow of water and it is hoped that this shaft will be successful in reaching the channel. The equipment of the property of the Placer Mine Ltd., situated on the Fraser River, 12 miles below Quesnel, with a Sanerman scraper was commenced during the summer. During the year a Company was organized by S. J. Marsh to work gravel deposits on the Quesnel River, 10 miles above Quesnel. It is intended to work the ground by means of a scraper and the necessary machinery has been bought but not yet delivered.

As to Harper's Camp it is stated that the International Dredging Company operated its plant, consisting of a drag line scraper, during the Season but the ground being worked as yet is mainly on old tailings. The prospecting of this area by Keystone drilling has been under consideration by the Mines Department for some time and about the end of November work was commenced. If weather permits drilling will be continued throughout the winter. In respect to this area it is explained that a small part of it, lying in the bend of the Horsefly River at Harper's Camp, was very rich placer ground, having produced from $500,000 to $1,000,000. The character of the gold found here shawed that it had travelled some distance. Therefore it is maintained by many that the small rich area at this point must have a feeding channel. A certain amount of prospecting by means of hand sunk shafts has been done in atempts to find a continuation of the rich ground but without success. For such prospecting Keystone drilling is the most satisfactory method. The work to be done by the Government this winter will be of great assistance to the International Dredging Company in outlining their pay areas and, if successful, the drilling will mean much to the Harper's Camp Section.

Southern Coast District.

Wm. M. Brewer, Government Mining Engineer for the southern coast district, observes that the mining industry has made much progress, although production is not so large as heretofore for the reason that owners of metalliferous and coal mining properties today are carrying on development ahead of production in order to demonstrate the producing capacity of the properties. He refers to the Britannia Mine, Howe Sound; the Old Sport, on Elk Lake, Northwestern Vancouver Island; the Indian Chief, Sidney Inlet, about the centre of the West Coast of the Island; and the Sunlook Mine, Jordan River, forty-two miles from Victoria on the Island, as being proven copper mines on which tonnages of positive or actual ore could be measured up that are sufficient both in quantity and grade to guarantee the production of a large tonnage for several years.

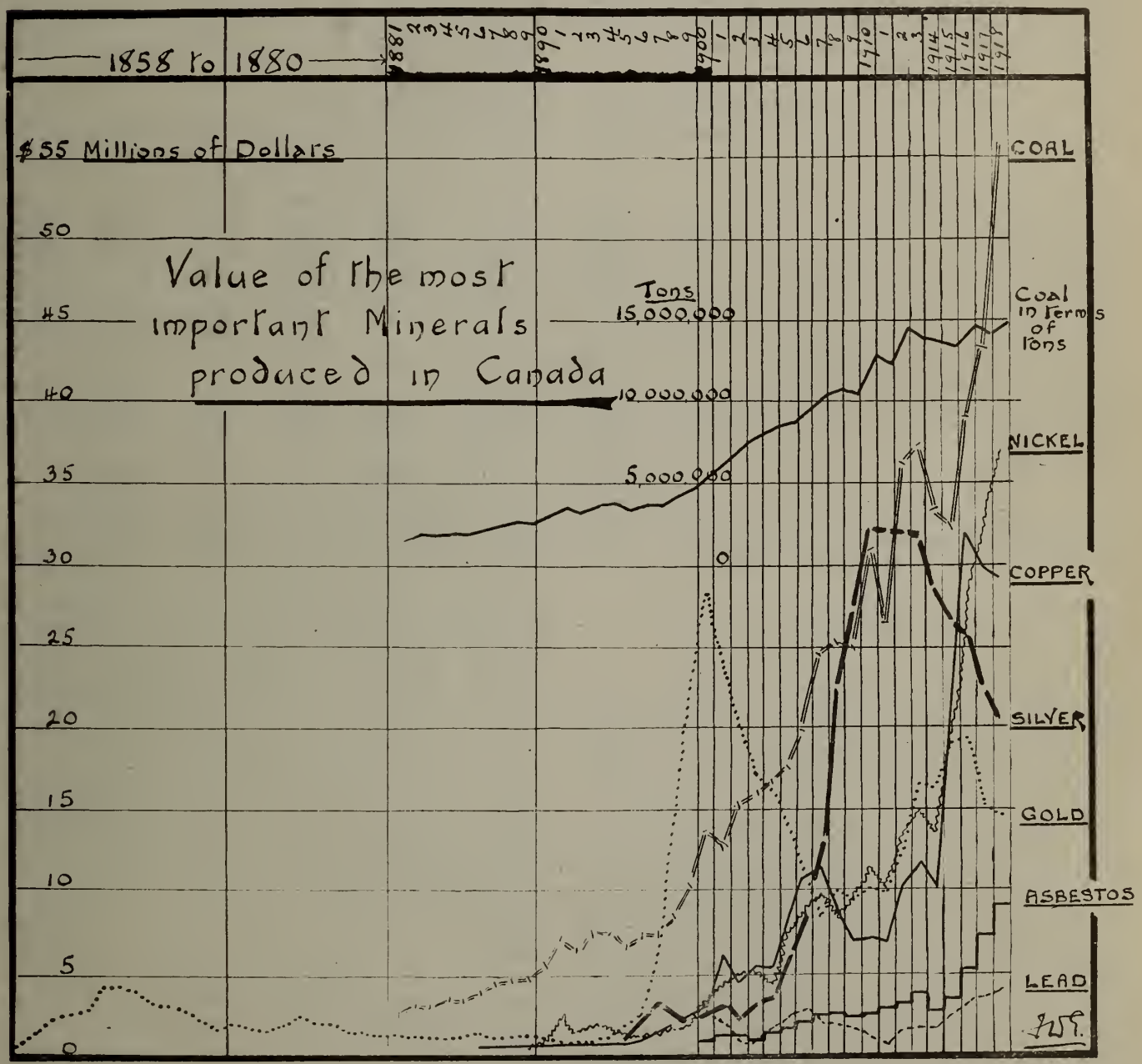
As to the Britannia reference is made to the recent extended development work done recently, demonstrating that there are approximately 9,000,000 tons of actual ore in addition to an enormous tonnage of what may be termed probable and possible ore. The positive ore will yield an average of two per cent copper in addition to low gold and silver values.

The Sunlock Mine, Jordan River, has reached the point which it is demonstrated that there is sufficient positive ore in sight to warrant the erection of a five hundred ton concentrating plant which has been designed and work on which will start in the early future. The Consolidated Mining & Smelting Co. of Trail, B. C. has secured a controlling interest in this property and W. M. Archibald, the Company's Chief Consulting Engineer, has been appointed Managing Director with R. H. Stewart as Consulting Engineer.

Fire, which burned down the compressor plant and other buildings interfered with development on the Old Sport Mine but these have been renewed with improved equipment and work now is progressing steadily. A concentrating plant capable of treating 500 tons of ore a day has been designed and construction will start shortly.

Development on the Indian Chief, Sidney Inlet, West Coast of the Island, has resulted in exposing a considerable tonnage of concentrating ore, sufficient being blocked out to guarantee operation continuously of the concentrating mill for some time. On the north side

of the mineral zone, and the mountain, a new ore body has been discovered which proves to be over eighty feet in width, this being demonstrated by a crosscut tunnel. The grade of this ore is high enough to produce a profit if treated by flotation concentration. On the southerly side of the mineralized zone drifting in the No. 2 Adit has demonstrated that the ore body on that level is maintaining its continuity towards the northerly side and work is being continued by driving to connect the north and south zones, with a view to establish whether they are one or separate bodies.



The foregoing graph can be used to plot the appro ximate figures for 1919 issued by the Mines Branch at Ottawa, and is re-produced from a fo rmer issue of the Canadian Mining Journal for that purpose.

The Coal Production of Nova Scotia During 1919

By The EDITOR

The following record of annual coal outputs in Nova Scotia shows that 1919 was the sixth consecutive year of falling production of coal, output being now at a discount of thirty per cent from the minimum figures of 1913. It will also be noticed that the lessening of production is more marked in Cape Breton Island than on the mainland, and has also affected the large companies more than the small operators.

COAL PRODUCTION OF NOVA SCOTIA, 1913 TO 1919.

Tons of 2240 lbs.—Calendar Year.

	1913	1914	1915	1916	1917	1918	1919
Dominion Coal Company—							
Cape Breton Collieries	4,739,149	4,287,717	4,608,979	4,091,790	3,551,787	3,271,755	3,090,000
Springhill Collieries	381,434	417,406	400,791	351,315	364,761	367,557	393,000
Nova Scotia Steel and Coal Co	813,877	752,173	611,923	605,649	580,310	502,018	557,000
Acadia Coal Company	539,121	394,397	340,975	392,065	398,507	277,526	398,000
Inverness Coal and Railway Company	293,847	264,842	245,749	265,427	202,719	204,495	139,200
Intercolonial Coal Mining Company	189,550	213,289	177,977	143,748	179,700	176,814	185,500
Bras d'Or Coal Company	65,844	53,420	56,941	44,357	42,126	49,924	41,000
Greenwood Coal Company				2,332	53,581	50,263	41,300
Sydney Coal Co. (Indian Cove Co.)	5,420	7,458	5,987	6,000	5,600	9,800	20,000
Cape Breton Coal Iron and Railway Co	8,425	48,277	2,500				
Milford Mining Company				8,500	16,402	18,000	21,000
Maritime Coal Iron and Railway Company	155,,051	141,830	175,482	197,101	200,380	180,000	
Minidie Coal Company	65,562	65,147	79,760	54,191	29,000	105,108	214,000
Other operators	6,205	4,275	2,885	8,949	40,604		
Total	7,263,485	6,650,031	6,709,951	6,171,424	5,665,477	5,213,260	5,100,000
Percentage of Production—							
from Cape Breton Island	81½ p.c.	81½ p.c.	82½ p.c.	81¼ p.c.	77½ p.c.	77½ p.c.	75½ p.c.
Reduction from the Basis of 1913 Production		8½ p.c.	7½ p.c.	15 p.c.	22 p.c.	28 p.c.	30 p.c.

One has to go back to 1902 to find recorded an annual production of coal in Nova Scotia so low as 1919.

At the close of the year, a slight increase in the capacity of the collieries for output is showing itself, and it would appear probable, with uninterrupted work and no accidents or delays that the production of coal in 1920 might reach 5,750,000 or even 6,000,000 tons.

Capacity of Mines for Output as impaired.

No quick reversal of the production tendency can be looked for, however, and things will have to go comparatively well at the collieries if last year's production rate is to be maintained. The capacity of the mines for output has been seriously impaired. The shortage of men and the contraction of advance development work which is a necessary consequence of such a prolonged shortage, combined with the almost complete absence of capital expenditure on the collieries during at least the past seven years, has put the operating mines into a condition from which they cannot recover completely except through intensive development continued over a number of years.

Cape Breton Collieries.

Furthermore, the war period happened to coincide with a time when a number of old collieries were approaching exhaustion, and the effect of the war was to prevent the development of new collieries which otherwise would doubtless have been undertaken about the year 1914. For example, the Dominion Coal Company, since the begining of 1914, have closed down No. 3 Colliery on the Phalen Seam, No. 7 Colliery on the Hub Seam, and No. 8 Colliery on the Harbour Seam,, mines with an aggregate output at that time of 1,450 tons daily. Another colliery, No. 5 on the Phalen Seam, is near exhaustion, and will shortly be closed. The older collieries, such as Nos. 1, 2, 4, and 6 on the Phalen Seam, No. 9 on the Harbour Seam, and Nos. 12 and 14 on the Victoria Seam, cannot again hope to produce the outputs of earlier years, when the coal faces were nearer to the pit-bottom. Nos. 21 and 22 in the Birch Grove District can maintain, but not increase their rate of production. No. 17 Colliery, which had an output capacity of 200 tons daily in 1914, was not operated during the war, and its present capacity is about what it was in 1914, but is capable of course of considerable expansion. A new colliery, Victory No. 24, recently opened on the crop of the Emery Seam, with No. 17 Colliery, provide the two sources from which any large increase of prodnetion must come during 1920, with the addition possibly of collieries Nos. 15 and 16 on the Lingan Seam in the Waterford District.

None of the other Cape Breton operators can be looked to for much increase in production during 1920.

Mainland Collieries.

On the mainland of Nova Scotia, the prospect is better. The Acadia Coal Co., now controlled by the Scotia Company, ought to obtain outputs almost as large as those of 1913. The Joggins Field has also fairly well of late, and although the number of small operations will not survive for any length of time, should there be any trade depression, yet there are a number of small openings in that field which together add very appreciably to the mainland production.

The Springhill Mines of the Dominion Coal Company have maintained their production throughout the war period better than any other group of collieries in Nova Scotia, and have the unique distinction of producing in 1919 more than they did in 1913. These mines, given fair luck, might during 1920 reach a production of 450,000 tons.

Summarising all the probabilities, however, it is to be doubted whether under the most favorable conditions of labour supply and demand the capacity of the collieries during 1920 will exceed six million tons.

Coal Problem is World-Wide.

There seems every reason to anticipate a continuance of a brisk demand for coal, because the same conditions which are acting as a deterrent to production in Nova Scotia are also operating in all other coal-producing countries. These include increased cost of production, associated with and proceeding from the general inflation of commodity prices; decreased working hours, and increased physical difficulties of extraction; the impairment of the efficiency of the working forces arising from the permanent effect of enlistments and the wastages of war, and an actual shortage of workmen. There seems some reason however, to expect that the shortage of workmen at the Nova Scotia collieries may increase rather than diminish, because of the probable reversal of emigration among European labourers. So far as supplies of men from the British Isles is concerned, this source of labour recruitment is becoming constantly a less likely one, as working conditions, wages and general comfort of the workmen are now such in Britain as to greatly lessen the attractiveness of other British countries.

The problem of labour supply at the collieries of Nova Scotia seems likely to increase in seriousness.

The Effect of the Shorter Working Day.

It is difficult to estimate, except at close quarters, the effect of the lessening of the working day upon production. It is not yet quite apparent what the effect of the shorter day is upon the actual output of coal producers at the working face. It is probably negative, so far as the amount of physical energy expended at the face is concerned, because the actual miners did not in any case work more than from six to eight hours. The effect of the shorter day will really be determined from its operation upon the removal and movement of the coal from the working face, and that it has already caused a marked lowering in production is not to be questioned.

There is one way in which the collieries of Nova Scotia can—probably to a greater extent than is possible in any other way—restore production and costs, and that is by the adoption of multiple shifts. When it is realised that the whole capital outlay and development of the Nova Scotia collieries is utilised only for eight hours out of each twenty-four, and that only for six or less days in a week, it is easily apparent that the industry cannot compete with fields that have three working shifts in each 24 hours for six days a week. Of course, a multiple shift is not possible except with a sufficient supply of workmen, and this is not in sight.

Among events of the year of some importance may be mentioned the following:

St. Lawrence Shipments Resumed.

The Dominion Coal Company received back from Admiralty requalition most of its coal freighters, and was able to make a commencement in the restoration of its former Montreal sales by sending some coal up the River in 1919, the first shipments of any note since 1915. This Company has also undertaken such prospecting of the lower seams on its properties during the year.

Consolidation of Coal Mining Properties Probable.

The acquisition by the Nova Scotia Steel Company of the control of the Acadia Coal Company is important as being, in the writer's opinion, the first of a series of consolidations of coal-mining interests that must take place if the coal mining industry is not to decline still more disastrously. In making this statement, the writer has no knowledge of, and intends no reference to the foolish crop of rumors that have amalgamated coal and steel companies in every conceivable, and many inconceivable combinations, but is merely expressing a personal conviction of the evolution which the coal trade of Nova Scotia must undergo before it attains real stability, a belief that has been expressed in these columns on a good many occasions. Only by consolidation of interests can the scattered, and in many instances financially weak coal companies of Nova Scotia hope to weather the future.

Benefit Society Revived.

The absence of serious accident during the year is a matter for thankfulness. It is also pleasing to know that the Dominion Coal Company's Employees Benefit Society has been revived after a lapse of some months. It is not so pleasing to know that the Society is debarred from all usefulness by the fact that only a portion of the employees of the Company are members of the Society. The financial soundness of these friendly societies cannot be assured unless all the employees, young and unmarried, as well as older and married men, are included. and it is very distinctly unfair that any man should be permitted to enter these societies and partake of their benefits when he has become middle-aged, if this same man was not a member during those years when his liability to sickness is smaller by reason of youth and greater vitality.

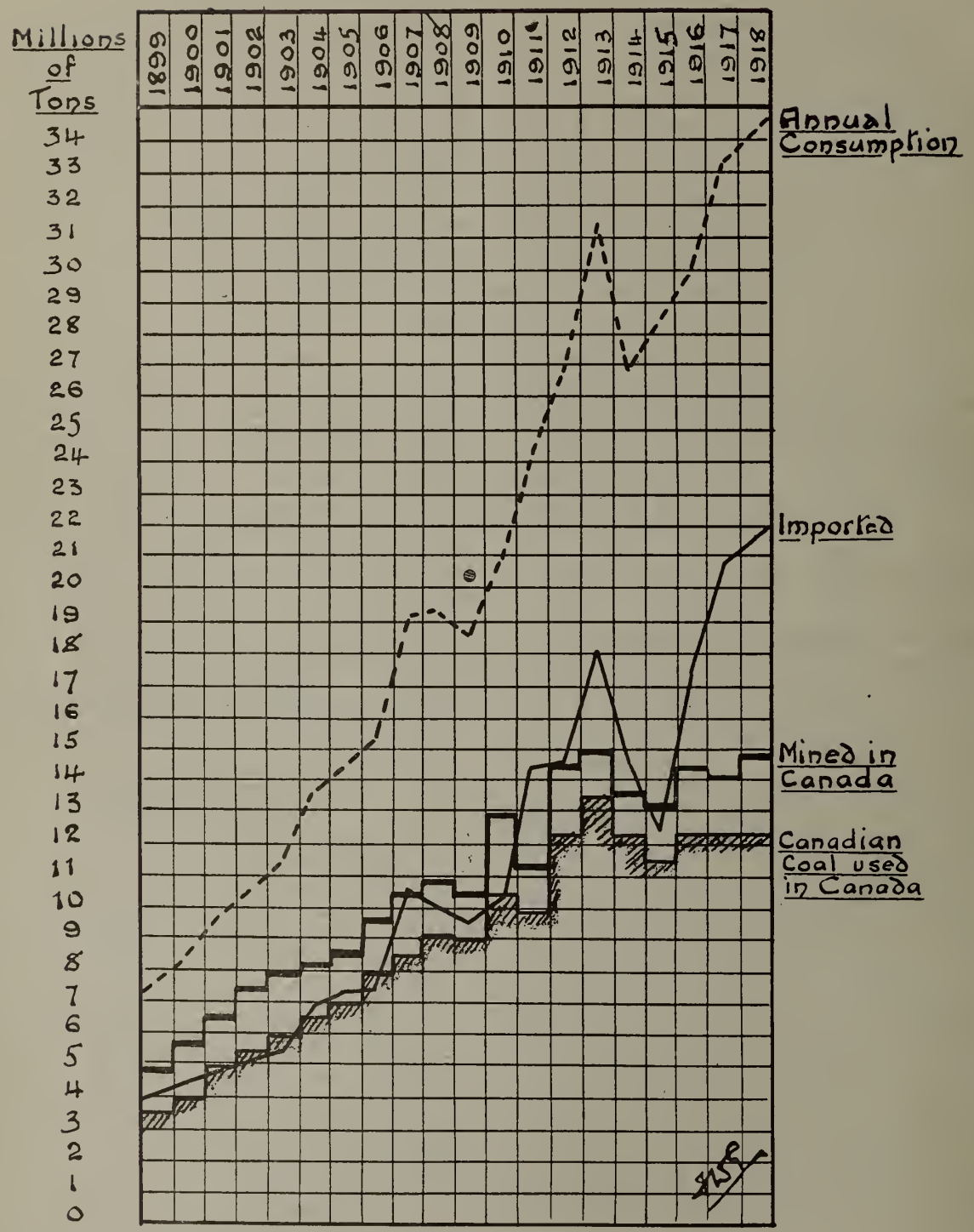
TORONTO NOTES

(From Our Own Correspondent)

Among the mining men down from the North this week was Major E. H. Birkett, Resident Mine Manager for Nipissing Extension Mines, Limited. He states that he has just completed the work on the No. 2 shaft and has commenced to cut a station at the 75-foot level preparatory to running a drift on the known veins and a cross-cut to the newly discovered veins. He reports that the vein in the No. 2 shaft is very strong and continues the full depth of 100 feet and that within a short distance from the bottom of the shaft the silver contents of the vein matter suddenly increased in value by 19 ounces to the ton over the previous assays.

North Davidson Progress

L. G. Harris, General Manager of the North Davidson Mines, Limited, who recently returned to Toronto after having successfully financed his proposition in England, states that the company are getting out plans for a mill which will be built in units and which will be of sufficient capacity to take care of 450 tons of ore a day. Some very successful diamond-drilling work has been done, the power line has been completed into the property and everything is rapidly taking on such shape as will enable the company to make the mine a producing one. The property is located three and a quarter miles north of South Porcupine and one mile from the Davidson.



— Production and Consumption of Coal in Canada —

The foregoing graph is reproduced for comparison of 1919 coal production with former years. Canada produced during 1919 only 12½ million tons, the smallest coal yield since 1911.

Review of 1919 Mineral Production

By JOHN McLEISH, Chief of the Division of Mineral Statistics, Ottawa, from the Globe Annual Review, Toronto.

"The mining and metal production of Canada will be an important factor in post-war conditions, as an abundance of metals will be required during the building-up stage, and with the influx of labor Canada should be able to supply these from her developed and undeveloped resources." Thus written Dr. S. F. Kirkpatrick, an eminent Canadian metallurgist, in discussing "Metals and Metallurgical Research."

The public records and the investigations of the Canadian Federal and Provincial Departments of Mines clearly show that Canada occupies a pre-eminent place amongst the world's geographic groups as a potential source of vast mineral wealth. Long source the greater production created by the war this country had already become the world's principal source of nickel, asbestos and cobalt, and an important producer of gold, silver, copper, lead, zinc and a number of rare metals. Few countries possess greater coal resources, and the Canadian production of arsenic, chromite, feldspar, graphite, gypsum, mica, magnesite, pyrites, and talc stand high in records of world's production.

During the past four years, under the stimulus created by war's demands, Canada's mineral production had increased from a total value of $128,863,075 in 1914 to a value of $211,301,897 in 1918. Notwithstanding that much of the increased value indicated by this record was due to higher prices many metals and minerals reached their highest recorded production in the latter year.

With the close of the war, however, came an almost immediate cessation of demand for nickel, copper, lead, zinc and other metals, with large stocks accumulated. Mining activity in these metals either ceased for the time or was greatly restricted, and the year 1919 will probably be looked back upon as the transition period, or, we trust, the greater part of the transition period between the insatiable demands of war for many products of the mine, and the legitimate requirement of peace industries supplemented by what we are pleased to term the demands of the period of reconstruction.

Effect of Armistice.

The effect of the armistice was immediate in the complete cessation of demand for many mineral products; the replacement by reconstruction and peace demands has of necessity been slow. Further, both the speed of the change and its methods are being most strongly influenced by the difficulties encountered in adjusting human relations. Production of gold, silver and of coal, would have been much greater during the past year but for an actual shortage of mine labor and the closing down of active operations for several months through strikes.

Definite records of production will not be available till some time after the close of the year, but on a broad survey of the results obtained the total value is estimated at $167,000,000.

During the past six years the annual totals have been:

	Metallic.	Non-Metallic.	The total value of Production.
1914	$ 59,386,619	$69,476,456	$128,863,075
1915	75,814,841	61,294,330	137,109,171
1916	106,319,365	70,882,169	177,201,534
1917	106,455,147	83,191,674	180,646,821
1918	114,549,152	96,752,745	211,301,897
1919	73,000,000	94,000,000	167,000,000

During the war nickel production was more than doubled; copper production increased by nearly 60 per cent; zinc production increased to five times its former output. Following the armistice the prices of food and of clothing continued to increase; the demand for such products could not abate as could the demand for metals of which accumulated stocks were for a time sufficient to meet current requirements. Silver and iron were two great exceptions, for widely different reasons. As the year advanced, however, stocks are evidently being rapidly absorbed, and the rate of production increased with rising prices.

The value of the production of non-metallic products is largely dominated by that of coal. The output of coal in 1919 was less than that of 1910, but greater in value by over $22,000,000.

The value of the production of asbestos in 1918 was over $5,000,000 in excess of its value in 1915, and its output in 1919 has been well maintained.

Notwithstanding the progress that has been achieved in the development of Canada's mineral wealth, there are three great products—probably the most important products—upon which industrial activities is built, viz., coal, iron and petroleum, for which Canada has become dependent in large measures upon foreign sources of supply. The total value of the imports of these products, much of the iron and steel in a manufactured form, and petroleum as refined oils, amounted in 1918 to no less than $286,115,000. Expressing the imports of petroleum as crude oil, and the iron and steel as pig iron, the total would probably be not less than $140,000,000. These figures serve to indicate the great possibilities for development of domestic resources, if satisfactory solutions can be obtained for the economic utilization of our Canadian coals, low grade iron ores and oil shales, and they demonstrate the great necessity of intensive prospecting for higher grade iron ores and for oil fields.

Copper and Nickel.

Copper and nickel followed by gold and silver, are the metals of first importance as wealth-producers in Canada. The nickel is derived from one main source, viz.: The ores of the Sudbury district. The other metals are derived from various sources, though the greater part of the silver is from the Cobalt district.

The production of nickel in 1918 was 92,507,293, of which 2,400,000 pounds were recovered as refined metal, the balance being exported in the form of matte, or mill residues. In 1914, the total production was 45,517,937 pounds. The production during 1919 has been about 43,000,000 pounds, or about one-half of the last war year, and slightly under the rate of production during the three years immediately preceding the war.

About one-fourth of the production during the year has been in the form of refined metal, the refinery of the International Nickel Company at Port Colborne having been in active operation throughout the year. The new nickel refinery of the British-American Nickel Corporation, under construction at Deschenes, near Ottawa, is rapidly approaching completion, and will be placed in operation early in 1920.

The price of nickel has not varied as greatly as that of other metals, either during the war, or subsequently. During 1918 the price in London varied from a maximum of £260 per long ton in May, to £196 per ton at the end of the year. In December, 1919, the London price was from £215 to £220 per ton. New York quotations varied from 45 to 50 cents per pound during 1918, and in December of 1919 were 42 cents per pound for ingots and 45 cents for electrolytic.

The production of copper during 1919 is estimated at $1,500,000 pounds, or slightly less than 70 per cent. of the previous year's output, which was 118,769,434 pounds. Even at this figure the copper production has been greater than that of 1914, or any previous year, and having in view the fact that the price fell from 26 cents per pound in November of 1918 to less than 15 cents in March, 1919, and the effect of labor difficulties in British Columbia may be viewed as highly satisfactory.

In 1918 the production included 5,800,000 pounds from Quebec; 47,000,000 pounds from Ontario; 2,340,000 pounds from Manitoba; 62,860,000 pounds from British Columbia and a little over 600,000 pounds from the Yukon District. In 1919 the production from Quebec, which is derived from the pyrites ores of the Eastern townships, and that of Ontario from the Sudbury nickel-copper ores has been at slightly less than half the rate of the previous year.

Development operations at Copper Mountain by the Canada Copper Corporation now in progress for several years have proved the existence of 10,000,000 tons of ores, with an additional tonnage probable. A 2,000-tons mill is about completed.

At Rossland active mining has, on the whole, been well maintained. The copper is now being recovered in the electrolytic refinry, as refined metal, and it is proposed to install mills for the production of rolled copper forms. On the coast there has been a good production at Anyox and Britannia, though these operations have not been continued without some interruption because of labor difficulties.

With the continued development of larger ore bodies at Hidden Creek, Britannia and Copper Mountain, improvements in treatment of the Rossland ores, the construction of a smelter in northern Manitoba for the reduction of the ores of the Mandy and other mines, resumption of capacity operations at Sudbury, and with the numerous lesser deposits that are under investigation with the hope of developing into big mines, considerably increased copper production in the immediate future may be confidently anticipated.

Gold and Silver.

Gold and zinc are the only metals apparently for which an increased production is recorded in 1919. The value of the gold production is estimated at $16,275,000, as against $14,463,689 in 1918. This output however, is still less than that of 1916, when a total value of $19,234,967 was obtained, and far below the output during the hey-days of the Yukon, when, in 1900, a maximum of $27,908,153 was produced.

In 1918 the production included $2,118,325 from the Yukon district, $3,624,476 from British Columbia, and $8,516,299 from Ontario, with smaller amounts from Manitob, New Brunswick and Nova Scotia. The Yukon district output was about the same in 1919 as in the previous year. It is less than half the average output of the previous ten years, and one-tenth the output of f1900. British Columbia's production of gold is believed to have been also about the same as in 1918.

Mnitoba produced $139,628 in gold in 1918, and probably a greater value in 1919. Some very spectacular finds made during the past year are attracting considerable attention to the new mining districts in this Province.

Ontario's gold production in 1919 has increased to at least $10,000,000, derived principally from the Hollinger, Dome and McIntyre mines, with smaller contributions from the Lake Shore, Davidson, Kirkland Lake and others. It is already well known to the reader of Northern Ontario mining news that production would have been larger had more labor been available, that in a number of properties large ore reserves had been developed, and that with decreasing costs of supplies and a greater labor supply a much larger annual production will shortly be obtained. The wide extent of territory over which gold discoveries have been made and new gold camps estblished give excellent reason for anticipating that this Province will in the near future occupy a much higher position among the gold-producing areas of the world.

Lead and Zinc.

Lead and zinc are obtained chiefly from British Columbia sources. Ore shipments materially declined during the early months of the year. Considerable dissatisfction was manifested by a number of shippers with the prices and purchasing conditions offered by the Trail smelter, the only lead smelter in Western Canada. A special committee of investigation was appointed who were given full access to the books are records of the smelting company. Evidence was also solicited from shippers. The conclusions of the committee were that the rates imposed by the smelter's lead schedule "B", at the time of its going into effect, were reasonable . Many lead shippers, however, sought markets for their lead ore shipments in the United States, and during the first nine months of the year lead ores were exported containing over 10,000,000 pounds of lead.

The production of lead in 1918 was 51,398,002 pounds, of which 47,594,328 pounds were obtained from British Columbia, and the balance chiefly from Ontario and Quebec, with a small production from the Yukon District. Of the total, 32,782,000 pounds were recovered as bullion, the balance being lead contained in ore exported.

Zinc production in 1918 comprising actual recoveries of refined zinc at the Trail refinery and estimated recoveries from ores and concentrtes exported was 35,083,175 pounds. Of this amount 2,802,928 pounds were credited to Quebec Province and the balance to British Columbia.

Estimates based upon the quantities of ores shipped from mines and exported would appear to indicate that the lead production in 1919 was but little less, if any, than that of the previous year, and the zinc production

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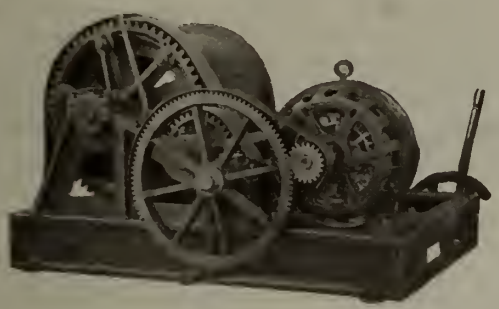

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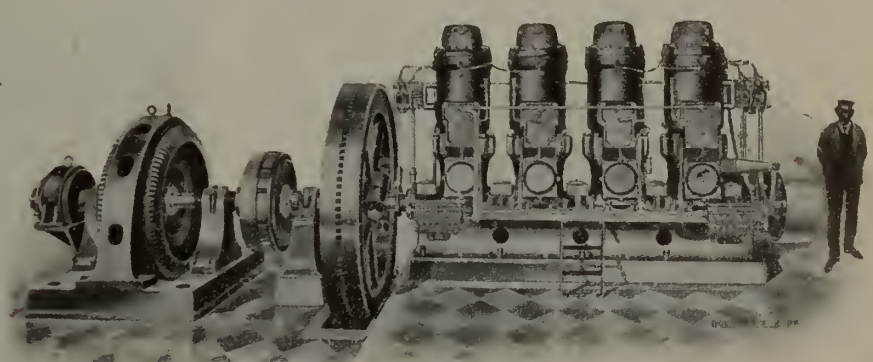

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probably somewhat in excess. The prices of both metals have been considerably less than during the last war year, that of lead having averaged about 5.73 cents (New York) and zinc 7.03 cents in 1919, as compared with 7.4 cents and 8.16 cents respectively in 1918.

The prospects for the future are, however, quite encouraging. The zinc reduction plant at Trail is claimed to be operating on a much more efficient basis; large resources of ore are assured in the Sullivan Mine, and the Consolidated Mining & Smelting Company, which operates both mine and smelter, is currently reported to have successfully arranged for the marketing of its surplus zinc products in Europe.

Iron and Steel.

In metalifferous mining different methods naturally exhibit varying conditions. Canada's metallurgical industry in iron and steel has become an important factor in our industrial situation, but has been based very largely upon imported ores, a situation which has not been materially altered by the war. A comparatively small production of beneficiated iron ores continues to be obtined from the siderite deposite at Magpie, and from the magnetites at Moose Mountain.

The total shipments of iron ores from Canadian mines in 1918 were only 211,608 short tons and probably about the same tonnage will have been shipped during 1919, the two properties above mentioned being the principal ones that have been operated.

The production of both pig-iron and steel has been less than in 1918, when the total production of pig-iron was 1,195,551 tons (of 2,000 pounds) and of steel 1,873,708 tons (of 2,000 pounds.)

The estimated production of pig-iron in 1919 is 920,000 tons, a falling off of about 23 per cent, and the production of steel ingots and castings is estimated at 1,020,000 tons, a decrease of about 45 per cent.

In 1918 pig-iron was made in electric furnaces from scrap steel to the extent of 32,031 tons. The corresponding production in 1919 was probably less than 8,000 tons. Electric furnace steel production in 1918 was 119,130 tons. It is doubtful whether the 1919 production reached 15,000 tons.

In Nova Scotia the blast furnace of the Nova Scotia Steel & Coal Co. was closed down toward the end of June and was not reblown until after the middle of November. All furnaces of the Dominion Iron & Steel Co. were closed down in August and remained down until late in October. In Ontario the furnaces were somewhat more active, the Steel Company of Canada at Hamilton havving all furnaces in blast at the end of September. The Algoma Steel Corporation had two furnaces active and two closed down, and the Canadian Furnace at Port Colborne was active. The Deseronto furnace was closed down in June, the Midland furnace in August and the Parry Sound furnace in September, all remaining down for the balance of the year.

The coal production in Canada in 1919 is estimated at 12,500,000 short tons. (This product is dealt with more fully on another page.)

Other Products.

Among other ores and mineral products for which particular demand was created by the war and by the production of which Canada was able to contribute important quntities were: Cobalt, molybdenum, arsenic, asbestos, chromite, magnesite, graphite and pyrites. The mining of asbestos haa been fairly teady throughout 1919, though that of th other products will show the effects of a lack of market. The exports of molybdenite to the end of August were 56½ tons, valued at $84,226, and were probably derived almost entirely from the Quyon, or Marsh Mine, near Ottawa. At this time all active production operations had ceased.

In the Black Lake district, Eastern Townships, three firms have continued the production of chromite ores and one mill has been in operaton. Six months' exports were 4,669 tons, vlued at $124,505. The estimated shipments for the year will total 8,400 short tons,including 5,750 tons of concentrate averaging 50 per cent., and 2.650 tons of crude ore, averaging40 per cent. chromic oxide. This production is practically equivalent to about one-half that of the previous year. The operators hve been improving their production fcilities. Canada's production of pyrites ores had greatly increased during the war, rising from 158,566 tons in 1913, to 416, 649 tons in 1917. Nine months' shipments in 1919 were 129,157 tons, as compared with 322,282 tons during the corresponding period of 1918.

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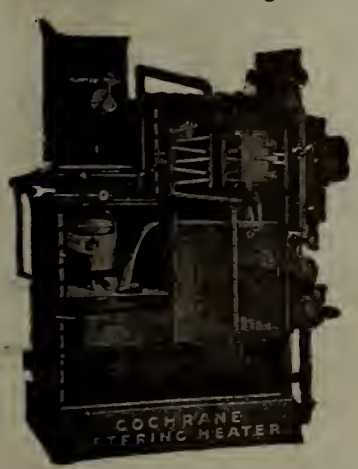

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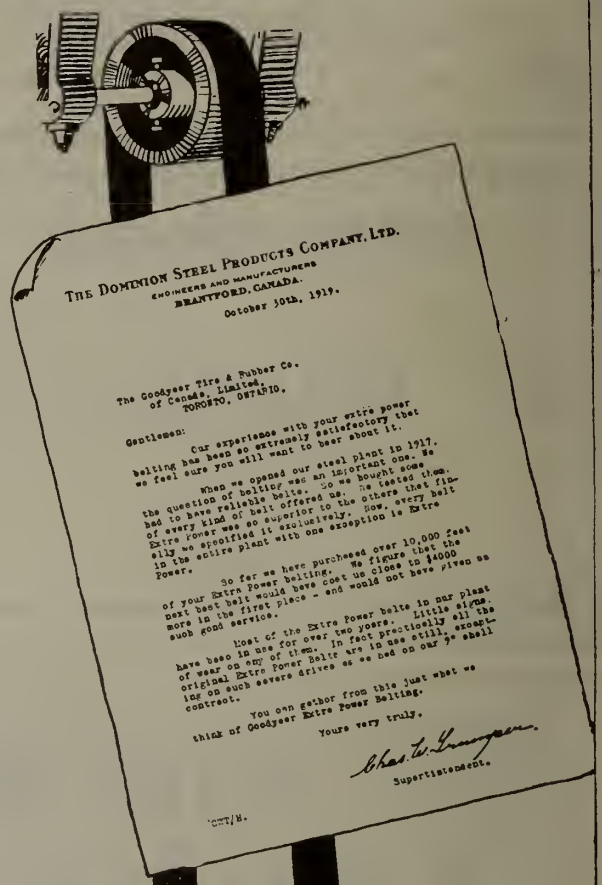

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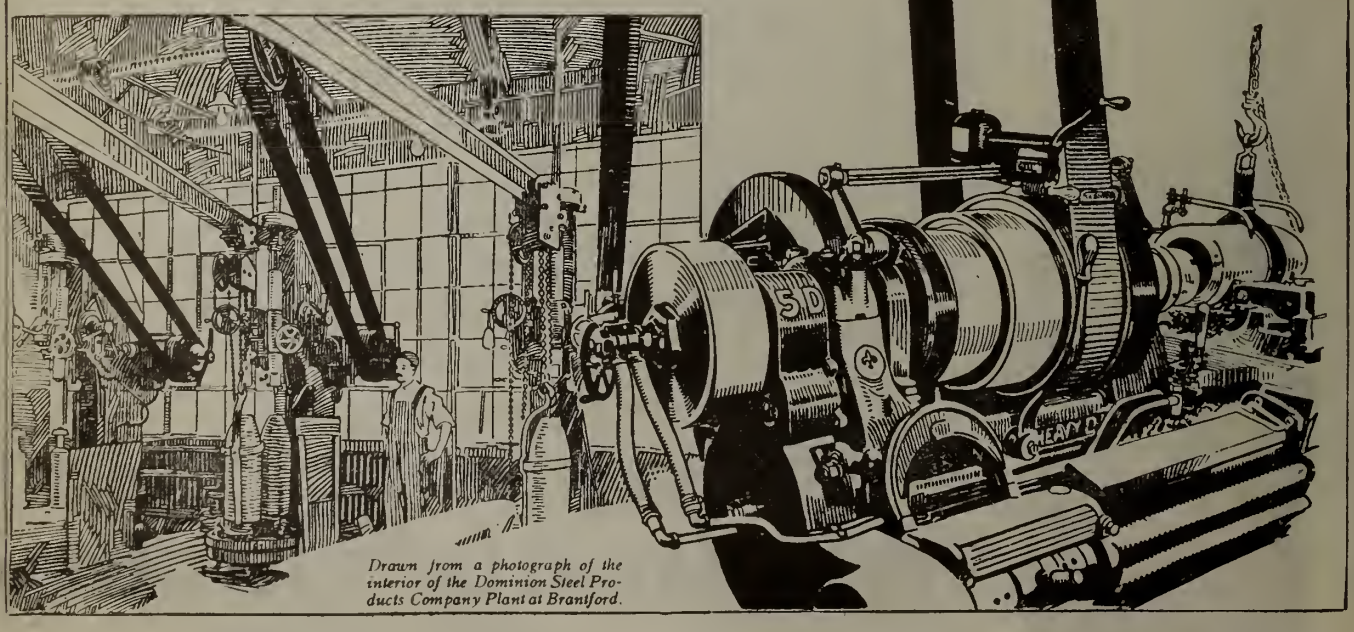

Drawn from a photograph of the interior of the Dominion Steel Products Company Plant at Brantford.

:-: EDITORIAL :-:

A Despised Profession

As was recently pointed out by the "Journal," the salaries paid to the members of the Canadian Geological Survey are a fair indication of the importance attached in Canada to the science of economic geology, and, rated in terms of monetary remuneration, indicate that geologists are considered of less account than a self-respecting locomotive engineer, and that two geologists are equivalent to one steel-melter or rolling mill attendant.

Quite recently, as will be noticed from a newspaper clipping reproduced elsewhere in this issue, six of the members of the Geological Survey, all but one having a record of ten years or more in the service of the Survey, have accepted more remunerative employment outside.

We do not see what else these men could do. Imagine the indignity of their position. With ten years service in the Survey, a Ph. D. degree, and brilliant technical records, these men are asked to support a family on salaries ranging from $2,200 to $2,700 per year. How can these men move in the social circle for which their professional status fits them, or how can they avoid the wounding comparisons that arise between their financial and social limitations and the comparatively affluent circumstances of men of less attainments engaged in commercial life?

We have, on several occasions, pleaded for a more accurate understanding of the true functions of a geologist. We believe that the longer and more concentrated the effort of a geologist upon one selected field the more valuable will be the ultimate results of this effort. Geology, like everything else worth while, is a life work. It is not an occupation for the dilettante, or the superficial man, and if a geologist is to yield full value to the department of the public service by which he is employed, the reward must be sufficient to enable him to look forward to a life of long patient work unembarrassed by trying to maintain a professional and social status entirely incompatible with the salaries that tradition allots to the geologist in Canada.

In this connection, our readers may have noted a piece of very special pleading that has been published in reference to the attractions offered by the Geological Survey of the United States to young men. This article stated: "The Survey offers much to the young "man newly graduated with a degree in geology. He "is enabled to complete his education in the school "of practical experience while earning enough to "live comfortably. He gets a variety and breadth of "experience such as can be seldom obtained elsewhere; "he has the opportunity for building up a valuable "acquaintance among influential men actively en- "gaged in the mining industry. The unique oppor- "tunities offered by the Survey are so obviously ad- "vantageous that there will never be difficulty in re- "cruiting suitable members for its staff. *The problem "is not so much to attract the best material as to de- "termine just how much the Survey can afford to "pay.*"

If the business of the Geological Survey is to train men under advantageous conditions, and introduce them to mining executives with a view to employment, then the foregoing opinion might be allowed to pass; but if, on the other hand, the Geological Survey is to attract to the public service and to retain the services of the best men, the opinion we have quoted is fundamentally erroneous.

A similar misconception existed for many years regarding the status of the mine surveyor, whose work was considered to be a mere preliminary to a managerial position. The result was that mine surveying was not regarded as a profession worth time or study to cultivate. Bad surveying was a further result, and eventually the lack of qualified men led to a statutory recognition of the status of the mine surveyor, and to more adequate remuneration.

We would transpose the opinion italicized above and state that the problem of the Geological Survey *is not so much to determine how much the Survey can pay, but to attract the best material.*

The steady conscientious accumulation of geological facts by a competent scientist, prolonged over a lifetime of endeavor and concentrated upon one particular field of enquiry, may yield, and often has yielded results of astonishing economic value. Yet, as has often been pointed out, the men whose researches and direction have in the past led to the discovery and de-

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Note:—See issue of 24th Sept., 1919, "The Functions "of a Geologist."

velopment of mineral resources of incalculable value, are rewarded with salaries that sound like comic opera, did one not know the tragedy—the word is deliberately selected—of trying to live and discharge family obligations upon these beggarly pittances.

If the salaries of every member of the Geological Survey were doubled, they would still compare unfavorably with the salaries paid by private corporations to men of equal attainments. The position of the geologist is not the same as that of an ordinary civil servant who discharges routine duties, calling for honest service, but little more. The geologist represents an investment, first of the educational expenditures of the country, secondly, of the accumulation of personal and inherited observation of many men at many periods and in many places. The geologist increases in value with the lapse of years of service, and his personal potentialities are enlarged with his years.

Considering the meagreness of the reward of the geologist in Canada, and the non-appreciation of their services by government and public; the faithfulness of their service, and the integrity of their professional etiquette, has been beyond praise, and, if the country persists in a policy of depreciation of these men, and thereby lowers the prestige and loosens the traditions of this distinguished branch of the public service in Canada, it must not be disappointed if a great part of the usefulness of the Geological Survey is destroyed, and our country is placed at an economic disadvantage.

Misplaced Parsimony

At the Vancouver meeting of the Canadian Mining Institute, Dean Brock of the University of British Columbia, and formerly a member of the Geological Survey, deplored the inadequate attention that had been paid in Canada to the economic geology of our coalfields, and instanced, in contradistinction, the large amount of attention that had been paid by the U. S. Geological Survey to the coalfields of the United States.

As a case in point, little or no attention was paid by the Geological Survey to the revision of the geological maps of the coalfields of Nova Scotia, from the time of the death of the late Hugh Fletcher, whose untimely taking off removed from the chosen scene of his labors a geologist much loved and often remembered in Nova Scotia. Hugh Fletcher's notes were unfinished, and his place has been hard to fill.

During the past three or four summers, after much pressure from Mining Society of Nova Scotia, a revision of the geological data appertaining to the lower seams of the Sydney Basin was undertaken ,and those interested in this imperfectly known territory have been awaiting the new maps and additional data. Now we hear that the member of the Survey charged with this necessary and delayed work has resigned from the Survey, for the totally adequate reason that his salary was not a living wage. Considering the importance of the work, the length of service, and the technical attainments of this member of the Survey—and his case is merely taken as typical of many—the salary paid, under the revised classification, is miserably, even indecently, disproportionate.

We do not recollect to have encountered an instance where parsimony is so out of place, or where the traditional folly of saving at the spigot and wasting at the bunghole is more exactly exemplified.

The Ratification of the Peace Treaty

The concluding paragraph of John Buchan's History of the War will, we believe, commend itself to our readers as a fitting and eloquent comment upon the resumption of international relations that accompanies the ratification of the Peace Treaty.

"When all due praise has been given to gifted "leaders, it remains true that the hero of the war was "the ordinary man. Victory was won less by genius "in the few than by faithfulness in the many. * * *

"The world has suffered a purgation by pity and "terror. It has made solemn sacrifice, and the sacri- "fice was mainly of the innocent and the young. This "was true of every side. Most men who fell died for "honorable things. Perversities of national policy "were changed in the case of the rank and file, both "of the Allies and their opponents, into the eternal "sanctities—love of country and home, comradeship, "loyalty to manly virtues, the indomitable questing "of youth. Against such a spirit the gates of death "cannot prevail. Innocence does not perish in vain. "We may dare to hope that the seed sown in sacri "fice and pain will yet quicken and bear fruit to the "amelioration of the world, and in this confidence "await the decrees of that Omnipotence to whom a "thousand years are as one day."

EN PASSANT

The "Engineering & Mining Journal" again betrays a curious inability to understand the status of Canada. In an editorial on the "League of Nations" it remarks that in the case of a dispute "between the United States and England, votes would be admitted from Canada, Australia, New Zealand and South Africa." Most decidedly they would, for each of the peoples so named constitutes a self-supporting, autonomous, sovereign nation, and if this fact is not understood throughout the world, it is only possible to express surprise. Again, it is remarked that "'England', as the price for her approval of the League of Nations, has safeguarded herself by providing for her domination of it by plural voting." As we have previously remarked, this use of the territorial term "England" is puzzling, and discloses a complete misapprehension of the constitution of the self-governing nations that compose the British Empire. The implication that Canada is not a sovereign signatory to the Covenant of the League of Nations is likely to be hotly resented in Canada. As to what reservations the United States Senate may insert should the United States subscribe to the League Covenant, that is distinctly and solely the business of the people of the United States, and it is generally admitted they are a competent nation, but, no dubiety should be longer allowed to exist as to the complete status of sovereign nationhood to which Canada has attained.

By request, we publish in this issue the text of the remarks made by Col. L. W. Marsh, of the Marsh Engineering Works, Belleville, Ont., in support of a Resolution which was adopted by the meeting of the Associated Boards of Trade and Chambers of Commerce held in Toronto towards the end of November.

Those who are familiar with the limitations of the economic utilization of iron ores will recognize the difficulties of competing with the United States ores that are apparent in the brief particulars given by Col. Marsh of the Ontario occurrences, but in urging the compilation of a condensed account of the iron ore resources of the Province, written so as to be understandable by persons not familiar with the technical terms of geology or the intricacies of iron and steel manufacture, we believe the Resolution is well adopted. The Department of Mines Report (Ottawa) No. 217, on the "Iron Ore Occurrences in Canada" is very comprehensive, and, so far as we are able to judge, very complete, but, if we correctly apprehend the purport of Col. Marsh's motion, it voices a desire on the part of business men in Ontario for a summarized and non-technical description of the scattered iron deposits of Ontario, setting forth the relative value of the known deposits and attempting to assess their economic value, and their attractiveness as profit-yielding investments. Such a compilation should not be difficult, but it might very conceivably lead to criticism of the compiler, as all such summarizations are liable to, if honestly and fearlessly carried out.

Our friend and colleague, Hon. Robert Drummond, the Editor of the "Maritime Mining Record," courteously points out in the January "Bulletin" of the Canadian Mining Institute, a rather slipshod statement of the writer, made in "Saward's Journal" to the effect that the royalty revenue of the Province of Nova Scotia derived from the coal sales of that province, had "fallen by $300,000 **annually.**" What we meant to convey, of course, was that the decline from the maximum royalty yield of 1913 had in the years 1918 and 1919 approached the sum of $300,000 in each year.

To be explicit, the coal sales in the fiscal year of the Mines Department of Nova Scotia in 1913, yielded in royalties the sum of $799,200. The royalties for the fiscal year 1919, based on an output of about 5,005,000 tons will probably be in the vicinity of $500,000, or equivalent to a decline as compared with 1913 of $300,000. The equivalent decline in 1918 was about $280,000 for that year. That is to say, the aggregate loss in royalties to the Province attributable to the decline from the figures of 1913, calculated over the period 1914 to 1919 inclusive, approximates $945,000.

Mr. Drummond, who is the doyen of the mining profession in Nova Scotia, has, in spite of years beyond the Psalmist's estimate, managed to maintain his youthfulness, and that salutary grace of youth, an indomitable optimism. He is a firm believer in the future of the coal mining industry in Nova Scotia, and in this we thoroughly agree with his views, but, so far as the immediate future of the maritime coal trade is concerned, optimism is hard to reconcile with the influences that are now affecting the industry, and will continue to affect it for several years to come.

METAL QUOTATIONS.

Fair prices in Montreal for Ingot Metals as at 13th January 1920.

	Cents per lb.
Electro-copper	24½
Castings Copper	24
Lead	10¼
Tin	52
Zinc	12
Antimony	11¾
Aluminum	34

Wm. Roper, formerly with the Canadian Western Fuel Company Ltd., has been appointed Mine Manager for the Pacific Coast Coal Co., South Wellington, Vancouver Island. This position has been held by Robert Bonner for some time.

The Graphite Industry

III—Oredressing: Graphite Ore.—General Outline.

By CHAS. SPEARMAN.*

The separation of flake graphite from its gangue presents problems comparable to that of the separation of its dimorphous form, the diamond, from its gangue; the separation of asbestos from its gangue, etc. In each of the above cases the desired content of the rock is sought free from the surrounding gangue and in its natural physical form, or as nearly so as possible, and therefore the operation of freeing the gangue must be such as not to interfere with the integrity of the commercial product, for, the reduction of the flake, the fracturing of the precious stone or the disintegration of the fibre, etc., are factors which greatly reduce in value the respective minerals.

In the separation and concentration of graphite from its gangue the ideal condition is attained when the flake, as a whole, is completely separated from the surrounding gangue and recovered by concentration, in the physical condition in which it is found in nature, unless market specifications deem otherwise. The first step in the operation is not at all easily accomplished commercially but when a fair degree of proficiency is attained the subsequent step of recovering the naked flake by concentration methods is a relatively simple matter; in fact, the treatment of graphite ore is more of an ore dressing problem than it is a concentration problem.

For various reasons it is advantageous to effect the complete operation of the separation of the flake from the gangue, prior to the concentration step, instead of adopting the widespread practice of doing more or less of it after the operation of concentration, under the guise of "refining" "finishing" etc., which necessitates an auxiliary ore-dressing unit.

Prior to the commercial application of the art of flotation to graphite ore, the average graphite separation and concentration plant was very crude and inefficient, so much so that it is doubtful if a single one of them ever showed a working profit. The ore was first dried "bone dry" in a suitable kiln in preparation for the dry rolls. This drying of the ore was a heavy burden at the best and was necessary to prevent "pancaking" of the reduced ore on the roll faces. After crushing, the ore went to a series of preliminary or "heavy duty" rolls and when the desired mesh was attained the product then went to a series of secondary or finer rolls usually of the flour mill type. Screening was resorted to between each of the sets of fine rolls with the object of removing the flake graphite as oversize. Some mills of this type were equipped with as many as ten sets of rolls and their corresponding screens so that most of the flake was broken and practically worn out before the end of the circuit was reached.

The action of the various screens was to remove the oversize naked flake, with adhering gangue in situ, mica, free gangue, etc. This oversize was collected and went to the "refining" or "finishing" oredressing unit which consisted of more fine rolls and French buhr stones which disintegrated the brittle gangue present and incidentally more of the flake. This product was then screened so as to remove the undersize—the oversize being the commercial flake. Very often dry tables of various makes were placed at convenient intervals in the circuit in order to lessen the burden on the screens and rolls in an endeavor to rescue more flake. The dust laden atmosphere attending this whole operation from the drier to the "refining unit was almost intolerable.

The final flake graphite resulting from the application of the above ore-dressing practice was thin flattened, polished and the natural physical structure of the original flake was rendered discontinuous due to intimate fracturing caused by flattening, deformation or squeezing by rolls, and the discreet particles were held loosely together. The ordinary handling of this "broken backed" "lifeless" product usually created an abnormal quantity of the lower grade flake.

In a more recent practice, the separation of the flake from the surrounding gangue is a much more simple matter than the above described and having a much higher degree of efficiency. The preliminary drying of the ore is eliminated. After crushing, the ore is fed to any type of wet crushing mill such as a ball mill. The load and feed of the mill is so adjusted as to insure quite a free discharge so as to exclude the liberated flake from the zone of disintegration as soon as possible. This action is sometimes accelerated by the addition of a small quantity of oil ahead of the ball mill on the principle of the well known Macquestin tube section.

The pulp from the ball mill is conducted to a mixer, then to an *Alderson hydraulic classifier from which most of the ganguebound flake is returned as oversize for retreatment while the free or naked flake for the most part follows the undersize to a Spearman concentrator.

After concentration the flake is dried and graded and that portion of it with adhering gangue in situ is removed. This low grade product usually comprises about from 3%—10% of the whole concentrate, depending upon the initial treatment, and is retreated as classifier oversize, while the remainder of the flake after the removal of the dust products classifies as No. 1 crucible stock.

By the older practice all the flake had to be subjected to the attrition of "refining" in order to attempt to properly separate the gangue from a small portion of the whole, which was a wasteful practice as much of the good flake was rendered low grade thereby.

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*Note:

This is the third article by Mr. Spearman on graphite mining and preparation. See issue February 19th 1919, page 87, and issue August 6th 1919, page 586.

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*W. P. Alderson, Manager, Timmins Graphite Mines, Westport, Ont.

The flake resulting from this newer method of separation of the gangue from the flake, may be described as coherent, thick, "bold" "rugged" that is, having rough edges and surfaces and is much higher in carbon than flake from the roll treatment on account of having no powdered gangue impressed into the relatively loosely coherent mass of minute flakes which constituted the so-called flake, and the specific gravity of a unit volume, under like conditions, is much higher than that of the flake resulting from the older practice.

The special advantages of the above described wet method of separation as applied to graphite ore are:

a. Low initial cost of installation.

b. Low cost of operation:—
   elimination of preliminary drying.
   low power consumption.
   low maintenance cost.
   low labour cost.

c. Much better grade of marketable products.

d. Greater quantity of the better grade of concentrate.

e. Better grade of low grade products.

f. Smaller quantity of low grade products.

g. One ore dressing unit instead of at least two.

h. Simplicity; short circuit.

i. Elimination of the dust nuisance.

The Dominion Crucible Co.—A New Canadian Industry

By R. F. MAFFRE

There have been many radical changes in the industrial life of Canada as a result of the World War. The imperative demand for munitions in enormous quantities caused a metamorphosis of the factories and workshops of the nation, and the spur of necessity augmented the efforts of invention in the endeavor to provide articles hitherto required only in small quantities or not at all.

The manufacture of plumbago crucibles was one of the "key" industries concerned in the making of munitions. As a result of the unprecedented demand for crucibles to supply the needs of those engaged in the manufacture of brass cartridge and shell cases and copper driving-bands for shells, the crucible-makers of the United States and Great Britain were literally

General View of Factory of Dominion Crucible Co., St. John's, P. Q.

swamped with orders, and stocks dwindled to the vanishing point. Correspondingly, the prices soared, and consumers paid four and five times the pre-war prices, considering themselves fortunate in securing crucibles at all.

The Dominion Copper Products Company of Montreal, was faced with the problem of obtaining crucibles, and, after considering the situation, decided to make its own crucibles. The Dominion Crucible Co. was, therefore, incorporated in October, 1916, and a plant was erected at St. John's, P. Q. Much of the machinery required had to be specially made, and this occasioned considerable delay in the completion of the plant. Owing to the shortage of ocean tonnage, lengthy delays were experienced in getting clay from England and plumbago from Ceylon and Madagascar, so that it was June, 1917, before an output was secured. From this time until the cessation of hostilities, and the consequent cancellation of orders for munitions, the entire output was absorbed by the Dominion Copper Products at its large plant at Lachine, P. Q. The amount of this output was 1,268,000 numbers, equivalent to a melting capacity of approximately 38,500tons of metal.

The return of peace-time conditions placed this output at the disposal of the trade in general, and Canadian-made crucibles were on the market for the first time, as, previous to the war, all the plumbago crucibles used in Canada were imported, mainly from the United States.

The crucible plant at St. John's P. Q., is capable of producing crucibles in sufficient quantities to take care of all the requirements of the Canadian trade. Crucibles range in size from the jeweller's crucible, with its capacity of a few ounces, to the tilting-furnace crucible, holding 1,800 pounds of metal. The chief ingredients of the paste from which crucibles are formed are plumbago and clay. The requisite qualities in a good clay crucible are—great plasticity, good bonding powers; low vitrification point; high fusion point; great strength when air dried and also when burned. As regards plumbago, different conditions of various grades are made, but in general it may be said that the resulting blend must have a high carbon content and a fibrous structure that will stand reduction in size by grinding without being destroyed

in the individual particles. For this reason, amorphous plumbago is unsuitable on account of its granular structure. No Canadian clay has been found that is suitable for crucibles, but while a portion of the plumbago used, of special quality, must be imported, this material is found in large quantities in Canada.

The making of crucibles is a branch of the oldest art in the world, the art of pottery, and the machine on which the crucibles are formed is an evolution of the potter's wheel of Biblical times. After the crucibles have been sufficiently dried they are burned in a specially designed muffle kiln which permits of their being subjected to an intense heat without coming in contact with the flames, smoke and gases of the fires.

This company is also making plumbago stoppers and nozzles for steel ladles and has supplied these to the majority of the steel plants in Canada, with the most satisfactory resuts. These articles were previously imported from the United States.

The quality of crucibles, stoppers and nozzles is an important matter to the metal trade, and there is considerable natural hesitation on the part of users to abandon goods in this line with which they are familiar in favour of a new line of goods of unknown qualities. Notwithstanding this, the "Dominion" crucibles, stoppers and nozzles are gradually establishing the fact that they can successfully compete in quality with imported goods but the future development of the industry will undoubtedly depend on being granted a sufficient protection against the foreign manufacturer to at least compensate it for the duty it is obliged to pay on the imported material employed.

Every new Canadian industry is an asset to the community at large, and it is hoped that the Dominion Crucible Company will receive sufficient encouragement to warrant a continuance of its efforts to establish this industry on a permanent footing.

The personnel of the Dominion Crucible Company is as follows: H. H. Vaughan, President; W. F. Angus, Vice-President; F. W. Evens, Secy.-Treas.; S. J. Kaufman, Works Manager, and R. F. Maffre, Accountant.

Pugging Machine, showing orifice and cutting-board in foreground. Crucibles are drying on racks preparatory to firing.

Top of Kilns, which extend from Basement. Firing is done on a lower floor.

Crucible-forming Machine, showing mould and forming tool in position.

In foreground is the Mixer. In rear are seen the Burr-Mill and Sifter.

An Underground Loading Pocket Adapted For Heavy Ores

JOHN S. WATTS, New Glasgow, N.S.

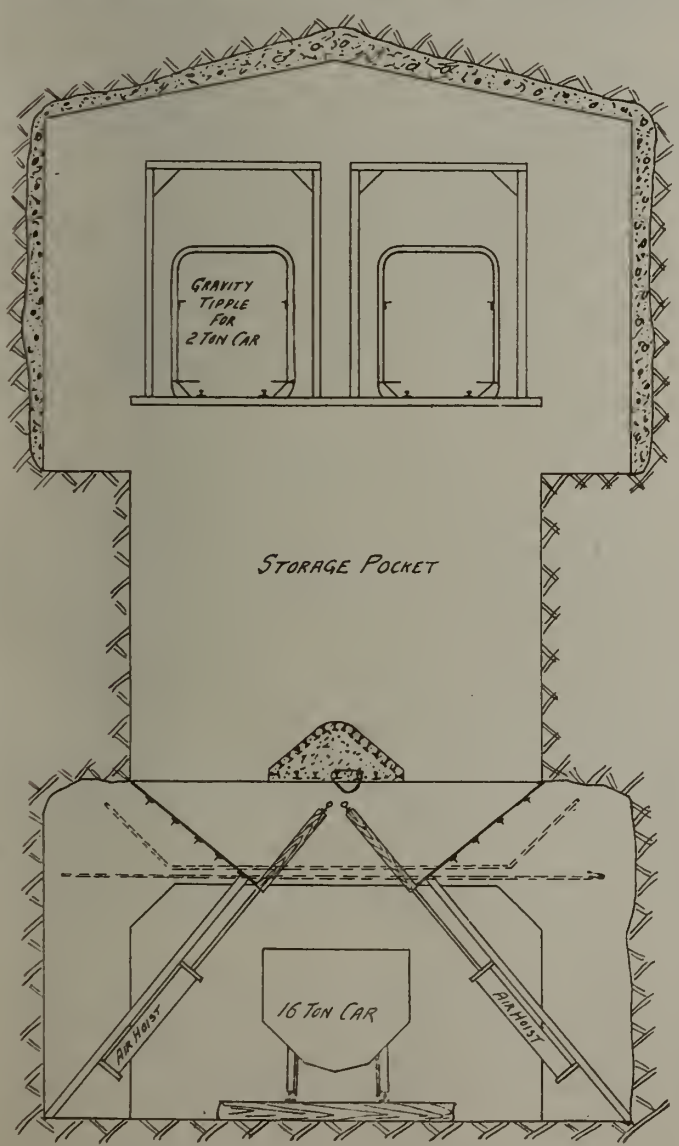
The drawings accompanying this article, show a highly successful underground loading pocket, installed last year, in the submarine iron mine of the Nova Scotia Steel & Coal Co. at Wabana, Newfoundland.

The product of this mine is a hard iron ore, and is mined in large lumps, frequently in cubes measuring three feet each way, and weighing over two tons each.

These heavy pieces make it a difficult proposition to control the loading by any of the ordinary varieties of gates. The design shown in the drawings is the result of much thought, and has proved successful, beyond all expectation.

The original intention was to break the larger pieces of ore, in the mine allowing no piece with any dimension of over two feet to get into the pocket.

This limit has, since, been raised to three feet, as it was found, by experience, that that size gave no trouble, and, as a matter of fact, larger pieces even than three feet have been passed through th gate without sticking.



Underground Loading Pocket

The method of operation, is, to bring the ore from the working faces, in small cars, to the tipple shown in the drawing, above the pocket. The tipples empty the cars by upsetting them, and return the car to its upright position by gravity.

The centres of gravity of the car and tipple, are so arranged, relatively to the centre of suspension of the tipple, that the full car causes the tipple to turn over, and when the car is empty, the tipple returns by gravity to its original position, which is as it is shown in the drawing.

The empty car is then pushed off, and replaced by a loaded car, and the operation is repeated. The movements of the tipple are controlled by a hand brake, not shown on these drawings.

As may be seen from the drawing, the bottom of the pocket is of concrete, strongly reinforced, with worn rails, to stand the shock of the dumping of the ore. Also it will be observed that at all places, where the movement of the ore would cause abrasion of the concrete, the surfaces have been lined with rails.

In the bottom of the pocket, places have been provided for six chutes and control gates, but only three chutes have been fitted and have proved sufficient.

These chutes empty the ore from the pocket into a sixteen-ton capacity car, which car carries the ore up to the deckhead on the surface.

It has been found that one of these cars can be loaded to capacity with sixteen tons of ore in less than thirty seconds, and it probably would be done in less time, were it not for the fact that the cars cannot be unloaded as quickly, and the two operations are performed simultaneously, the hoisting being done in balance.

The main improvement in this pocket, over the old one, is, that the control gate rises through the stream of ore to shut it off; instead of pushing down into the ore, as is the more common method.

It is obvious that there is nothing to prevent this door closing, except the weight of the ore on top of the door, and the friction of the ore against the gate. This merely involves applying sufficient power to overcome the resistance, and then perfect control is attained.

With the downward closing door, however, a lump of ore will get stuck under the door, and make it impossible to get it closed until this lump is got out of the way, by which time the car will be overloaded, and ore piled up on the floor around the car, to be later shovelled out of the way.

It is somewhat of a mystery to me why this type of door is not more generally used, as while it needs more careful designing and manufacture, to avoid the danger of its getting jammed by fines or dirt accumulating in the guides; its perfect control and reliability under the roughest of treatment well repays the small extra cost.

In fairness to all, the writer should state that he thought when designing this gate, that he had invented something new, but discovered afterwards, that the idea of making the gate come up through the stream of ore, had been used by others, previously. Particulars of two doors on this principle, are published in "The

Handbook of Mining Machinery," published by "Mines and Minerals." Neither of these doors, however, are subject to the severe treatment, that the one described has to withstand.

The gates are operated by the 6-inch push and pull, air hoists shown on the drawing, so that power is available for both opening and closing the gate.

To make certain of having ample power to operate the gates, provision was made for fitting either one, two or three air hoists to each. Actual operating experience has proved that two six-inch hoists, with 60 lbs. air pressure, will effectively operate the gate under all conditions of service.

To take care of the possibility of the gates falling open, in the event of accidental failure of the compressed air supply, the gates are fitted with eye bolts at the upper end, and provision made for connecting rope blocks and tackle, to operate the doors by hand. This is, the writer believes, a very remote possibility, as if the air supply should fail, the doors would still remain closed, unless the pocket was nearly empty, and in that case little damage would be done even if the door did open by reason of its own weight.

The details of construction of the chutes and gates are quite clear, and require no further elucidation.

THE "QUALITY OF MARITIME PROVINCES COAL"

In view of a threatened coal shortage in this country this winter, Canadian importers have speculated on the possibility of getting their supply from the Nova Scotia bituminous coal centers. There is a strong feeling, however, in Canadian manufacturing centers opposed to the quality of the maritime provinces coal, and it has been reported through official channels that it is doubtful whether such a change will be made.

In addition to the superior quality of bituminous coal from certain American districts over the Nova Scotia bituminous coal, freight charges from Nova Scotia are reported to be unusually high, and manufacturers in Quebec have found it more profitable to use American coal. The quality of bituminous coal from Nova Scotia, according to a report, would not relieve the domestic heating problem in Ontario.

Despite the warnings that have been sent by the transportation department of the Canadian Manufacturers' Association to all users of bituminous coal to secure their supplies as soon as possible, it would appear from the comparative figure on the importations of bituminous coal in Ontario that the users of this coal were well supplied.

The importations of bituminous coal between April 1 and August 31, 1916, according to customs returns, were in round figures 3,500,000 tons. In the same period in 1919, the importations amounted to 3,300,000 tons in 1917, 4,850,000 tons; and in 1918, 5,350,000 tons.

The large importations of 1918, with the sudden ending of the war and the closing up of many industrial plants, would lead to the conclusion that large quantities were on hand this year.—Coal Age.

Note:—We do not think that our Nova Scotian friends will altogether approve of the foregoing viewpoint of a New York trade journal. Of course anthracite happens to be an exclusive possession of United States collieries, but the reference to the "superior quality of bituminous coal from certain American districts over the Nova Scotia bituminous coal" is worthy of notice, not so much because of its appearance in a New York paper, but because it reflects a certain erroneous, but ingrained belief in "Canadian manufacturing centres."

Actually, of course, the reverse is the truth, and Nova Scotian coal will have no difficulty in regaining the market it held before the war in Quebec on the score of quality. We do not grasp, either, the statement that the "quality of bituminous coal from Nova Scotia would not relieve the domestic heating problem of Ontario. Nova Scotia coal relieves the domestic heating problem of a very large area of Canada, and there is no known peculiarity in the climate of Ontario, or the constitution of its inhabitants, that should remove the heating qualities of Nova Scotia coal when it crosses the Ontario provincial boundary.—Ed.

PEARSON OIL INTERESTS ENGAGE SIX MEMBERS OF THE GEOLOGICAL SURVEY.

The Geological Survey branch of the Department of Mines is soon to lose the services of six of its foremost experts, they having accepted appointments with the world famous British oil firm of S. Pearson and Son, Limited, with headquarters in London, but operating oil concessions all over the world.

The men to go are Messrs. L. D. Burling, A. O. Hayes, J. J. O'Neill, W. J. Wright, B. R. McKay and Bruce Rose, all of whom have seen long service in their department and are generally recognized as foremost experts in their line.

They were engaged by Mr. Robert Anderson, American manager of the Pearson and Son interests. Mr. Anderson arrived in the city on Janury 2 and met his men. After several consultations the propositions he was able to make proved so attractive that he closed with all of them and left Ottawa on Monday night, going to Montreal on his way to New York, and thence to Menlo Park, California, where he makes his headquarters.

Where They Will Go.

While the destination of all the men named has not yet been announced, it is known that Mr. Burling will go to Trinidad, in connection with the large oil and asphalt deposits there; Mr. Wright will go to North Africa, where the Pearson concern has extensive interests. At least one of the others will go to California and still another is likely to be located in Mexico.

While the many friends of the citizens named will regret to learn that their new positions will necessitate their leaving Ottawa, general congratulations upon their success will be in order when it is known that all the appointments are said to carry salaries at most generous proportrions and the opportunity to do a most attractive line of work under particularly congenial circumstances.

It is also indicative of the quality of the experts engaged in the Geological Survey branch that when an organization of the size and resources of that represented by Mr. Anderson desires to secure men for particular appointments it should seek for them in the Government service.

—Ottawa Journal.

AN ECONOMIC SURVEY OF THE IRON DEPOSITS OF ONTARIO URGED BY THE ASSOCIATED BOADRS OF TRADE ON ONTARIO.

Being the text of a resolution presented by Colonel L. W. Marsh, President of the Belleville Board of Trade, at the annual meeting of the Associated Boards of Trade and Chambers of Commerce held in the City of Toronto, November 20th and 21st, 1919.

There appears to be considerable information of a certain sort published by Government Engineers regarding the iron mines and formations of Ontario, but it is published partly by the Dominion authorities, and partly by the Provincial authorities. Moreover, it is scattered here and there through several volumes of annual reports where it is difficult to find, and is frequently buried in a mass of technical and geological information unintelligible to the ordinary lay prospector or miner, making the information of no practical use.

According to the Provincial Government 1918 Report, the Mines of Ontario shipped 198,882 tons of iron ore. Of this

91,609 tons were shipped to Ontario Smelters
107,273 " " " " U. S. "

The chief producers were the Algoma Steel Corporation from their mines in the Michipicoten District, and the Moose Mountain Limited, at Sellwood, near Sudbury.

345 Tons were also shipped by the Poe Mining Co., Palmerstton Township, Frontenac County, and 80 tons by the Canadian Union Iron Mines Corporation, Township of Drummond, Lanark County.

Ontario Blast Furnaces smelted in 1918
99,852 Tons of Ontario ore, and
1,375,459 " " U. S. "

The Canadian Mining Journal says that iron ore deposits are scattered practically all over the northern and western section of Ontario. The principal deposits are as follows:

In Northern Ontario.

There is a known deposit of titaniferous magnetite, containing vanadium, near Mine Centre, on the Canadian National R. R. 40 miles east from Fort Frances. This was studied and mapped three times by Dr. A. C. Lawson in 1887-8, 1913 and 1918. To develop this would require a R. R. siding 4 to 6 miles from Mine Centre. Dr. Lawson says he did not go all over the the ground, but believes the ore body is from 10 to 15 miles long, and the railroad siding could easily parallel the veins, of which there are two or more.

There is another known deposit near Paska Station, on the Canadian National R. R., Thunder Bay Region. There are two distinct Iron Ranges here, examined by E. S. Moore 1907-8. Mr. Moore said the eastern end of the southern range was worthy of further prospecting.

A deposit of hematite ore has been discovered in Yarrow Township, West of the Montreal River, Matachewan Gold Area. This has not been mapped out or examined as to size, though one vein was found from 5 to 30 feet in width. There is plenty of water power handy for developing electricity in this neighborhood.

There are also good iron deposits near Dryden, the 1912 Report says that "there is reason to believe that further exploration will be rewarded by more large bodies of workable iron ores similar to the Helen, Moose Mountain, Magpie, Atikokan. It is estimated that 100,000,000 tons of low grade ore await development near Helen Mine, Algoma.

In Eastern Ontario.

There are several known deposits of iron ore in the counties of Peterboro, Hastings, Frontenac and Lanark. A few of these are being worked at present. Others were worked a number of years ago and abandoned owing either to high cost of labor and fuel, difficulties of transportation or ore, or ruinous competition of U. S. producers.

The Blairton Mine in Peterboro County, worked back in the 30's and around about 1873, was the greatest producer in Canada. It is now closed, and has been closed for some years. The Belmont mine close by is still being worked. The Blairton used to ship to Pittsburg.

The Mines Branch, Dept. of Mines, Ottawa, made surveys of these two mines 1912-1913.

Besides these two mines, there are known to be three distinct belts of hematite near Belmont Lake, Peterboro County, running from 12% to 15% iron.

There are also six bands of iron ore between Harlowe and Bishop's Corners near the Village of Queensboro, Hastings County.

Iron ore is also suspected in Huntingoon Township, Hastings County. There are good hematite deposits near Eldorado, the Wallbridge mine being one of them.

The Bessemer Iron Mine at Bessemer, Hastings County is now being worked in a small way, and has been a large producer in the past few years. There are also several known deposits of good ore within a few miles of Madoc, Hastings County, some of which were formerly worked.

The information given above was gleaned by much toil from some eight or ten Official Reports and other authentic sources, and is at the best but fragmentary, scattered and incomplete.

Though information is given in a general way that iron is to be found in a certain district, there seems to have been no attempt made to definitely plot out the size and area of any deposit, or to ascertain or give any clear idea as to the amount of ore, or its richness. There are few isolated exceptions to this statement, such as the Blairton and Belmont Mines in Peterboro County, where the Dominion Government, apparently at the request of the mine owners, plotted out the size of these two deposits, but left all the other rich deposits in the neighborhood untouched.

The presence of iron ore, and its near relative iron pyrites, can be detected by the magnetic needle. The Canadian Sulphur Ore Co., located and thoroughly mapped out one of their best deposits of iron pyrites with the magnetic needle, and opened the vein at the spot indicated by the needle to be the best ore though the surface soil or overburden at the spot was forty feet thick.

The known information regarding Ontario iron ores should be assembled in concise form, with non-technical maps, and properly described in terms intelligible to those who are not trained geologists.

In a general way there seem to be two main iron ore districts in Ontario. The deposit in southeastern Ontario, which seems to centre in or about Madoc, and the larger and more widely scattered areas in New Ontario from Sudbury to Dryden and north to Fort Matachewan.

These two iron ore areas should be dealt with separately by the Provincial and Dominion authorities. For instance, the Madoc area, as it might be called, should be thoroughly surveyed magnetically, the **size and boundaries of the various deposits definitely given,** and also information as to the probable tonnage of ore **and its percentage of pure iron.** This information should be embodied in a special bulletin or book, as free as possible from geological and technical phraseology. The northern iron area should be treated in the same way, making two distinct publications, the two covering thoroughly the iron resources of the Province. A new survey should also be undertaken, particularly of the older sections of South Eastern Ontario, where the work was done by prospectors and miners a good many years ago, but about which there seems to be little recent authentic information. The iron formation of Peterboro, Hastings, Frontenac and Lanark Counties does not appear to have been properly mapped out and described for a good many years.

The Madoc iron area, being smaller, more central, and easier of access, should be dealt with first, this area covering or embracing portions of four countries, Peterboro, Hastings, Frontenac and Lanark.

Steps should also be taken by either the Provincial or the Dominion authorities, or both in collaboration, to ascertain the best method of extracting the iron from these ores and utilizing the titanium, vanadium, and other rare materials associated with the iron.

The steel strike in the States has called our attention to our utter dependance on the States for most of our steel products. The Government should do what they can to so develop our iron resources and smelters that we will ultimately become independent of the United States for Plates, Sheets, and structural shapes.

Assistance is needed from the Government for solving the great technical difficulties in the smelting of some of our refractory ores, which dififculties have hindered development in the past. This is a problem too big for the private person or corporation, and requires the best knowledge and resources of the government experts.

The following resolution was adopted:—"Resolved "that the Provincial and Dominion Governments be "memorialized and urged to prepare and publish im- "mediately a reliable and up-to-date general Report "upon the minerals and metals of Ontario, their dis- "tribution, quantity and quality, and especially with "regard to iron, the foundation of one of Canada's "basic industries."

"Iron and Coal Trades Review," a well-known technical journal published in London, England, contains in the latest issue received a number of advertising pages printed in colors by the three-color process, which are of striking excellence. The publishers refer to this innovation as a new departure in British technical journalism, although it is of course well-known in the United States, where the advertising pages are often more interesting than news columns. The advertisement of a well-known British safety lamp, which shows the revealing of the spectre of "gas" by the safety-lamp is a combination of clever drawing and effective advertising, effective even in black and white reproduction, but much more so in colors.

DEVELOPMENTS IN THE SHININGTREE GOLD AREA DURING 1919.

The Shiningtree gold area is not easily reached from Porcupine or Cobalt and few of those who write about Northern Ontario gold mines have yet visited the Shiningtree properties. The district has suffered both from the extravagant claims of stock salesmen and from the equally erroneous counter statements of supposedly informed journalists. None of the mines in the Shiningtree district have yet reached the producing stage, but the work that has been done during 1919 has resulted very favorably. Most of the work during the year has been done on two properties—the Wasapika and Herrick, and the results obtained should be gratifying to the owners, for both seem now to be reasonably sure of becoming producers.

At the Wasapika development has been carried on steadily, though slowly. The big vein has been cut at the 100 ft. level, and found to be even wider than at the surface. The shaft is now being deepened. The footwall portion of the deposit where cut on the 100 ft. level carries about $12. per ton for a width of 5 ft. This of itself would be considered very satisfactry, but there is in addition a wider body of lower grade ore. To satisfactorily develop this large orebody will take time and money. The company has been handicapped by lack of sufficient funds and has not been able to proceed with development rapidly. This weakness will be easier to overcome than would a lack of ore, but it is one of the many problems that the pioneer has to meet. The Wasapika has had a hard struggle and few friends, but it has the earmarks of a big gold mine.

At the Herrick a shaft was sunk by hand, early in 1919, to a depth of 50 feet on the vein. Very good values were encountered and sampling at 5 ft. intervals showed the ore for a width of 5 ft. to be high grade all the way down. The equipping of the property with machinery suitable for carrying on development work was not undertaken during the summer, but a contract for exploration by diamond drilling was let. By this means the deposit has been tested at depth. Three holes have been drilled and a fourth is now nearing completion. The satisfactory results of the summer's work have resulted in plans being made to equip the property this winter with the necessary mining plant. The erection of a mill is also under consideration. If these two leading properties receive the attention they merit during the coming year the Shiningtree district will doubtless emerge as a gold producer in spite of the voluminous criticism, some of it deserved, that it has received.—R.E.H.

PERSONAL.

Freyn, Brassert & Company, Engineers, Chicago, announce the appointment of Mr. F. L. Collins as Power and Electrical Engineer.

Mr .Collins was formerly connected with the Illinois Steel Co., South Chicago, and Gary Works and Universal Portland Cement Co. at Buffington, as Electrical Engineer; later joining the Dominion Iron & Steel Co., Sydney, N. S., as Chief Electrical Engineer. Subsequently he was connected with the Ordnance Department of the U. S. Steel Corporation at Neville Island, and lately was Chief Electrical Engineer of the Pittsburg Crucible Steel Co.

Our Northern Ontario Letter

The Silver Mines.

Official statements to the Canadian Mining Journal tend to show that the mining companies operating in Cobalt are taking full advantage of the present high quotations for silver. Not only is $1.33 silver in their favor, but the rate of exchange adds another 8 per cent for those companies which are Canadian concerns and receive payment in New York funds.

During the month of December the Nipissing mine established the highest month's record in its history by producing $423,139. This compares with $350,208 in November and $375,247 in October, and makes a total of $1,148,595 for the last quarter of 1919. It follows that this is at the rate of $4,594,380 a year. With costs averaging about 40 cents an ounce. it is obvious that net profits amount to considerably more than two-thirds of the total value produced. This, based on the above figures would indicate a net profit of well over $3,000,000 a year, which is equivalent to more than 50 per cent on the company's issued capital. Following is the official report of Hugh Park, manager, to the president and directors of the Nipissing Mining Company:—

"During the month of December the company mined ore of an estimated value of $423,139 and shipped products from Nipissing and custom ores of an estimated net value of $449.-758.

"Drifting on vein 544 at the 515-ft. level produced good results. Drifting is proceeding east to west, one face showing two inches of 800 ounce ore, and the other face two to four inches of 1200 ounce ore. Vein 3006 continues to show good values. For the last fifty feet the vein has averaged 1000 ounces a ton over one and a half inches. All stoping operations at 73 shaft continue to be satisfactory. No new veins were encountered in exploration.

"Development work on vein 109 at a level 90 feet below the tunnel, is giving good results. Two raises show from one to two inches of ore assaying as high as 4000 ounces to the ton. Vein 99 was also encountered at the lower level. At the present time the vein is low grade but the rock assays sufficiently high to be sent to the low grade mill .

"A few veins of low assay were encountered in cross-cutting at 63 shaft.

"The low grade mill treated 6632 tons. The High grade plant treated 150 tons. The refinery shipped 326,079 fine ounces of bullion.

"The following is an estimate of production for the month of December:—

Washing plant	$198,940
Low grade mill	224,199
Total	$423,139

At the Kerr Lake, also, production is running high, a total of 106,000 ounces having been produced in December. Based on silver at $1.33 an ounce and exchange at 8 per cent, the output had a value of close to $150,000.

More than usual interest centers upon the renewed success of the Beaver Consolidated,not alone as a result of the success at the company's Cobalt mine, but also due to the favorable results in the development of the Kirkland Lake Gold Mines of which the Beaver owns close to 90 per cent of the stock. While the Beaver Company is realizing about $2,000 daily net profit from the operations of its silver mine at Cobalt, the mill of the Kirkland Lake mine is operating at full capacity and has definitely taken its place among the important gold producers of that camp. In addition to this come reports that a large amount of new ore is being developed, a considerable quantity of which is said to contain around $30 to the ton.

A small shipment, amounting to about ten tons of picked ore, has been made from the Castle property of the Trethewey-Cobalt company. This consignment came chiefly from the new workings on claim R. C. 101. It is learned that effort is now to be concentrated on the latter claim, while work has been suspended on the original Castle property which adjoins the Miller Lake-O'Brien. In Cobalt, it is reported that the Coniagas is endeavouring to purchase the Cobalt property of the Trethewey company.

Concerning the proposed light railways in the North the scheme is coming in for fairly general favor with the exception of the Gowganda silver area where it is contended that the government would be inconsistent were future extension of the present Elk Lake branch to be forestalled by the installation of a light narrow gauge equipment. Leading silver mine operators in the district are utterly opposed to the Gowganda district are utterly opposed to the Gowganda district being used as a field for such an experiment and are open in their criticism of the failure of the government to extend the standard guage railroad. Were the Ontario government to ignore the views of the mine operators on this point it would create a peculiar situation inasmuch as the government confesses to a dearth of knowledge regarding the mining districts.

The McKinley-Darragh will keep its oil floation equipment in operation all winter if possible to do so. From experience it is learned that the pumps operate successfully in weather registering 30 below zero and that the only danger of the plant being obliged to close would be due to a temporary interruption in operation, in which case the pumps would freeze. Provided the pumping equipment can be shifted to a point where the supply of sand tailings is adequate to keep the equipment in constant operation, it is believed no difficulty will be experienced in operating the flotation plant at full capacity in addition to normal operations in the mine.

The agitation among the workmen at the mines in connection with choosing a future policy still continues. While a majority of the members of the Cobalt Miners' Union have evinced a desire to break away from the International, yet such a step does not appear to have been definitely decided upon. It is learned that some 51 of the membership are in favor of joining the One Big Union. Should such a course be followed, it would probably mark the end of the union as an important factor in the labor problems of the North, because the steady men are utterly opposed to the principles of the O. B. U., knowing that it is condemned by all responsible labor organizations on the continent. Unless the course of the Union is marked by reasonable moderation, the workmen may be expected to split up into factions. For instance, the Finlanders and a small sprinkling of other foreigners are in favor of the O.B.U., while the returned soldiers and British born appear to favor a policy of moderation. It appears certain that the percenttage of the workmen who will join the O. B. U. is decidedly small.

In regards to the indieated increase in the seope of operations in Cobalt as well as the outlying silver areas, it is interesting to note that inquiries relative to properties in the Elk Lakes and Gowganda districts as well as South Lorrain and Gillies Limit are coming in with inereased frequency.

Another factor of more than usual interest is the decision of a local mining engineer to aequire and develop properties on whieh large deposits of Cobalt mineral occurs. Cobalt is now worth about $2 a pound and is being used in the manufacture of cutlery as well as high speed tools. The South Lorrain district as well as a part of the Portage Bay area is expeeted to eome in for attention.

During the week ended Jan. 8th, three Cobalt companies shipped a total of three cars containing approximately 215,855 pounds of ore.

Following is a summary:—

Shipper.	Cars.	Pounds.
Trethewey	1	82,064
La Rose	1	69,795
O'Brien	1	64,000
Totals	3	215,855

During the corresponding period, the Nipissing was the only bullion shipper, sending out one consignment on Jan. 8th made up of 75 bars containing 100,800 fine ounces.

The Gold Mines.

While gold mining operations continue to record a steady increase, interest in the industry is growing keen. Despite the handicaps under whieh gold mining has been earried on in reeent years, and in spite of the lack of government support, it is significant to find a greater number of gold producing mines in Northern Ontario at present than since the year 1917. That this situation will be further improved seems certain, owing to the large measure of suecess attending all aggressive gold mining operations in the province. The fact is that a large volume of capital is now found ready to participate in the development of the gold resourees of this country and the next few months promise to see a greater number of producing gold mines than ever before in Ontario's history. Already the amount of gold being produced is the highest on record for Ontario.

It is stated that the Hollinger mine is now treating approximately 2,800 tons of ore daily. The significance of this may be realized by a glance at the 1918 annual report in which ore reserves are estimated to contain an average of $9.15 a ton. It is evident that in treating 2,800 tons daily, and with ore averaging $9 a ton, the daily output approximates $25,200, and is at the rate of $9,198,000 annually. While this record is a big one, yet it is interesting to remember that the present mill when at maximum capacity will treat about 3,500 tons daily. On $9 ore the output at maximum capacity would amount to $31,500 daily, or something like $11,497,500 a year. Provided the Hollinger is able to procure sufficient men—and the prospects of this are brighter now than for some time—sueh a record may actually be achieved by the end of this winter. This seems to indieate that before the end of the current year the Hollinger may indeed take its place as the largest gold producing mine in the world.

The Porcupine Crown Company has dewatered the Moneta and is now proeeeding with an examination. It is stated that the prospects of a deal between these two companies is considered more or less promising.

The Dome Mines is stated to be preparing a further increase in tonnage treated, and current earnings unofficially reported at the rate of upwards of $100,000 a month. Earnings at this rate amounting to $1,200,000 a year equal to 30 per eent net profit, and, if maintained, would indicate a return of around 10 p.c. on shares at $30 each, whereas quotations on the open market are now around $14.

With regard to the option which the Dome Mines holds on the Dome Extension, and which expires in March unless extended or exercised, it is mooted in mining cireles that the Dome may request an extension of another year's time. Up until very reeently the general impression appeared to be that the option would be exercised this year. Even yet, not a few mining men believe such will be the ease. The current report that an extension of time might be requestd is unofficial, but has caused widespread discussion among shareholders of the Dome as well as the Dome Extension Company.

According to official advice, the shaft at the Clifton-Porcupine has reached a depth of 200 feet. Down to that point the deposition of gold has been found to be quite uniform. It is stated that drifting and cross-cutting at that depth will be carried out at once for the purpose of developing the downward continuation of the ore bodies developed at the first level. A substantial quantity of commercial ore is now in sight.

A change in the management of the Porcupine-Keora is reported, and Mr. Waite, formerly of the engineering staff of the Hollinger has reeeived the appointment. Arrangements have been made to sink the central shaft to a depth of 250 feet.

At Kirkland Lake, the favorable developments at the 600-ft. level of the Kirkland Lake Gold Mines is among the most interesting events of the week. Some of the ore being eneountered is stated to run about $30 to the ton. While this is considerably higher than the average, yet it indicates the likelihood of mill heads being increased.

In connection with the bonds held by Mr. Denison in the Teck-Hughes Company, it is reported that a large Cobalt mining company is negotiating with the object in view of purchasing them. As to this, nothing of an official nature has been given out.

Arrangements have been made to resume work on the Fidelity property, in the north-east part of Teek township in the Kirkland Lake area. Prior to the labor strike the shaft was driven to a depth of 145 feet at whieh point the vein had widened out to about six feet in width as compared with less than half that width at surface. The property is equipped with a steam plant. The present plans are to earry out drifting operations at the 145-ft. level, the work to be done by contact.

In the Boston Creek distriet, satisfactory progress continues. Until the shaft at the Miller Independence reaches the 500-ft. level and cross-cutting toward the ore bodies eommenees, nothing of particular interest is expected from that property. By the middle of February, developments will have reached an interesting point.

At the Kennedy-Boston, the shaft has reached a depth of 70 feet and high values are said to occur in the vein at that depth.

In the Fort Matachewan district, with operations confined chiefly to diamond drilling, and on account of the extreme reticence of the one important operation, that of the Matachewan Gold Mines, nothing of particular interest may be expected during the next few months.

At Larder Lake, interest centres around the Associated Goldfields. This Company has been extremely successful in raising capital, current reports intimating that the treasury now contains some $800,000. As yet, however, no detailed report is available, although there is some evidence of the newspaper criticism of the situation causing the management to take some action in regard to the preparation of a report by a thoroughly qualified and reputable mining engineer

In the Larder Lake district as well as Kirkland Lake, Boston Creek and Skead township, property powers are showing a great deal of interest in the recent proposal to build a light narrow gauge railway, some fifty miles in length proposed to pass through each of the camps mentioned, and interesting developments appear likely.

A revised statement of the dividend record of the silver and gold mines of Northern Ontario shows that the total amount paid up to the end of December 1919, amounted to $95,757,368.04, and not $101,087,368.04 as stated in an earlier statement.

The record is:—

Silver mines	$4,882,341	$81,003,616
Gold mines	2,461,542	15,753,752
Totals	$7,343,883	$95,757,368

A DRAIN ON CANADIAN BRAINS

By offers of better compensation and more brilliant prospects, the representatives of a United States petroleum company has succeeded in relieving the Dominion Department of Mines of half a dozen of its experts. It is not a surprising development. It is a notorious fact, and to the discredit of Canada, that experts and technical men in our public service are grossly underpaid. Even under the recent re-classification, which, despite all the abuse hurled against it, is an improvement on the past, technical men received far from the recognition they deserved. The result is bound to be bad for Canada. It is bound to mean that the old drain upon Canadian brains to help build up the United States will continue. Today, all over the United States Canadians are to be found in the highest positions, helping to build up the commercial, industrial, and scientific greatness of our neighbor. These men might have remained in Canada, might have been enlisted in the service of their own country, except for the fact that their own country refused either to recognize or was too small to pay for their brains. And as time goes on, and the importance of science increases in the growth and development of nations, the situation for Canada is bound to grow worse. It is a subject that might well engage the attention of the highest authorities in the land.

—Ottawa "Journal."

MINING IN THE PORT ARTHUR DISTRICT DURING 1919.

By J. J. O'CONNOR.

The year 1919 closed the first year of mining activity in this district in twenty years.

The abnormally high price of silver caused much attention to be paid to several of the old silver producers in this area, and to the opening of new silver properties. It is expected that the year 1920 will see many of the old properties, such as the Beaver, Porcupine, West Beaver, West End, Silver Creek, Silver Glance and Silver Fox, in the producing list.

Iron ore has been one of the chief factors in the mining activity of 1919. Drilling operations are being carried on on the Nepigon range with amazing results, large bodies of good merchantable ore are being disclosed by the drills, where nothing but lean jaspilites showed on the surface. This is but an indication of what may be expected on all the ranges of this district when drilling is commenced on them. We have vast deposits of iron ore, showing low grade on the surface, that, wherever drilled, have been proven to contain merchantable ore at depth.

A number of iron properties are now under working option to United States interests, and it is confidently expected that another year will see satisfactory results from the work in hand, and others to be undertaken.

A number of gold finds north of Schreiber, some of them carrying spectacular values on the surface, have been made during the year. No actual mining has been undertaken on any large scale. Trending, stripping and shaft sinking is being done on several of them, with highly satisfactory results. This district has been visited by several representatives of mining companies in Cobalt, Porcupine and Montreal, during the Autumn, and options have been taken on a number of the new claims, with operations to begin in the summer of 1920.

The most important transaction in gold mining was the purchase of the "Foley" at Mine Centre, by the Swedish-Canadian Mines, Limited, represented by Mr. J. A. Johnson. This property will be put under active operations Jan. 15th 1920. About 100 men will be employed.

The Wachman Mining Co., began active mining operations on their gold properties near Dryden, in October last, employing 60 miners. The Rognon Mining Co .are developing their properties at Contact Bay, Vermillian Lake.

The Mikado Mine, at Shoal Lake, has been sold to Chicago parties, and will be operated in the summer of 1920.

The Grace, and Norwalk gold properties have been sold to W. A. Burmeister, of Chicago, these mines are on the Algoma Central Railway, and will be actively operated during 1920.

Twelve claims have been staked at Ozone Siding, on which there are splendid showings of zinc blende. Near these claims, a ten foot vein of baryta has also been staked.

More geologists, mining engineers, and men prominent in the mining world have visited, and examined mining lands n the district surrounding Port Arthur, in 1919, than in the whole of the past twenty years, evidencing the interest that is being taken in our mineral areas.

The year 1920 is being looked forward to hopefully by all interested in the development of the dormant wealth of this mineral area.

INSTITUTIONAL ACTIVITIES IN BRITISH COLUMBIA

(From Our Staff Correspondent at Vancouver)

B. C. Chamber of Mines: The British Columbia Chamber of Mines has arranged a series of lectures in the audience room of the Chamber of Mines in the Dominion Building, Vancouver. The lectures are free and the public is invited to attend.

The following is the series of lectures as arranged, and it will be noted that each subject is to be discussed by men well qualified to do this.

Jan. 6. Relationship of Geology to Mining, Dean R. W. Brock, University of B. C.

Jan. 8. Assaying. R. L. McKillop.

Jan. 12. Mine Development. Prof. J. M. Turnbull.

Jan. 15. Chemistry, Dr. D. McIntosh.

Jan. 20. Modern Ore Leaching, Prof. H. N. Thompson.

Jan. 27. Petroleum (Volcanic origin), Prof. G. A. Gillies.

Jan. 29. Oil Flotation Process, G. S. Eldridge.

Feb. 3. Petroleum, Dr. E. T. Hodge.

Feb. 5. Metallurgical Fuels and Refractories, Prof. H. N. Thompson.

Feb. 10. Petroleum, Dr. E. T. Hodge.

Feb. 12. Origin and Occurrence of Iron Ores, Dean R. W. Brock.

Feb. 17. Petroleum, Dr. E. T. Hodge.

Feb. 19. Iron and Steel Metallurgy, H. N. Thompson.

Feb. 24. Petroleum, Dr. E. T. Hodge.

The lectures on Petroleum are intended to form a series dealing with the origin and search for oil, and differing theories on the origin of oil will be presented, which it is hoped will add a little liveliness to the discussions.

It is evident, from the names of the lecturers, that the University of British Columbia intends to be a focus of both light and leading in Vancouver. It is undertaking that extension of its activities among the outside public which most quickly leads to the adoption of a university by the community among which it is placed, and creates that sense of proprietory attachment among the general public which a university must possess if it is to be successful in the best sense of the word.

Short Courses in Mining and Allied Subjects at the University of British Columbia, Vancouver:

For a period of eight weeks, commencing the second Monday in January, the University of British Columbia offers short courses for the benefit of those who have had practical experience in mining and prospecting, or are connected with the business of mining in any way. The courses are not intended primarily for those who have had a technical training, but so far as they go are complete and adapted to fulfill their special purpose.

Classes are to be held in the day-time only, and require about 30 hours per week for those who attend all the courses.

Short mining courses were inaugurated in January, 1917, and lasted six weeks, with 27 students in attendance, which average was well maintained throughout the courses. Prospectors, miners, brokers, businessmen, newspapermen and others took the course. Resolutions were passed stating the appreciation of these persons of the courses, and requesting further enlargement and extension of the work. As far as possible this request has been carried out.

All courses are free to returned soldiers. A registration fee of $5.00 is charged, and as many courses as desired can be taken for this inclusive sum.

Following is a summary of the courses offered:

Mining. Prof. Turnbull.
Smelting. Prof. H. N. Thomson.
Geology and Ore Deposits. Dr. E. T. Hodge.
Ore Concentration. Prof. Turnbull.
Mineralogy & Rock Study. Dr. W. L. Uglow.
Fire Assaying. Prof. H. N. Thomson.
Chemistry. Dr. D. McIntosh.
Surveying. Prof. E. G. Matheson.
Blacksmithing. Actual Shopwork. Mr. H. Taylor.

Uuqualified commendation should be accorded to the Faculty of the University for their enterprise and public spirit in arranging these university extension courses. There are many mining communities in Canada, older, more populous and as welathy as British Columbia, that have not yet attained to these privileges.

Canadian Mining Institute: A recent reference in the "Journal" was made to the "Western Branch of the B. C. Division." This should have read: "The B. C. Division of the Western Branch of the C.M.I."

The North Coast Branch of the Institute has approved the proposed bill entitled the "Regulation of the Engineering Profession in Canada." So far, none of the other local branches have taken action in this connection.

ALICE ARM REPORTS ARE EXAGGERATED.

The report in a morning paper of Vancouver that a vein of fabulous richness had been struck in the Dolly Varden mine is denied by the Taylor Engineering Co., Ltd., absolutely.

The Taylor Engineering Co., Ltd., which is operating the Dolly Varden at the present time or were before winter set in, state that they have had some very good returns, and several times have shipped some high grade ore to the smelter, which would total forty to fifty ton, but this would not run over an average of 1000 ounces to the ton. Although this is pretty nice returns at the same time these figures do not reach anywhere near the figures that were given in the newspaper report. In fact the prospector whose name was used now denies that he gave anything like the figures that were published. It will be well for the public in general to make some allowance for fancy stories that may be printed about the different districts throughout British Columbia from now on, as there is every indication of a big rush to the different fields the coming Spring, and some alluring stories will no doubt appear from time to time.

Note:—A report from Vancouver in the Montreal papers of January 13th is evidently the same report that is authoritatively denied by the management of the Dolly Varden Mine.

Canada's future largely turns upon her handling of the coal problem. Until she releases herself from coal subservience, she cannot rise to her full stature nor stride forward with free step. We cannot be economically or otherwise a sovereign people until we show that we can take care of ourselves, in summer or winter.—Montreal "Star."

OUR BRITISH COLUMBIA LETTER

The Metal Mines

Trail, B.C.—While the estimated value of the output of the Trail Smeltery of the Consolidated Mining & Smelting Company for 1919 is less than that of 1917 and 1918, the gross ore tonnage treated is not materially less than that of the previous year. Having in mind the great stimulation for which the war was responsible, and the high prices which prevailed during that period, the 1919 record, the third highest in the fourteen years' history of the Company's Plant, is extremely creditable.

The 1919 production is provisionally valued at $7,942,101, zinc providing nearly one-third of the total value with lead and silver next in the order named. Details are shown in the appended table:

Output Trail Smeltery for 1919:
(Month of December partially estimated.)

Gold	$ 938,449
Silver	1,598,489
Copper	951,360
Lead	1,890,597
Zinc	2,563,206
	$7,942,101

The estimated tonnage of ore and concentrates received at the Smelter for the year is 319,147, which is about the same as in 1918. On the basis of the actual figures up to December 21—omitting the last ten days of the year—the total tonnage of 312,589 is divided between raw ore and concentrates in the proportion of 302,589 tons of ore to 10,072 tons of concentrates. Up to that date 134 different properties were represented in these receipts. Properties of the Consolidatd Company contributed over 230,000 tons of ore and concentrates.

Ore and concentrates of the Kootenay-Boundary District of British Columbia, not handled at the Trail Smelter, add quite substantially to the production of that section in the past year. The Granby Consolidated Mining & Smelting Company operated the Grand Forks Smelter for the first six months of the year, treating 152,821 tons of ore. All but a few tons from a couple of mines in the Republic Camp were from the Company's low grade property at Phoenix. The output of the Smelter was 1,888 tons of blister copper, which, at an average price of $400 a ton, would work out at a valuation of $755,200.

Nineteen Kootenay properties exported ore or concentrates for treatment in various American smelters. These exports were nearly all concentrates, although 3,143 tons of high grade ore were shipped, which at $100 a ton would be valued at $314,300. The concentrates amounted to 13,260 tons, which at $250 a ton would work out at $355,000. Thus the estimated total exports for the Kootenay-Boundary District would total $649,300 in value.

Referring to ore and concentrates, the production of the district under discussion for 1919, inclusive of a few outside shippers, would be as follows:

	Mines	Ores	Concentrates
To Trail Smelter	134	302,589	10,072
To Granby Smelter	3	156,821	
To American Smelters	19	3,143	13,260
Totals	156	462,533	23,332

The Minister of Mines for the Dominion is to receive a special invitation to attend the annual meeting of the Associated Boards of Trade of Eastern British Columbia to be held next month at Trail, B.C. One of the most important questions for discussion is expected to be that of obtaining a preference in the British market for Canadian metals as well as for other Canadian raw materials and manufactures.

The Florence Silver Mining Company has resumed operation of its mine and mill, situated on Princess Creek. This property has been colsed down for between two and three weeks owing to plant trouble experienced during the severe cold of early December.

Slocan, B. C.—The Soho Silver-Lead Mine, which adjoins the Rambler-Cariboo Property in the McGuigan Basin, Slocan District, and which has been closed for the past eighteen months is being reopened under the supervision of J. C. Ryan, the manager of the Soho Mining Company. Although only from ten to twelve men will be employed during the winter it is the intention to increase the force materially in the spring and to that end it is proposed augmenting the camp accommodation. There are four veins on the property, on one of which there has been development of something like 3,000 feet, while on another a 100 foot shaft has been sunk from which there has been some drifting. Two carloads of ore were taken from the shaft in the working. It is said that there is about $10,000 worth of ore on the dump awaiting shipment, basing the computation on present prices.

Another Slocan property recently heard from is the Ottawa, now under lease from the Consolidated Mining & Smelting Co., by A. L. McPhee and P. Maguire. They are said to have encountered a shoot of high grade ore in a raise from a lower drift, there being a vein of ore, eight inches in width, assaying approximately 1,000 ounces to the ton.

Still another Slocan property, known as the Anna Group, situated near Slocan City, is reported to have rewarded those engaged in development. Here again it is asserted that a rich vein has been struck, the ore of which assays very high in silver. The work of opening this up is proceeding.

Princeton, B.C.—Work on the railway from Allenby to the Copper Mountain Mine of the Canada Copper Company, is being prosecuted now with much vigor. A gang of about 500 men is employed and, if there is no further trouble, there is no doubt that the railway will be in shape for operation some time next summer. The working of the mine as well as the new mill at Allenby, and the placing of this large new British Columbia mining enterprise on a producing basis awaits only the completion of the railway and the power line from Bonningtom Falls, near Nelson, B.C.

Vancouver, B. C.

Until sometime in the month of December last officials in charge of the Dominion Assay Office, Vancouver, B. C., were authorized to pay for gold offered for sale in New York Funds, providing the same were demanded. On the discontinuance of this concession by the Dominion Government representations went forward to Ottawa, the Canadian Capital, through the Vancouver Board of Trade, on be-

half of the gold producers of this Province. It was pointed out that with costs increased, the value of their product fixed, and the exchange quite substantially against Canada, the gold miners of British Columbia found themselves in a serious situation. They were tied, figuratively, hand and feet as the government embargo against the export of the metal still was effective. As a result the Canadian Government has decided to modify the condition to an extent by allowing what amounts to a bonus of 5 per cent over and above the actual value of the gold presented at the Assay Office. While this, under present conditions, will not entirely make up the loss incurred through the withdrawal of the previous arrangement of payment, on demand of New York Funds it will in a large measure meet the wishes of those most interested.

The original telegram of the Vancouver Board of Trade to Ottawa read as follows:

December 19th, 1919

Sir Henry Drayton,
Minister of Finance,
Ottawa, Ontario.

We understand Vancouver mint has been instructed to discontinue payments for gold at value New York Funds. This will result in closing down the most important gold producing mines of British Columbia and thereby throw out of employment many men during this most critical period of our gold returns leave the country as blister copper without any arrangements being made for the return of the gold values. We would respectfully suggest that this order be withdrawn. Please wire immediately as situation is acute.

Ultimately the following reply was received: Vancouver Board of Trade:

"Referring to your message to Sir Henry Drayton the policy of paying New York Funds for gold deposits has been suspended in view of the present high rates. In lieu thereof the Minister has authorized an allowance to be made to depositors to the extent of 5 per cent. In other words the depositors will have a fixed rate of 5 per cent for the present if they desire to take advantage of it.

(Signed) T. C. BOVILLE,
Deputy Minister of Finance.

Shareholders in the Belmont-Surf Inlet Mines recently received their third dividend in a twelve month period, the same amounting to 2½ cents per share, of the share capital of $2,500,000 in dollar shares. This property, which is situated on Princess Royal Island, has been a steady dividend payer. The mine is worked by tunnels, shafts, stopes and winzes and ore is treated at a cost of about $7.20 a ton, while the values realized in 1918 were a little over $11 a ton. Owing to the increased price of silver this valuation will be considerably higher for 1919. Considerable development work also has been done during the past year and it is expected that , when official information is available, it will be shown that the ore reserves have been increased.

A syndicate of prominent Vancouver business-men has been organized, and incorporated as the Whale Channel Mines Co., to take over and develop six mineral claims situated on Princess Royal Island about three miles noth of the Belmont-Surf Inlet Property. It is said that the ore bearing lead is about 12 feet in width and that it has been traced for a distance of 3500 feet. A force of men is being sent north immediately to continue work on a tunnel which is to be driven for 1500 feet.

Statements painting the future of the mining industry in British Columbia in bright colors have been made recently by Hon. Wm. Sloan, Minister of Mines, and by others in touch with conditions. Among the concrete reasons given for this spirit of optimism are the following:

Tha the Granby Consolidated Mining and Smelting Company proposes the installation of a Mill to treat low grade ores, thus making a rich smelter product.

That the Granby Company also is likely to take over the Exstall Mine on the Skeena River, which it has had under development of some years.

That the Britannia Mining Co., Howe Sound, will be able to maintain its present rate of production.

That the Canada Copper Company will be ready some to commence active production at its Copper Mountain Mine.

That new mills are proposed for this year at the Sunlock Mine and the Old Sport Mine, Vancouver Island, in both of which the Consolidated Mining and Smelting Company of Canada is interested.

All these enterprises have a direct bearing on the copper production of the Province in which there was a distinct falling off in 1919. Basing their calculations on such very clear indications, and having in mind the smaller properties being developed and some producing in small quantities, it is argued that, providing the copper market hold good, 1920 should be a record year for British Columbia.

Mention also is made of the prospects of an iron and steel industry being launched. It is suggested this may be undertaken by the Canadian Collieries (D) Limited. Union Bay, Vancouver Island, where there is a fine harbour, suitable coking coal, and railway facilities is mentioned as a possible site. Here there are available, also, limestone and fire-clay, manganese ores and extensive iron-ore deposits, among the latter being those of Texada and Redonda Islands. In addition the Company has at Puntledge an hydro-electric plant which could be utilized in connection with the projected industry.

Victoria, B. C.

Intimation has been received by Hon. John Oliver, Premier of British Columbia, that the Dolly Varden Mines Company has taken the necessary steps to test the validity of legislation passed by the British Columbia Legislature relative to their holdings in this Province. No definite word has been given as to what course is to be pursued but it is likely to take the form of an appeal to the Minister of Justice, Ottawa, for the disallowance of the Provincial Statute complained of.

Possibly it will be recalled that at the last Session of the Provincial Legislature, that of 1918-19, a special Committee of the House was appointed to investigate a dispute between the Dolly Varden Mines Company and the Taylor Engineering Company, of Vancouver, B. C., the latter Company having been engaged in the construction of a railway from tidewater. Alice Arm, to the Dolly Varden Company's mineral properties. Much the greater part of the railway was complete, but a few miles of steel had yet to be laid and it was the fact that it was essential that the Provincial Charter granted for the building of the railway should be renewed that was primarily re-

sponsible for bringing the matter to the attention of the Legislature. This charter limited the period for the completion of construction and that period had lapsed. Having come before the House the differences between the mining company and the railway construction company became known and were ventilated. It was charged by the last named that the mining company was in debt for the greater part of the cost of the railroad and this allegation was proved, as is apparent from the subsequent legislation, to the satisfaction of the Special Committee of the House.

Then came the legislation which, evidently, it is proposed to have vetoed. It provided, briefly, that the Dolly Varden Mining Company should have a certain stated period in which to meet its indebtedness. Bluntly, it was "put up" to the company to meet what, it was considered, were its just obligations. If it failed, its properties were to be forfeited, and someone else was to have the opportunity to develop and operate them. The company did not rspond. Accordingly, and in strict compliance with the terms of the Statutes, the mine, plant, and the almost completed railway fell into the hands of the Taylor Engineering Company. With further financial backing the principals of this company, and some other associates, acting as the Taylor Mining Company, took up the task of the development and the placing on a shipping basis of the Dolly Varden Mine.

These efforts, so far, have met with conspicuous success. The railway was finished to a point just below the mine by September 1st of last year. Within that period, also—work having started about the middle of June—a 2,000 foot, 2-bucket aerial-tramway, with upper and lower terminal-bunkers was ready for operation. Although little development work was done, a careful geological examination of the property is being made this winter on which will be based next year's programme. Between the 1st of September and December 15th the mine delivered to the Granby Company's Anyox Smlter approximately 7,000 tons of ore averaging 56 ounces of silver to the ton, as well as a small quantity of high-grade sacked ore averaging about 1,000 ounces.

W. E. Somerville, a prospector and mine operator of the Portland Canal District, and associates are reported to have bought the Homestake Group of five claims situated in the Alice Arm section. It is said that the lead has been traced for 3,000 feet by tunnels and open-cut and a good deal of diamond drilling has been done.

Grand Forks, B. C.

Since the closing down of the Phoenix Mines of the Granby Consolidated Mining & Smelting Co., with the result that the formerly bustling little town of Phoenix now is deserted, there have been reports from time to time that the company has plans which, in their development, will rehabilitate Phoenix to some extent as well as bringing a larger measure of prosperity to the contiguous section. The assertion now made is that the company proposes the installation of a concentration mill at or near Phoenix for the handling of the low grade ores of the mines. The volume of water necessary is said to be available. Such action, it is pointed out, might lead to the resumption of smelting at the Grand Forks Smelter. In this connection, however, it is to be borne in mind that there is no assurance that the concentrates would not be shipped to the smelting plant at Anyox. The mines at Phoenix are said to contain a large quantity of low grade ore.

Prince Rupert, B. C.

For the benefit of the many smaller mines situated near the northern Coast and in the northern Interior of British Columbia a sampling plant may be established at Prince Rupert according to report from the latter City. It is said that the enterprise has sufficient financial backing to meet the required initial outlay and to enable advances to be made on small shipments of ore. Mining men consider that the enterprise can be made to pay its way and assert that it will materially assist in the development of the mineral areas of the North, there being not a few instances where operators are retarded in the development of their properties because they cannot ship in large enough quantities to make shipment to the existing smelters worth while.

Stewart, B. C.

The universal labour unrest appears to have spread to the Salmon River Mining District, B. C., from where it is reported that the men employed at the Premier Mine have gone on strike. The quality of the food is said to be the complaint.

Cowichan, B. C.

Having shipped 500 tons of Manganese Ore with satisfactory results the B. C. Manganese Company, whose property is situated on the E. and N. Ry. in the Cowichan District, Vancouver Island, is making arrangements for the installation of an aerial tramway. With better transportation facilities it is figured that it will be possible to increase the output of the Mine. The tram is expected to be in shape within two months. Meanwhile no shipments are being made because the road is in no condition for use.

In a letter to the owners Guy S. Rowe, second vice-president of the Bilrowe Alloys Co., Tacoma, Wn., expresses himself as pleased with the quality of the Vancouver Island Manganese Ore. He says that this ore analysed not lower than 48 per cent metallic manganese, with some cars going over 50 per cent metallic manganese, and that it contained no deleterious elements in sufficient quantity to interfere with the manufacture of standard 80 per cent Ferro-Manganese.

Mr. Rowe continues:

"We hope that you will be in a position soon to enter into a contract to supply us with approximately three cars of ore, or about 120 tons, a week.

"It is possible that we may start another furnace and need an additional 50 tons a week. In the event of our doing this we would be glad to contract with you for approximately 150 tons a week.

"Having visited your property we feel assured that you have thousands of tons of this excellent ore in sight, with large amounts yet uncovered, and we trust you will lose no time in installing your aerial tramway, as we are very anxious to use your manganese ore again in our operations."

Nelson, B. C.

James McGregor, for the past 22 years mining inspector for West Kootenay, Boundary and Yale Districts, who has made his headquarters in Nelson for

20 years, has been transferred to another of the Provincial Districts with headqnarters at Vancouver, B. C. It is expected that he will assume the inspectorate in the Nicola District.

A British Columbia Prospectors' Protective Association has been organized with a membership of eighty-five and with headquarters at Nelson, B.C. The officers are: J. W. Mulholland, president; C. E. Crossley, vice-present; Fred A. Starkey, secretary; and Dr. F. E. Morrison, treasurer. The objects of the organization as outlined are: To deal with the matter of grants from the Government for roads and trails to mining properties; to continue to a successful issue the agitation for a government ore testing plant in the Kootenay District; to advocate the re-opening of dormant crown-granted mineral claims; to secure free sets of surface samples for purpose of study by prospectors; and to take the necessary action to have prospects examined by the district engineer, or by an engineer representing the association, the engineer's report to be filled with the secretary of the Association and the property to be listed. Not one prospector in a hundred, it was stated, had an engineer's report on his holding and such reports were essential, as investors were not in the habit of buying by word of mouth.

Having accepted an offer of the Henry L. Doherty Company, of New York, to undertake some important reconnaissance work in Southern Mexico, John D. Galloway, for six years prominently connected with the Provincial Department of Mines ,during the last three of which he has performed the duties of Resident Engineer of Mineral Survey District No. 2 (Northeastern British Columbia) with headquarters at Hazelton, has placed his resignation in the hands of Hon. Wm. Sloan, Minister of Mines.

While Mr. Sloan very much regrets losing the valued serviees of Mr. Galloway, it is gratifying to him that a firm of high standing should seek one of the officials of his department to carry on important geological and explorative work in foreign fields it is proposed bringing under development. Mr. Galloway, it is pointed out, will haev an opportunity to obtain a broader experience. His selection is taken as a flattering commentary on the reputation of the technical staff of the Department of Mines for efficiency, and Mr. Galloway is being extended the best wishes of his confreres together with the assurance of a warm welcome should he ever decide to return to British Columbia. Mr. Galloway is an honor graduate of McGill University in Mining Engineering. In 1911 he obtained the degree of B.Sc. ,and in the following year that of M.Sc.

THE COLLIERIES.

While it is conceded that the success of Senator Robertson, Minister of Labor, and W. H. Armstrong, director of coal operations in District 18, U.M.W.A., (Eastern British Columbia and the Province of Alberta) in effecting an agreement with the coal miners, under the direction of the United Mine Workers of America, is a serious blow to the aspirations of leaders of the One Big Union Movement there is a firmly rooted belief that the last has not been heard.

Unquestionably the ground has been cut from under the feet of the O.B.U. in that the miners have agreed to the increase amounting to 14 per cent over wages previously received and to the principle of the "check off", or, in other words, that the dues of the miners are to be deducted by the operators themselves and remitted to the headquarters of the U.M.W. of A. and not passed over to the various local unions. S. Ballantyne, representative of the United Mine Workers, has charged that these funds for some time have been used for O.B.U. purposes.

Nominally the actual position facing the miners is this: They will have either to own allegiance to the U.M.W. of A. or cease work. There is little probability of a strike, however, as the O.B.U. is said to be practically without funds. Another point recognized is that a strike at the present time could not have public endorsation. In the Crow's Nest Pass District the situation has been complicated by the recent declaration of the local union in favor of the O.B.U. Still it is thought that nothing will be done for some time at any rate. From the standpoint of the miners the position appears to be summed up in an observation attributed to Henry Beard, the president of the dual organization in District No. 18, that "we shall wait and see."

In view of the increase of 14 per cent granted the miners the dealers have been authorized to increase the price of coal to the public. In the case of Drumheller coal the increase will be 40 cents a ton. The product of the Lethbridge field will advance 52 cents a ton while bituminous or steam coal will be increased 34 cents a ton.

A reconstruction of the Canadian Collieries (Dunsmuir) Ltd., which company has large holdings and operates on a considerable scale in the coal fields of Vancouver Island, has been announced from London England, where a large proportion of the company's stock is held.

In discussing the present situation, as well as the new proposals, the London Times in a recent issue says:—"It will be recollected that as part of the arrangement made in 1915 a Bondholders' Committee was appointed, and the control of the Company was placed in their hands through deposit of a majority of the shares in a voting trust in their favour. During the war the company's earnings have not sufficed to provide ny interest on the bonds. Duding the first part of the war the company was actually working at a loss, owing to the falling off in the bunker trade on the Pacific Coast. In the latter part of the war the bunker trade revived and the company was able to make a better showing, but the scarcity of labour and nts abnormally high cost both reduced the Company's output and continued to keep the margin of profit down to a low figure, while the depreciation of the plant and the upkeep of the mines absorbed considerable sums, leaving no surplus available for interest on the bonds. Although results have been better recently, the outlook for the company must remain uncertain for some time to eome. While the Company has very large coal areas available for exploitation, the cost of obtaining the coal is very high, and the market for it is fluctuating both as to demand and price."

The same article then proceeds to give details of the contemplated re-organization, an interesting portion of which reads as follows:—"A new Debenture Stockholders' Committee is to be constituted which will have power to authorize the Company to issue prior lien securities ranking in front of the 'A' and 'B'

Debenture stocks to an amount not exceeding 1,500,000 dollars carrying interest at not exceeding 10 per cent, and will also have other wide powers and discretions, including power to consent to the whole or any part of the company's net earnigs up to June 30, 1924, being applied or reserved to meet capital expenditure, and at any time to approve of development and exploration work being charged to revenue, etc."

With the completion of this plan of reconstruction it is believed in British Columbia that the Company will be in a better position to undertake the development fo its holdings on the Island and the adoption of a progressive policy, which, it has been suggested, may include the launching on a small scale at least of an iron and steel industry.

Note:—With reference to the figures which appeared in the general review of British Columbia mineral production (see page 13, issue 7th January 1920) your correspondent would point out that the figures therein given are based on what was known regarding production up to the end of October. Since then information is to hand indicating that, contrary to earlier expectations, British Columbia's 1919 output of silver will be slightly in excess of that of 1918. This is accounted by the fact that the returns from the Sullivan Mine, operated by the Consolidated Mining and Smelting Company of Canada, for the latter part of the year were over what was looked for and also by reason of the accumulated production of small shippers of the Slocan District, to which insufficient attention was paid in the compilation of estimated. Gold and Lead production also will be somewhat above what was estimated although not equalling the mark established in 1918. As to Gold the explanation is almost entirely the speeding up of the output of the Rossland Mines, also operated by the Consolidated Mining and Smelting Company of Canada, during the months of November and December. The difference in regard to Lead is due to the increased activity at the Sullivan Mine and to the small shippers of the Slocan. Outside of these improvements the estimates stand and it may be predicted that the monetary value of British Columbia's mineral production for the past year will be approximately $8.000,000 less than that of 1918 or about $33,000,000. The decline is accounted for, almost to the full extent, by the falling off in production and the fluctuations in price of copper.

Mr. J. K. L. Ross, who recently resigned from the Board of the Dominion Steel Corporation, has been elected a director of the Consolidated Mining and Smelting Company.

Mr. Lorne Webster of Quebec has been appointed a member of the Senate. Mr. Webster, among many other activities and directorates, is a director of the Nova Scotia Steel & Coal Company, and was for many years the Quebec representative of that Company. He has taken a very active interest in the raising of war funds, and in charitable organizations. Mr. Webster's business acumen, and his wide knowledge of the coal and transportation problems of Canada, should enable him to take a leading part in the counsels and policies of the Senate.

Mr. D. H. McDougall was in Montreal recently for the first time since returning from England, and visited headquarters of the Canadian Mining Institute.

PUBLICATIONS RECEIVED

Investigations in the Gas and Oil Fields of Alberta, Saskatchewan and Manitoba. By. D. B. Dowling, S. E. Slipper and F. H. McLearn. Memoir 116. Geological Survey. Publication Serial No. 1722.

This Report is composed of three separate ones, namely, Part 1, "The Structure & Correlation of the formations underlying Alberta, Saskatchewan and Manitoba, by D. B. Dowling; Part 2, "Sketch of the Geology of Southern and Central Alberta, by S. E. Slipper, and Part 3, "The Cretaceous of Peace and Athabaska Valleys, by F. H. McLearn. An appendix gives a record of selected wells, arranged in East-West order, compiled by Dr. Dowling. The Reports are accompanied by relief and contour maps, and a series of colored sections of strata revealed by well records.

With reference to the foot-hill district, Dr. Dowling remarks:

"The oil boom of 1914 will long be remembered on "account of the indiscriminate locating of oil leases "without reference to the structure of the underlying "rocks, and the consequent very large useless expen-"diture in drilling. The general absence of favor-"able structure areas in the disturbed belt of the "foothills has directed attention to the plains, where "the formations are only gently folded, and a little "oil has been obtained in the Peace and Athabaska "Valleys, and the presence of gas proved at various "places. A more extended study of the general "structure than has yet been made is necessary before "the extent of the new fields can be predicted."

Summary Report, Geological Survey, Part A. This gives a general summary by the Directing Geologist of the work of the season of 1918, details of which have already been published in the parts "B" to "G" issued at intervals.

Mr. McInnes's introduction summarises in brief the chief points of interest in the investigations of the Survey, and is as follows:

"During the season of 1918 the work of the Geological Survey was devoted more than ever to the investigation of areas and deposits that promised to be of economic importance. The number of field parties was fewer than in the period before the war, but investigations were carried on in all parts of Canada. In Yukon, particular attention was given to lode deposits upon which the establishment, there, of a permanent mining industry must depend. In British Columbia, the field parties were placed in areas where geological work seemed to be most greatly needed to help in their commercial development; and particular attention was given to the investigation of the platinum situation and to the prospects of securing a greater supply of that mineral which was then so urgently needed for the purposes of the war. Further work was done in the coal areas of western Alberta; and in the Great Plains area and to the north of it further progress was made in working out the structure of the rocks and its bearing upon the occurrence of oil and gas.

The examination of areas in northern Manitoba in which important copper sulphide deposits and gold-bearing veins occur, was continued and the extent of the areas more closely defined.

The geology of several areas in northern Ontario was studied; the pyrite deposits were specially investigated; and further work was done on the central Ontario oil fields.

Important mineral areas were mapped geologically in Quebec and in the Maritime Provinces; and at Malagash, in Nova Scotia, a deposit of salt and associated minerals was examined. The deposit is of interest both because it is the first bed of salt to be discovered in eastern Canada and because of its promising nature from an economic standpoint."

Gabbros of East Sooke and Rocky Point. By H. C. Cooke. Museum Bulletin No. 30. Geological Survey. Publication No. Dept. of Mines 1762.

This is a petrological study of two plutonic masses of general gabbroid composition which occur on the southwestern coast of Vancouver Island, bordering the Strait of Juan de Fuca, and about 15 miles southwest of Victoria.

The author has formulated a theory of the processes through which the gabbros have passed, postulating an original homogeneous magma, which was differentiated into four differing rock types, these being later subjected to regional disturbances before complete solidification had taken place, followed by the effects of a new intrusion accompanied by faulting and jointing, through which hot solutions were circulated that caused further alterations in the rocks with which they came into contact. At a later date, further faulting took place, and into the fissures thus formed there ascended solutions which deposited the chalcopyritic ores that give economic value to this district of Vancouver Island.

Report of the Commission of Conservation for 1919. Tenth Annual Volume.

The latest annual report of the Commission of Conservation covers a striking variety of subjects, indicating that the Commission considers its scope is not limited to conservation of material resources alone, but includes such matters as town planning, venereal disease, prophylaxis and the general public health. This viewpoint cannot be quarrelled with, although it is a curious commentary on civilization that we spend much time and thought on preserving human life, and then are apparently unable to agree regarding a League of Nations, which, as Mr. Balfour says, if not perfect, has no substitute as a preventative of future wars.

Under the heading "Mines" we note the following paragraph

"In July, last, Mr. W. J. Dick, our Mining Engin-"eer, resigned, to accept a more lucrative position "in Winnipeg. Pending the appointment of a success-"or to Mr. Dick, your Assistant to Chairman has had "to carry on this branch of work as best he could. In "addition it is quite evident that we cannot get a "competent mining engineer for the salary we were "paying Mr. Dick."

We believe that Mr. Dick's new position is connected with the sale of coal, and it is evident that when the sale of coal commands a more attractive salary than the work connected with its conservation, the outlook is rather hopeless from the point of view of the public domain.

The Commission of Conservation is doing good work, if only in ventilating the records of waste of material resources in Canada, but in many respects its preaching is like to the voice of a pelican crying in the wilderness.

Another proof of the activity of the Commission is a volume reporting the proceedings of a National Conference on Game and Wild Life Conservation.

Our readers will recollect a recent notice in the Journal of a bird sanctuary made possible by the Dorr Co. at Westport, Conn., and one of the most interesting parts of this recent volume is the description of a bird sanctuary created by Jack Miner of Kingsville, Ontario, who is doing his best to preserve the Canada goose, and to trace its migration by means of name plates.

We would suggest that Isle Perrot, which is situated within view of the "Journal's" office at Ste. Anne de Bellevue, at the junction of the Ottawa and the St. Lawrence, might well be made a bird sanctuary.

The Why of Westport.

This little book is a charmingly designed description of the Dorr Company's metallurgical laboratories at Westport Mill, Conn. The equipment of these laboratories consists of a library of scientific and technical literature, a fully equipped analytical laboratory, a large scale testing plant, with crushing and grinding apparatus, ball mill and Dorr classifier in closed circuit, concentrating tables and flotation equipment, a complete counter-current decantation unit consisting of Dorr agitators, Dorreo pumps and thickeners, and two types of vacuum filters, hydro-separators and percolating tanks. Sleeping accomodation is provided for transient visitors, and, as has been previously mentioned in the "Journal," the surroundings of the Westport Mill are rural and designed to provide ideal working conditions for the staff.

We do not remember to have seen a more tastefully designed brochure, nor one of more consistent typographical excellence.

MINERAL DEPOSITS OF SOUTH AMERICA: By Benjamin L. Miller, Professor of Geology, Lehigh University, and Joseph Singewald, Assoc. Prof. of Economic Geology, John Hopkins University. First Edition. Cloth. 6¼ by 9¼ inches. 598 pages with Index and Bibliographies. McGraw Hill Book Co., New York and London.

This work fulfils the intention of its author to "fill a genuine want in the literature of economic geology" and is the outcome of an extended trip made by the authors in 1915. The idea of publishing the observations made on this journey in book form is well justified by the volume now presented, for not only have the authors assembled in handy form a great deal of information regarding an immensely wealthy but little known half-continent, but they have added to each chapter that deals with the individual countries, a detailed bibliography that adds greatly to the value of the work.

The volume is too well digested and contains too large a mass of information to permit of covering the ground in a short review, but iron and steel men will be much interested in the description of the large deposits of iron-ore and manganese which occur in Brazil, chiefly in the State of Minas Geraes, and are concentrated around the peak of Itabira. The authors quote Harder's estimate that the Central Mines Gereas region, roughly 100 miles square, contains in the thirty known deposits 410,000,000 long tons of Bessemer ores with over 69 per cent iron and less than

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0.02 phosporous, and almost three billion long tons of non-Bessemer ores with over 50 per cent iron and 0.05 to 0.3 phosporous. The authors state that without doubt Brazil contains "the most extensive undeveloped deposits of iron ore of any country in the world".

With reference to manganese, it is stated that during the first years of the European war the steel industry of North America was almost entirely dependent upon Brazilian manganese ores, and it is probable that even after the close of the war North America will continue to look to Brazil for a considerable part of its manganese ores. The authors say: "It is questionable "whether any country in the world possesses greater "deposits of manganese ore than does Brazil, so that "we confidentially predict that the Brazilian man-"ganese industry is bound to increase steadily in importance. No other country, certainly, with the exception of Russia and perhaps India, at the present time, seems to offer more promise in the way of exploration for workable manganese ore bodies."

The mention of Brazilian iron ores is of particular interest to Canadians, as at one time, if not now, one of the large steel companies in Canada held some extensive options on deposits near Itabira.

An interesting reference is made to the Minasragra Vanadium Mine near the Hauraucaca Smelter in Peru, now owned by the American Vanadium Company, which since its discovery is said to have furnished 80 per cent of the world's demand for vanadium.

The Moro Velho Mine of the St. John del Rey Mining Company, at Villa Nova de Lima in the State of Minas Geraes, Brazil, is described as the most interesting mine in South America, and in some respects the most remarkable in the world. The mine, which operates for gold, which has been operated by an English Company since 1834 without serious interruption.

The mine claims the world's record for depth, workings being on August 24th 1917 at a depth of 6,126 ft. below the surface. It is stated that it can probably be worked—if the ore retains its value—to horizon 26, which would give a vertical depth of 7,626 feet, and even to a much greater depth.

The authors remark that the persistence of the ore-body and the absence of any material change in the tenor of the ores with depth are of especial interest "as both are in disagreement with ideas commonly held by mining men."

It is interesting to note, in connection with the depth of the mine, that the surface has an elevation of 2,-774 feet above sea-level.

South America appears to be extremely rich in metals, but the coal deposits are unimportant, except in Chili where there is an interesting extension of the coal seams under the ocean near Conception Bay, where mining has been carried on since 1840.

It may well be that Drs. Singewald's and Miller's work will see future editions as the knowledge of South American mineral deposits is added to.

IRON DEPOSITING BACTERIA AND THEIR GEOLOGIC RELATIONS; by Edmund Cecil Harder. Professional Paper No. 113, U. S. Geological Survey. 1919.

While this professional paper is extremely technical it is not without interest even to those who do not possess the wide knowledge of chemistry and bacteriology that is necessary to its full understanding. In the preface, by F. L. Ransome, it is stated that since 1836, it has been known that certain bacteria have the power of withdrawing iron from solution, and causing its precipitation as ferric hydroxide. "The precipit-"ation of iron sulphide by bacterial processes has also "been known for some time. The geologic application "of these discoveries, though predicted by some to be "far-reaching, have been rather slowly made, and it is "safe to say that many geologists have paid little "attention to the possible extent of bacterial action in "the deposition of iron ores."

Dr. Reinhardt Theissen recently, in a paper before the A. I. M. & M. E., referred to the part possibly played by the so-called "sulphur bacteria" in the formation of the sulphur that is present in coal (see Iron & Steel, November issue, page 283) and it is stated also by Mr. Ransome that the part played by bacteria in the deposition of limestones has been specially investigated and found to be important.

While the actual utility to the bacterial organism of the iron particles that it concentrates is not ascertained, it appears quite certain that large bodies of iron-ore have been formed entirely through the activity of bacterial deposition. Mr. Harder's conclusions are that in general it was found that iron-precipitating organisms were present wherever iron-bearing waters occur, both underground in wells and mines, and in surface waters. It was found that the ocherous scums which occur in such localities consisted mainly and in many places entirely of iron-precipitating organisms, of their remains. It was also found "that solu-"tions of certain iron compounds when inoculated "with almost any type of natural water or of soil, "showed a precipitation of ferric hydroxide by cer-"tain types of lower bacteria, thus indicating the al-"most universal presence in nature of organisms capable of precipitating iron from solution."

We recollect, as a boy in the mine, seeing in a quiet air-course, a small lake of blood-red, almost cardinal coloured "ochre", which was made more conspicuous because it occurred in the midst of long needles of a saline effloreseence upon the white shale side of the air-course. The consistency and appearance of this cardinal lake corresponds exactly with the results of the work of the bacteria described by Mr. Harder.

Among the iron-ore deposits classified as being originally laid down mainly as ferric hydroxide are included the Wabana ores in Newfoundland, and our readers will recollect a paper which was delivered by Dr. A. O. Hayes of the Canadian Geological Survey, and summarised in "Iron & Steel" of August last (see page 176) wherein slight reference was made to the probably bacterial origin of these vast deposits.

The Mine & Smelter Supply Co. announces that Mr. W. A. Leddell has been appointed Manager of their Engineering Dept., with headquarters in Denver, Colo.

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B. C. COAL MAY EXTEND ITS MARKET

The announcement that the Canadian Manufacturers' Association is to investigate the possibility of developing sufficient coal in Canada to meet the requirements of Canadian industry has given rise to the suggestion that the time may not be far distant when the coal of Western Canada will find its way via the Panama Canal to the St. Lawrence River.

On a previous occasion when the subject was broached the statement was made in the East that British Columbia was too far away to be considered as a source of supply for manufacturing purposes in Ontario and Quebec. But with the changing conditions and the fact facing them that the United States may develop other markets for export besides Canada the whole question probably will be reconsidered and the possibility of this Province coming to the aid of eastern manufacturing concerns will be thoroughly investigated.

Arthur V. White, consulting engineer for the Commission of Conservation, in discussing this matter recently, said that the war had brought out the fact that nations which did not possess within their own borders coal and other fuel supplies from which to derive light heat and power have found themselves in desperate straits. Formerly Great Britain was a heavy exporter of coal especially to those European countries which either had no coal of their own or were only partly able to supply their requirements. But Britain is unable now to supply this demand. European countries which require coal have not only been exercising extreme efforts to produce fuel from all possible sources of their own but have been looking outside to ascertain what are the maximum deliveries that may be secured from those countries fortunate enough to have coal for export. The United States, it was said, is stepping to the forefront as an exporter and Great Britain, among other countries, is looking to the United States for assistance in this respect.

"It is manifest, therefore" Mr. White said "that Canada no longer occupies a favored position as being the easiest market for United States coal operators. It may be the easiest market insofar as transportation is concerned but there is the question of price. European countries have demonstrated the fact that they are practically ready to pay any price demanded because it is so evident to those in charge of affairs in these countries that they cannot go on, either economically or in many instances even maintain physical existence unless additional fuel is available.

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:-: EDITORIAL :-:

Misplaced Parsimony

Further bearing on the opinions expressed under the above caption in the last "Journal" we reproduce a Canadian Press dispatch which has appeared in the newspapers, making excerpts from a Statement by the Civil Service Commission which takes exception to the widespread condemnation by Canadian newspapers and the technical press of the circumstances which have compelled a number of the members of the Geological Survey to resign their positions in order to take up more remunerative employment offered to them by wealthy oil corporations. We do not believe the explanation of the Commission requires much comment. It is self-revealing enough. The crux of the statement is in the following sentence, which we excerpt:

"This powerful and tremendously wealthy corpo-
"ration (The British Petroleum Company) approaches
"an officer on the staff of the Geological Survey who
"has been receiving $2,600, but who under the classi-
"fication will at once increase to $3,300, and offers
"him $6,200 to start with. The Government cannot
"compete with such an offer, and the country would
"not sanction it."

What justification was there **at any time**, let alone the unusual times through which we are passing, for paying a competent geologist $2,600 a year? What ground is there for considering $3,300 to be an adequate annual salary for a competent professional man to-day?

The Commission asks that equally wide publicity should be given to the actual conditions under which the defections from the Geological Survey are taking place as has been given to the defections and their necessary consequence. It may be surmised that the daily and technical press will gladly give the requested publicity, for the facts disclosed by the Commission's statement of explanation and defence emphazise the point we have previously endeavoured to make clear, namely, that there is a fundamental and absolute misconception in the official mind, and in the mind of our provincial and federal legislatures, of the status of the scientific man, and the remuneration that he should receive.

The Commission states that two of the members of the Survey who are going away admit that the revised scale of salaries "is as liberal as the Government is justified in offering." Judging by the salaries for which Government geologists have worked in the past, we hardly think they can be admitted as competent judges of what is the extent of the remuneration the Government is justified in offering The Ottawa Journal more-accurately sums up the relative issues at stake when it remarks:

"The loss within a few weeks of one-third of its
"staff is the worst blow ever received by the Geo-
"logical Survey—the most powerful single instrument
"in the past development of the natural resources of
"Canada. Coming at the present crisis in the progress
"of that nation this is nothing short of a calamity."

It is assumed—and it is nothing but an assumption—that the people of Canada will not sanction adequate remuneration of the Geological Survey and other departments of the Civil Service detailed to deal with scientific matters, but why should the people of Canada play second fiddle to a private corporation?

The Permanency of High Prices of Commodities

Has the peak of commodity prices been reached? The reasons for such a belief, when examined, are found to consist largely of faith in things not seen, and they are insubstantial, conjectural, and above all, the expression of a very natural hope.

Conversely, what are the reasons to expect a continuance of the decreased purchasing value of money, or possibly a further decrease in that value? These reasons, if looked into in detail, will be discovered to be substantial and matters of fact, and not admitting hopefulness for decreased prices.

Overshadowing all other questions affecting production is the loss in world population occasioned by war, famine and pestilence, three miseries that even to-day affect a large part of Europe and Asia. Added to these things is the political instability of Central Europe, and the whole Mohametan and Mongolian world. The outcome of this unrest none can foresee, but it is an unmistakable and certain deterrent to production. The world is not at peace.

There is a definite shortage in the basic raw materials of civilization. The wheat production in Can-

ada, Australia, the United States and Argentina, both that now being harvested and that which will be harvested and that which will be harvested next Summer, promises very poorly. There is no visible reason why either the supply or the price of wheat should favour the consumer in the near future.

The same outlook applied to the production and cost of coal. With the notable exception of the United States, and possibly Japan, there is every reason to look for lessened production of coal and increased cost of mining and transportation.

In the matter of transportation, it has recently been pointed out in the United States that when the railways are returned to their owners in that country an increase in rates will be required that will cost each family in the United States, no less than $215. The likelihood of an increase in the rates of the Canadian National Railways has been announced by the Chairman of the Board, and, whether he had announced it or not, an increase in miners' wages and the increase in railwaymen's wages provide a self-evident and compelling reason to expect an increase in transportation rates. Some decrease in ocean-freights may take place as new vessels are completed, but this is a slow process, and, in any case, the cost of commodities in Canada is but slightly affected by ocean freights, except in the case of some luxuries and such articles as tea and sugar.

The general adoption of the shorter working day will inevitably decrease production, and no increased efficiency during the actual working hours can possibly make up for the shorter use of machinery during each twenty-four hours which accompanies the shorter working day of the machine attendants. By increased efficiency during working hours, by greater use of machinery, and by cutting out unnecessary or duplicate motions, possibly production may be helped, but the natural outcome of the shorter day is the adoption of multiple shifts, something to which labour is opposed, and a system moreover that is only possible where a complete sufficiency of workmen and housing accomodation exists. Neither of these requirements are found in North America to-day.

Increased wages mean very little in these days of considerable uncertainty as to what monetary value really consists of, but decreased working hours, smaller production, and actual shortage of basic raw materials, do mean a great deal, and, apart from all questions of currency inflation, functioning of themselves, they mean increased costs of commodities.

Summarizing the foregoing, the influences which tend to decrease production, and to cause scarcity of essential raw materials are, amongst others, chiefly the following—improverishment of the world by actual material destruction during the war, and in the wars now in progress; loss of life by war, famine and pestilence, in the past four years and at the present time; shortage of the products of the field, the forest and the mine, cumulative over the war period, and still continuing; restriction of production by shorter working hours; lessening of efficiency by apparently high wages and easily gained wealth; diminishing stores of natural resources, particularly coal and timber; and above all, and entering into all, the lassitude and disillusionment that has followed upon a peace that is not peace, and the non-fulfilment of promises given under the urgency of national peril. promises that are impossible of fulfilment.

The resultant of all these forces, it seems to us, will be to further increase the apparent price of all commodities, and it may well be that we have entered upon a permanently higher level of prices, irrespective altogether of considerations of currency, and arising from a general desire to work less, to eat more, and to engage more frequently in life's little diversions

As to reasons why commodity prices should decline there do not appear to be any.

En Passant

AN interesting statement was recently made in London by Dr. H. Forbes Leslie, managing director of English Oilfields, Ltd., at the annual meeting. "In several of our borings," said he, "at a considerable depth from surface we have encountered a mineral formation quite unknown in England. It is impossible at present to estimate what commercial value, if any, this discovery may represent, but, so far, we have been able to determine the presence of several valuable metals and mineral substances. One thing appears certain, however, that below the Mesozoic formations in East Anglia there probably exist great thicknesses of metamorphic rocks, in character and mineral wealth resembling those outcropping on the west of these Islands in Wales and elsewhere, but, by the appearance of the sediments which have been derived from them, they would appear to be far richer in minerals and metals than their Welsh counterparts, and to more nearly approximate to the South African metamorphic series." The analogy strikes us as rather strained, but the discovery of a hitherto unsuspected formation, with mineral-bearing possibilities, in so long-settled a country as East Anglia, would indicate how little can really be known of the vast and but meagrely prospected stretches of Canada, and is another proof of the folly of allowing Canada to lose the servees of the men who are able to piece together with some coherence the fragmntary knowledge that is as yet possessed of the geological history and structure of this Dominion.

NO more romantic tale was ever told in mining annals than that entitled "Imprisoned Underground" reproduced in this issue from "Mining and Scientific Press," and best of all, the tale has a happy ending. The combination of the diamond drill, the geophone and the electric-light to rescue men entombed for fourteen days is literally a fairy tale of science.

OF much interest to Canada is the announcement that the experiments which have for some years been carried on at Duluth, Minn., by Heyden Stone & Co., for the commercialization of the lean magnetites of the Eastern Mesaba Range, have proved conclusively the commercial practicability of the enterprise. A new plant is expected to be completed towards the end of 1920 which will have a treating capacity of up to 4,000 tons daily. The product, which is understood to be a magnetically concentrated one, following sintering, will contain upwards of 60 per cent iron, low in phosphorous and with practically no moisture. Mr. Chase Osborn has described the great bodies of lean iron ore that exist on the North Shore of Lake Superior, and these will, if the Duluth enterprise proves successful, assume new and greater importance. It is also interesting to note, from our Port Arthur's correspondent's letters, that drilling in Northern Ontario has proved the presence of iron ores of considerable iron content at depth, where only lean ores were present in the surface exposures.

OUR readers will note a letter in this issue subscribed collectively by Sheffield manufacturers of molybdenum steels, which has reference to Dr. Arnold's new formula, reported to be a substitution of molybdenum for tungsten in high-speed steels, combined with vanadium as a stabiliser. The steel manufacturers who are licensees of "Como" steel believe that they have demonstrated the superior stabilizing value of cobalt mineral, a fact that should be of significant interest in Canada. We have both molybdenum, cobalt and tungsten, and, indeed, Canada appears to possess all the necessary factors to enable this country to take high rank as a producer of alloy steels.

THE confident forecasts which are so liberally distributed through our daily press, ostensibly originating in Holland, as to what Holland will do with regard to the Allied demand for the person of the ex-King of Prussia and the former German Emperor, evidence that the machine of German propaganda is working with undiminished efficiency. Some Canadian newspapers can even beat the Dutch at knowing the Dutchman's mind and intentions.

WHY should it be assumed that the Allies wish to put the ex-Kaiser on trial out of a spirit of revenge? What the British people want; what they elected Lloyd George as Premier to do, is to find out who, or what, started the war. If this is uncovered, so that all the world can see it, then perchance, we can prevent a second, and an infinitely more horrible war.

OBITUARY.

John Casey, Manager of the Caledonia Colliery of the Dominion Coal Company at Glace Bay died of pneumonia on the 14th January, after a very brief illness.

Mr. Casey was 44 years of age, and had all his life been employed at the Caledonia Colliery, where by personal merit he had risen from trapper boy to manager, and had he lived was likely to have gained further preferment.

After the Caledonia Mine fire, which occurred in 1899, and following the death of the Underground Manager who, with a number of other men was killed in the mine at the time of the fire, Mr. Casey was appointed overman. He continued in this position until his father, who was Underground Manager, retired from that position, and his son took his place. In 1910, Mr. Casey was appointed manager, and remained in that position until his death.

John Casey was regarded by his fellows and those who worked under his direction as a man among men, and, as the Glace Bay "Gazette" remarks, they would have followed his lead anywhere.

Mr. Casey always took a lively interest in the "Safety First" Movement, and his management of the mine that came under his charge was competent, conscientious, and consistent. At the same time Mr. Casey was always on the look-out for new methods, and kept himself up-to-date by technical reading.

The Editor would beg permission to record his own grief at John Casey's sudden taking-off, and his appreciation of many kindnesses received from a man who in his time befriended many and was never sparing of his time or purse to serve others. The sympathy of Mr. Casey's many friends and admirers will be extended to his relatives.

VANCOUVER BRANCH OF THE CANADIAN MINING INSTITUTE.

Dr. E. T. Hodge was presented with a pair of gold cuff-links, engraved with his monogram, by the Vancouver Branch, in recognition of the competent manner in which he organized the First Annual General Meeting of the Institute in Toronto at the close of last November. Dr. P. W. Brock made the presentation on behalf of the Vancouver Branch, and that the recognition was well-deserved will be unanimously agreed in by every person who attended this meeting.

Dr. Brock reported on the recent conference held in Vancouver to consider the draft of the bill which Parliament is to be asked to enact regulating the engineering profession in Canada. The draft bill has been considered in British Columbia by a Committee comprising representatives of the civil engineers, architects, chemists assayers, and members of the Canadian Mining Institute, and amendments have been considered by this local body, known as the Joint Mainland Legislative Committee. The Institute members propose amendments to protect geologists and mining engineers specifically. A similar local committee is considering the draft bill in the interests of the Vancouver Island engineers.

Primary Considerations In Hydraulic Stowing*

By C. A. John Hendry F. R. S., A. M. I. M. E,

The flushing of anthracite coal mines with slit and fine rock or slate has been carried on in the United States for many years with great success In fact the idea originated in the United States, and the method has been adopted with certain modifications by various other countries. British engineers term the process "hydraulic stowing," and the following article notes conditions prevailing at various mines in India where stowing is practiced. Certain factors should be taken into consideration before a definite plant is decided upon in introducing hydraulic stowing in a mine and suggestions are here made as to the lines along which such preliminary investigations should be conducted.

Looking at the matter from a purely hydraulic standpoint, the delivery of stowing hydraulically through a pipe is subject to the following elementary rules: (1) The loss by friction is proportional to the length of the pipe; (2) is varies roughly as the square of the velocity; (3) it varies inversely with the diameter of the pipe; (4) it increases with the roughness of the pipe surface; (5) it is dependent of the pressure. The introduction of some lubricating element in the stowing material, such as nodules of clay, is possibly well worth consideration for it would reduce wear on the pipes carrying the stowing material.

The coefficient of friction naturally varies with the velocity of flow and the diameter of the pipe. With a comparatively short pipe it may be necessary to consider losses due to elbows or bends in the pipe line. Where (as is usually the case) the length of the pipe is greater than 1000 times the diameter, the velocity head and the loss of heat at the entrance need not be considered, for it is so small in comparison to the frictional loss as to be quite negligible.

Loss of Efficiency in Pipe Lines.

Generally speaking, in long pipes we may ignore losses due to entrance, bends and variations in the pipe sections. The effect due to bends is of small importance compared with other frictional losses, and it is with these other frictional losses that we are chiefly concerned. If sand stowing, or packing, is to be carried out on definite lines, it will be necessary to find out the relation of head to length of pipe line, the ratio of sand to water and the velocity to the size of the pipe.

All these things will have a definite relation one to the other, and if the system is to be carried out on a larger scale than is desirable to collect information and to experiment so that a basis may be established for common use. It may be an exhaustive matter to derive suitable coefficients for all conditions, still there is no reason why the behavior of certin mixtures, such as one part of sand to three of water, should not have certain coefficients of friction worked out for them. Then the velocity (and therefore the rate of supply) can be determined; or the maximum length to a certain head can be derived and the cost of an installation and its capabilities can be worked out with some exactness prior to the commencement of the work.

Rough experiments have shown that the ratio of sand to water varies in direct proportion to the head and the length of the pipe, while the frictional coefficient is doubled when the sand is introduced to the maximum carrying capacity of the water. Such results should be checked with pipes of a greater head and length; then we will find that the effect of a bend at the entrance will be less evident and the flow steadier. Roughly speaking, where the proportion of the head to the length is 1 to 5, then the proportion of sand to water will be about 1 to 3; or where the proportion of the head to the length is 1 to 3, then the sand to the water will be about 1 to 15. However, the capacity of an installation will depend upon the size of the pipes and the velocity of flow in them; it would be an advantage of experiments as previously suggested could be carried out in instances where systems were in actual use so as to determine the proportionate results with some degree of accurary.

Planning a Stowing System.

To determine the size of a pipe for use under certain conditions it will be necessary first to decide upon the rate at which stowing (flushing) is to be done. Furthermore, the velocity of discharge will bear a definite relation to the diameter of the pipe and its length. Hence, the first problem will be to determine the most economical proportion of the head to the length of pipe underground. The problem is to determine whether it would be more economical to put down a series of boreholes direct to the various portions of the workings to be flushed, or whether it would be better to establish one or two main points of flushing supply pipes from the surface to the mines and use long lines of pipe underground.

This problem will be influenced by the following considerations: (1) The rate at which the flushing must be done; (2) nature of the strata to be bored; (3) quantity of water available; (4) grade of the underground pipes; and (5) the velocity of flow of the flushing mixture. It should be remembered that there is a limit or the minimum velocity at which the mixture will flow; at velocities below this minimum the sand held in suspension will gradually increase frictional losses until movement of solids practically ceases. On the other hand, high velocities of mixtures result in abnormal and costly wear of pipes.

The wear on the pipe due to friction would vary with the proportion of sand to water—the more water used the less friction. However, it should be considered that the more water used the greater will be the expense for pumping out the water after it had been used for flushing. It would be a nice balance of costs to determine which would be the most economical mixtures.

Having determined upon the output and velocity, it will be a simple matter to gage the head required, to work out the most convenient flushing or feeding point at the surface to calculate the dimensions of pipe required. Where the head is considerable it would possibly be an advantage either to put down two or more boreholes, or to supplement the head by the introduction of a pumping unit.

The disposal of the flush water and its clarification are important. In certain mines where the pitch of the

*From a paper read before the Geological and Mining Society of India.

seam is steep enough, it may be cheaper to flush the sand to the workings through a flume or trough. This method can be used when the pitch is 15 deg.; or even at a less pitch if the proportion of sand to water is high. It may be necessary to bring the flushing water from a distance; this might be offset by the greater availability of river sand in a dry season. If the distance to move the mixture on the surface is considerable, and the grades favorable, then an open flume may be more economical than a pipe-line.

Regarding the character of the pipes to be employed we may consider: (1) Cast iron; (2) wrought iron; (3) wood; (4) terra cotta; and (5) porcelain lined. The shape in comparatively small installations would be circular, but avoid pipes may be coensidered in special cases. In general it will prove economical to employ thicker cast iron pipes for flushing lines than is usual in the case of pipes used for water only; in no case is it advisable to employ them under ½ in. in thickness as the tensile strength is low and uncertain.

If, for economic reasons, cast-iron pipes must be employed, it is advisable to have them as thick as practicable. For instance, assume the outer diameter of a pipe is 7 in. and the inner 6 in., then the cross-section area of pipe metal would be 10.21 sq.in. If we increase the outer diameter of the pipe to 7½ in., and keep the inside diameter 6 in., then the section area would be 15.904 sq.in.; there would be an increase of 5.694 sq.in. in section. Thus, for scarcely more than half as much more metal, the life of the thicker pipe will be double as long as in the first case; this is true provided we assume the pipe will give trouble and have to be discarded when its thickness get below, say, ¼ inch.

Materials Used in Stowing Pipes.

Wrought-iron pipes are not particularly suitable for use on longitudinal lines, as their cross-section is comparatively small; they have, however, the advantage of considerable length, resulting in fewer joints, and their fibrous structure (if unrivited) offers less resistance than granular sections.

For underground pipe lines wood might be profitably employed in special cases; the pipes consist of a number of staves, their edges bevelled at an angle radiating to the centre of the pipe and bound around at intervals with steel ties arranged with a take-up block to insure efficient tightening. The staves would be 1 to 3 in. thick, depending upon the size of the pipe. The pipe would be bulky and not generally adaptable. Pressures up to 200 lb. per sq.in. are possible, though 150 lb. would be a satisfactory maximum. With higher pressures it is likely that water would be forced through the pores of the wood.

The porcelain-line pipe is possibly debarred by its high cost from adoption in cases where coal is mined and sold at a particularly low figure. It is possible that vitrified terra cotta may be suitable for underground use, as when vitrified it is coated with an impervious vitreous lining on which acids and alkalies make no impression. This is an important point. As in some cases a good proportion of the wear of pipes is due to the acidity of the water. It may be possible for interested concerns in India to devise means of materially increasing the vitreous lining to suit the peculiar conditions of use. The average pipe can be made to stand a reasonable pressure, say, 100 lb. per sq.in. The joint will, of course, be somewhat difficult and tedious to make. In Pennsylvania half-section glazed-tile pipe has been used on the surface for carrying silt and water to great advantage; this transportation line constituted an open trough.

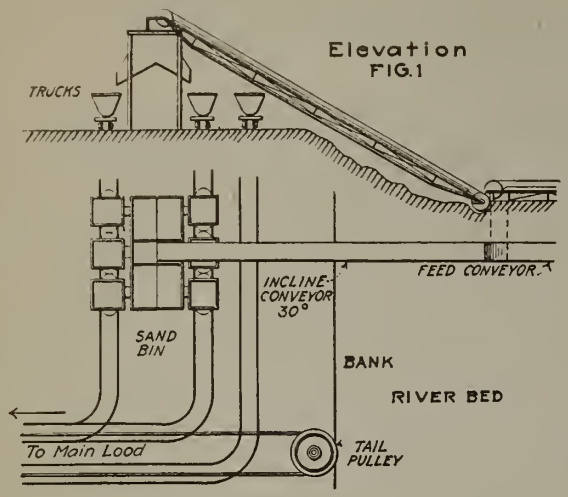
It all cases it will be advisable to arrange so that the pipe can be turned around, if desired, as the wear will be greater on its lower portion. Continental experiments have shown that steel pipes must be changed or turned over when 97,446 cu.yd. (74,500 cu.m.) of stowing material, made up of waste from the washeries, broken boiler cylinder, etc., had been flushed through them; while the same attention was necessary after 56,506 cu.yd. (43,200 cu.m.) of sand had passed through the pipes. With cast-iron pipes it was necessary to turn them over after the flushing through of 68,016 cu.yd. (52,000 cu.m.) of sand. The steel pipes in this case had a thickness of 5/16 in. (8 mm.) and an internal diameter of 7¼ in. (185 mm.) The cast-iron pipes had a thickness of 3/8 in. (10 mm.) and an internal diameter of 5 7/8 in. (150 mm.).

Considerations Influencing Materials Used.

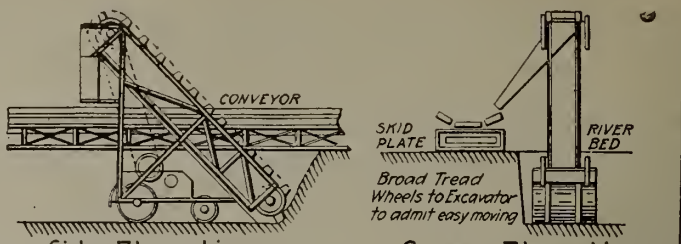
In the Jharia, India, coal field the approximity to sand areas renders one apt to overlook other sources of packing nearer at hand. It might, for instance, be more economical to remove the overburden (surface) covering coal on the outcrop and utilize this if suitable; or even put it through crushers in the case of hard or lumpy material in order to reduce it to its requisite fineness, before using in the mine. There might be cases where local material which required crushing may prove more economical than obtaining something from a distance; at the Rand mines in Africa the whole of the tailings is often utilized for this purpose.

The following points require attention when considering the question of transportating sand from its source of supply to the mines: (1) Accessibility of the sand; (2) cost of transportation to the mines; (3) method of packing. In the case of India, whether the sand is required for the Dishergarh of Jharia field, the accessibility of supply is practically the same; but in the case of transport there are two entirely different problems to be dealt with—one in which mines are near enough to the river to draw their supply of sand, and the other where mines are at such a distance as to render the capital outlay prohibitive without co-operation between adjacent mines.

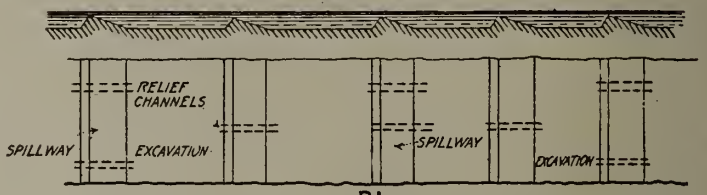
The packing may be deposited in a bin or reservoir adjacent to the mine or above the workings, and be washed down a pipe, the head being sufficient to drive the sand up to the required position. There will also be cases where it is possible to sink a borehole in the river bed and feed with sand direct; in this case the pipe should be fitted with valves at the surface and also (as an additional safeguard) at the foot, in order that they may be closed down during flood periods. Otherwise the loading from the river bed will, in a measure, depend upon the method of transportation adapted to the mine. In any case it is safe to assume a severe gradient will have to be negotiated from the river bed to the bank. The work on the bed will in a majority of cases have to be of a temporary nature suitable for rapid removal and therefore a separate unit to the main pipe line. For this, light belt conveyors may be suggested, one of more horizontal ones on the bed and the other running up the bank (see Figs. 1 and 2).



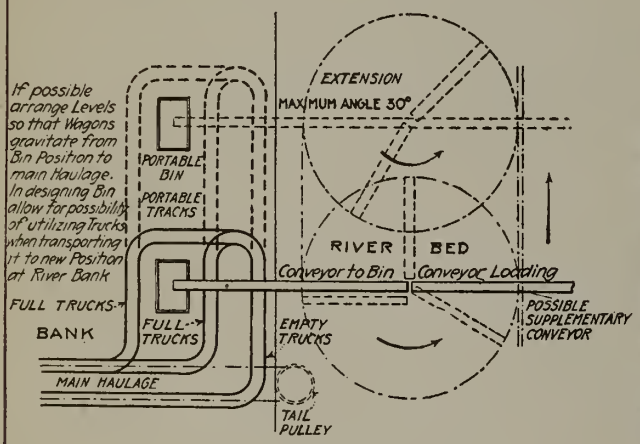
METHOD OF RAISING SAND FROM RIVER



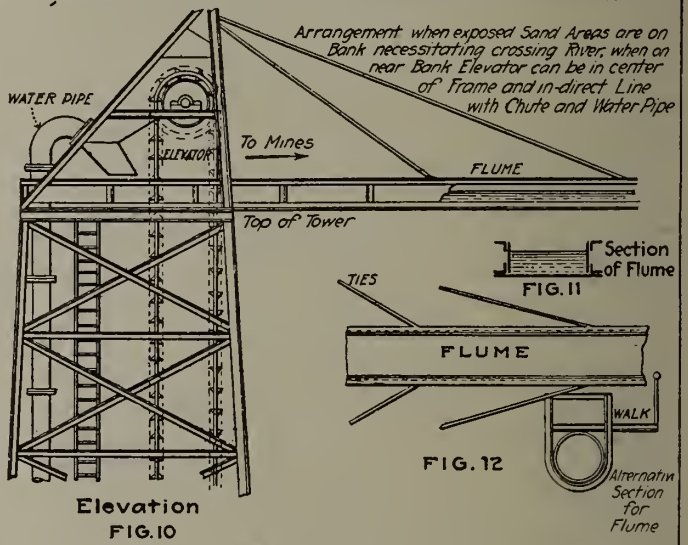
EXCAVATOR FOR LOADING CONVEYORS



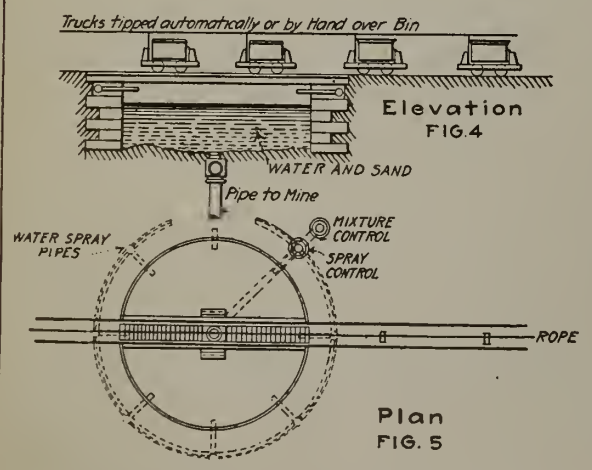
LONGITUDINAL SECTION OF RIVER WITH SUGGESTED EXCAVATION LEAVING SPILLWAYS TO ADMIT OF MAXIMUM PRECIPITATION AND MINIMUM OF SCOUR



ARRANGEMENT OF SUPPLEMENTARY CONVEYOR

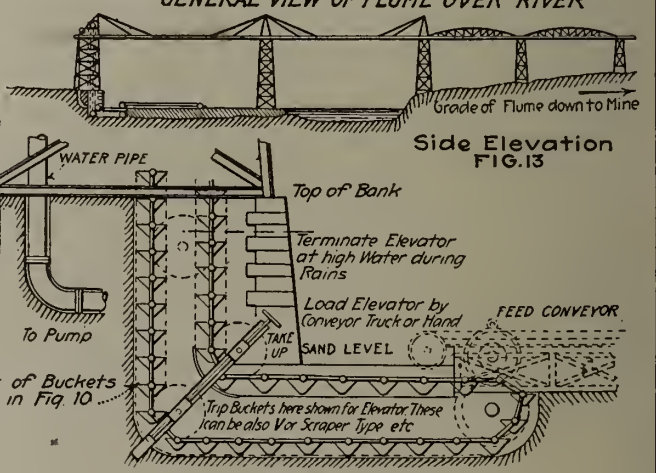


BANK TOWER FOR FLUME



SAND RECEIVING BIN OVER MINE

GENERAL VIEW OF FLUME OVER RIVER


Grade of Flume down to Mine
Side Elevation
FIG.13
WATER PIPE
Top of Bank
Terminate Elevator at high Water during Rains
Load Elevator by Conveyor Truck or Hand
FEED CONVEYOR
To Pump
TAKE UP
SAND LEVEL
Details of Buckets shown in Fig. 10
Trip Buckets here shown for Elevator These can be also V or Scraper Type etc
Elevation
FIG.14

BASE OF TOWER FOR FLUME AND SAND FEED IN RIVER BED

The maximum angle at which sand can be dealt with would be about 30 deg., although certain patent types and scraper conveyors will, of course, deal with much steeper gradients. The horizontal feed conveyors should preferably be entirely self-contained, driven by a motor and capable of being moved around in a semi-circle with the lower end of the inclined one as a pivot (Fig. 3). It would be necessary to fix it on rollers or skid plates to faciliate its circuitous movement, and it could be provided with a simple motor driving attachment for the purpose if necessary.

Methods of Transporting Stowing Material.

A steam shovel is likely to prove too heavy for the purpose of loading and a conveyor appears to be the most suitable. Should an aerial gear be employed for the transportation line another type of gear might be profitably substituted.

Assuming the case of mines adjacent to the river, with possibly plenty of water, the simplest form of transporting sand appears to be an endless haulage in conjunction with three-ply rubber and canvas conveyors. The plant would be practically automatic, and we might assume the following conditions: The sand would be loaded in a horizontal conveyor, and thence to an inclined one leading into a small loading hopper on the bank. From this it is fed into dump cars and these are moved by endless haulage over a bin; as the cars pass over the bin they are automatically dumped. From the bin the sand is washed into the mine (Figs. 4 and 5).

A constant supply of sand is by no means the least important matter when the tonnage becomes considerable. It might pay to have an inclined plane at the bank, have a supplementary haulage to the main one and run the dump cars on tracks on the bed of the river. A series of light tracks provided with the flat steel ties could be used. This plan omits the conveyors and bin at the bank (Figs. 6 and 7). Pumping the sand direct through a pipe line may be suggested; but it does not overcome any more successfully the problem of loading, while the effect of sand on anything with which it comes in contact is familiar.

Examples of Stowing Plants.

It may be mentioned that the dredging plant at the Port Talbot docks included a sand-pumping unit. This dealt with something like 150,000 cu.yd. of spoil material with a 22-in. pump and discharged it at a rate of 200 cu.yd. per hr., at a point 500 yards from the pump. Possibly further investigations of the suitability of such a unit is warranted under certain conditions.

Another method may be considered where the distance to the mine is comparatively short and the sand area is situated on the far side of the river from the mine; the sand for flushing, under these circumstances, would be (for a certain period of the year) carried across the river. The scheme might be outlined as follows (Figs. 10 to 14):

A tower might be set up at some point on the river bank most conveniently situated for sand excavation. A combined conveyor and elevator possibly could be arranged to run from the river sand deposit to the top of the tower, running horizontally in the river bed so as to facilitate loading. At certain times of the year it could be shortened to avoid flood water and to enable the vertical section still to operate should sand be available. The elevator would discharge sand into a flume at a sufficient height above the receiving point at the mine to allow the material flushed with water to gravitate to the mine. The water for flushing would be pumped up a pipe supported by the same tower. The proposition would necessitate the use of a number of frames or intermediate towers to carry the flume at a suitable grade. The flume towers should be suitably braced to withstand wind pressure and the load, the former possibly proving the most serious consideration. There may be cases where it would prove more advantageous to employ a pipe in the place of the open fflume. so that the head necessary to transport the sand may be reduced; this plan would allow water to enter the pipe under pressure, thus preventing the settlement of sand in transit.

The scheme shown in Figs. 10 to 14 would only necessitate power to drive the elevator and necessary pumps. Further, in order to produce the necessary scouring effect the usual proportion of water to sand might be greatly increased. Having completed its work of transporting the sand to the mine, the water could be drained off and let back to the pumps by means of another flume.

Details of Hydraulic Features.

Thus the water could be used over again. The sand could be allowed to settle in a bin adjacent to the borehole into the mine and the usual proportion of water added to carry it underground.

In considering a suitable coefficient of friction for flume troughs of various dimensions with varving velocities to suit conditions. it should be observed that the scouring power of a flow of water in an open channel does not at all times bear a direct relation to the velocity and depth. In other words. as the hydraulic radius is increased. it does not follow that in order for the water to impart motion to the sand the velocity of the water will increase proportionally.

The depth of flow is an important factor, as the water first subjects the sand to a motion of dragging, and later the particles are lifted up into the stream, the motion then being converted into one of suspension. The water carries a larger quantity of sand in its lower portion thn the upper, and generally it could be assumed that the amount is proportional to the depth, Regarding he wear due to friction of the sand on the pipe, it may be an advantage later to investigate carefully the relationship of this to the velocity. For it may be assumed that in pipes the greater amount of material carried will be along the center portion of the water; it remains to be determined to what economical limit the velocity of the water may be accelerated in order to increase the time of suspension of the particles and reduce the friction due to the dragging effect of sand particles.

Where. however. the sand is washed into a bin and precipitated, while the water is allowed to overflow and run back to the pumps at the river bank, then the portion of water to sand may be high so that the incluination of the flume or pipe line can be reduced. Further, at the feeding point the tower can be extended to a greater height so as to increase he head. and this would reduce the requisite height of the other towers in the case of a pipe line.

In the open flume it is doubtful whether a coefficient of friction for sand and iron will be less than one-fifth. Thus. for water to carry 1 llb. of sand a distance of 100 ft. requires 100/5 = 20 ft.-lb.; if the proportion

of sand to water is 1 to 10 lb. of water must fall 2 ft. in 100 to give this energy. However, while the water imparts motion to the sand there is a tendency for the former to run at a higher velocity over the latter, so that the inclination of the flume should be more than 2 ft. in 100. Possibly for feeding the sand, in the place of the flume it would be better to employ a pipe, and we may then roughly assume that the grade will be in proportion to the mixture; if one part of sand be used to 25 of water the grade would be also in this proportion, or 4 ft. in 100. The necessary head might be increased at the feed tower, so as to reduce the height necessary for the intermediate towers. The flume bearing the return water to the pumps could be carried across the river (when necessary) below the supply pipe and on the same supports.

Stowing Plant at the Mine.

The area of the receiving bin would in this case have to be of sufficient extent to admit of the requisite precipitation of the sand with sufficient rapidity to allow a large proportion of the water to overflow. For this reason the bin might be provided with a well in its floor and the surface graded to meet this, so that an adequate sand pump would be provided. The feeding pipe from the river should terminate at a comparatively deep point in the bin so as to keep the sand at as low level as possible to aid its precipitation; from the bottom of the veil the sand could be led straight to the mine or a supplementary feeding bin. The flume for taking back the surplus water should emerge from a point near the surface-level of the feed bin. A strainer might be put at the entrance of the flume to assist in keeping out the sand. It might be convenient to have this flume follow directly under the supply pipe though possibly set on the ground until it reaches the river when it can be carried across the stream to the pumps on the same support as the upper pipe. Owing to the low grade required for the return water, it is possible that this flume could meet the feed tower at a point considerably above the level of the river. Thus pumps could be situated at this higher elevation and reduce most of the expense of pumping water from the river below.

It is a course doubtful if this project would always prove economical or convenient. But it is possibly worth consideration, particularly where the location of the sand areas neeessitates crossing a river which may need bridging for a good portion of the year. This is a case where the mine is comparatively adjacent to the sand area. In the Jharia field the river is generally at a distance from the mines, and the problem involves considerable capacity. This problem may be solved either by the co-operation of a number of collieries or the contruction and operation of the main transportation line by a private company.

For transporting the sand, endless haulage appears the most suitable. With this system, if we have a four-mile transportation line and assume each car carries one ton at a speed of two miles per hour, then one car takes two hours to make the round trip For the sake of illustration we may assume that we have to transport 5000 tons per day of 12 hours, equal to, say, 416 tons per hour. This means 832 full cars and 832 empty ones in transit, or a total of 1664 plus those being loaded at the river bed. Possibly not less than a total of 1800 cars will be employed. Five thousand tons daily means 11 200.000 lb., and at 100 lb. per cu. ft. this equals 112.000 cu. ft. A simple method of loading would be by running the cars on a series of portable tracks at occasion required. The loading, however, would be a difficult problem as a loaded car would have to leave every eight seconds; and if we consider the sand is excavated to a depth of 2 ft. then every day an area equal to 56,000 sq. ft. will be cleared. Therefore, a simple loading device becomes absolutely necessary, the simplest methods being to employ a conveyor, which by reason of its length is particularly adapted to work of this kind.

In Amercia sand is often excavated and loaded by portable machines consisting of a frame with a number of buckets fixed to an endless chain running over both head and tall wheels. The buckets are about 18 x 18 in. in cross-section, and the apparatus delivers about one ton per minute. The machine is equipped with a chute and only requires about a 7-hp. motor to drive it, the weight with the motor being about 7000 lb. About eight of these machines would possibly help to solve the difficulty of labor trouble with regard to loading and prove more economical. The excavators at the river bed would then feed into a conveyor, and from experiments it is found that one man can load a conveyor with 6.75 cu. ft. of sand in 12 minutes with the material at a distance of 18 ft. from the conveyor. In practice the conveyor could possibly be moved in such a way that the men would be close to it all the time, and would at the most have to carry the sand about 3 ft. In the condition under review it was found that the 6.75 cu. ft. actually were deposited in the conveyor in 12 minutes, as noted. This represents 675 lb. in 12 minutes, or 1.6 tons per hour.

Practical Considerations Affecting Plant.

Assuming the conveyor could be moved practically in a circle, we get a superficial area of 783,828 sq. ft.; or excavating to a depth of 2 ft., we would have about 1,567,656 cu. ft. equalling about 70,000 tons, or 14 days' supply. This conveyor then would feed into another one leading up the bank, the latter being 600 ft. long. Since the loading point at the bank is being continually shifted from the bank terminal of the main transportation system, a supplementary haulage would have to be introduced running parallel and close to the bank; a portable bin would have to be provided into which the conveyor running up the bank would feed as the area was evacuated in the river bed, and the conveyors were shifted, the bin would be moved from time to time to suit conditions. Owing to conveyors being more expensive than a track, the former is not to be recommended for feeding direct to the main haulage. The loading bin would have a capacity of about 100 tons (or 2,240 cu. ft.) and if it was 40 ft. long, would accommodate eight trucks at a time; this would enable loading at the speed required to allow them to leave at their eight-second intervals.

In Jharia, the point for depositing the sand from the main transportation line would be about 80 ft. higher than the river bank, the grade being 1 in 230 or a pitch of 0 deg. 16 min. The load on the rope equals 832 tons; to handle this load a 1-in. rope may be used weighing, say, 5 lb. per yd. It will possibly be advisable to have a central power station which could either be situated at the river bank, thus saving the poles and wiring to the conveyor motors; or we may assume a power unit with sufficient power to operate, in conjunction with the main transportation line, and endless haulages in mines adjacent to it. The latter is the more expensive arrangement, but is used, as the grade to the mines is favorable to the load, as a rule.

Imprisoned Underground

By GEORGE HUSTON.
(Copied from Mining and Scientific Press)

To be imprisioned for over two weeks in the cross-cut by a cave underground and to be rescued unhurt was the remarkable experience of two miners, Peter Grant and Emil Sayko. The accident occurred at 10. 45 a.m., November 15, in the Gold Hunter Mine, situated on the outskirts of Mullan, Idaho, in the Coeur d'Alene region. Both men had families in the town.

The cave happened in what is known as the northwest stope, an extension of the Ryan stope. The old Ryan workings had caved in 1913, being filled thereby to the 33rd floor, leaving an opening between the top of the debris and the roof. The roof had not been penetrated, 60 ft. of solid rock intervening between it and the old level above. The extension stope had not been worked for several months, and the two men were cleaning up preparatory to taking a contract for a raise through. They had finished and were descending, when Sayko noticed a crack on one of the walls. Becoming alarmed, he climbed a few floors for his carbide and water. On descending again, he had a slight argument and prevailed on Grant to go back for his lunch bucket. The delays undoubtedly saved the men's lives, for on descending a few floors more, a cap snapped in front of them.They then made all haste to reach 48th footwall prospect cross-cut, barely entering it in advance of the cave, which was thundering behind them.

The Hunter lode is in a wide zone of fissuring, shearing, and sheeting, which crosses the strike of the thin-bedded Wallace formation. The dip of the fissuring as nearly vertical or slightly south. The practice was to timber close to the stopes, to hold the slabby walls apart, then fill for safety, afterward. In this case, the extension stope, consisting of 35 floors, had been filled from the 3rd to the 22nd, excepting three 6-ft. sets that were used for a man-way, timber-slide, and chutes. From the 28th floor up, it was only a raise. The 49-ft prospect cross-cut in which the men took refuge was on the 26th floor. From the third floor down to the tunnel-level the stope was supported on stulls, and as no stoping had been done below the tunnel-level, the stulled ground was not damaged by the cave.

What caused the cave was the slipping down of a huge wedge-shaped slab running parallel to the length of the stope, adjacent to the timber, and extending down to the eighth floor; the bottom lodged against the filling, while the top fell over and smashed the upper timbering of the stopes, the subsequent movement effectually sealing all the connecting openings.

Every means was tried to reach the men through old workings, but these were found to be blocked. An incline-raise from a safe floor was started toward the west end, where the extension stope was known to be narrowest, but it became apparent soon that all the chutes were closed and that no openings existed. Efforts were then concentrated on getting up through the muck-pile to the top by the quickest route. The rescue-crew knew the men were alive from faint rappings and the smell of wood-smoke resulting from their efforts to keep warm.

At this juncture the Bureau of Mines at Washington was asked for the use of the new device, the geophone for locating noises incidental to operations of this nature. The Bureau responded at once, directing two experts at widely separated points to report at Mullan, and the apparatus and men arrived as fast as the railway could bring them. In the meantime the men had been reached by a drill-hole, but the mere fact of the ready acquiesence of the Bureau and the sending of some of their best talent gave a high degree of encouragement to the hard-pushed crew and management.

After working six days on the raise, reaching about the 24th floor, through the muck-pile, the whole mass started to move closing the mouth and other portions of the rescue raise, imprisoning two men, Jack Delmarh and James Collins of the rescue-crew.

It was hardly thought possible, in view of the movement of big slabs of rock and fine material, to find Delmarh and Collins alive, so a feverish search for the bodies began. After six hours of strenuous work the men were heard talking. They were removed unhurt, after 15 hours imprisonment.

But the settling left the search for Grant and Sayko where it had started, it being evident that raising through the muck was too dangerous and slow, and that the men would perish before being found.

A raise was started imediately in solid rock at the west end of the stope, utilizing the latter to break against and spiling against the muck. This method favored safety and speed, but the distance was nearly one hundred feet, and some coincident operation had to be carried on to sustain life in the men, who had now been imprisoned for six days.

There being a 1¼-in. diamond-drill outfit on the ground, the Diamond Drill Contracting Co. of Spokane was called by telephone to furnish a crew, which arrived on the next train. A hastily improvised hoist lowered the outfit to the top of the 60 ft. of solid rock capping the Ryan stope, and on November 21 at 8 p.m. drilling was started the 60 ft. of drilling being completed in 15 hours.

The drill crew and management were ignorant of the exact position of the imprisoned men. To avoid end-projections of the stope and filling, the hole was drilled vertically into the Ryan stope, instead of on an incline to reach the cross-cut. When near the bottom the hole lost its water, the seepage attracting the attention of the imprisoned miners. They scrambled in the direction of the seepage with a lunch-bucket, catching the first drink that they had had for four days. After breaking through, the drillers lowered a half-inch galvanized pipe, which struck Grant on the head. The over-joyed man shook the pipe vigorously, conveying the information to those above that their efforts had not been in vain. A whistle had been attached to call the men, and after its removal communication was opened up.

One of the first things for which they asked was light, so a wire was passed down outside the pipe, with a two candle-power bulb, taking current from a storage battery. The pipe, after being warmed by flushing with hot water, served to convey soup, stimulant, milk, etc. The company's physician prescribed the diet, and the hungry men were made as comfortable

as possible. Meanwhile another hole was drilled and reamed out to two inches. Through this, elongated loaves of bread wrapped in paraffined paper were passed and suitable receptacles filled with finely chopped fruit, vegetables, and meats were forced.

On acount of the danger from further caving, a two weeks stock of provisions, candles, and other things was lowered and conveyed to the cross-cut; also the ½-in. pipe was extended and the men were instructed to stay there until rescued. With plenty to eat and drink, and means of warmth, the question of sustenance was solved.

Meanwhile the work of raising went on with strenuous energy, day and night, until on November 29 at 3 p.m. the men were removed after being confined for 14 days and 4 hours in their underground prison.

It is pleasing to record that the resources of the entire district were placed at the disposal of the Gold Hunter management. With characteristic brotherly feeling, the workers engaged in the rescue gave of themselves freely and without stint. The rescued men after having their eyes bandaged were conveyed to the hospital at Walace. They were in good condition, and thanks to their pluck and powers of endurance, will soon be out in good health. Their faithful wives who sustained the men's courage after communication was opened, are the happiest of women, never losing their faith in the ultimate rescue.

CIVIL SERVICE COMMISSIONERS' STATEMENT REGARDING GEOLOGICAL SURVEY RESIGNANTIONS

In a statement from the Commission, on the recent withdrawals of experts from the civil service, it is said: "Many wild and exaggerated statements have been made in reference thereto and some newspaper comments have been none too complimentary to the Civil Service Commission." The Commission says many of the alleged facts are not borne out by careful enquiry. "Dissatisfaction with the classification does not appear to be at the root of the trouble, but rather a wide-spread activity in the commercial world in the direction of increased endeavor to exploit those natural resoources which have been wasted so desperately during the past five years of world-wide war and devastation."

The Commission sets forth as typical cases those of a number of the most capable men on the staff of the geological survey who have accepted offers of outside employment. "The principal competitor for the services of these men," says the statement, "is the British Petroleum Company, an Imperial corporation with a capital of $275,000,000, organized to develop the oil supply of the world, wherever it may be found. This powerful and tremendously wealthy corporation approaches an officer on the staff of the geological survey who has been receiving $2,600, but who under the classification will at once increase to $3,300, and offers him $6,200 to start with. The Government cannot compete with such an offer and the country would not sanction it. Another on the same salary and with the same prospective increase is offered $5,100 and he too accepts. Neither of these men has one word of criticism for the new schedule, on the contrary, they admit that it is fair and as liberal as the Government is justified in offering, but their services are worth more in the outside market and naturally they go."

The statement concludes by saying that the services of those men are not lost to the Empire, but their value in the wider fields will be enhanced. The Commission states "it is therefore to be hoped and may be expected that those newspapers which have given such wide publicity to the alleged deficiencies and "foolishness" of the Civil Service Commission will give their readers the benefit of an equally widely published statement of the actual conditions under which these defections are taking place."

RESIGNATIONS FROM U. S. GEOLOGICAL SURVEY.

Conditions similar to those at Ottawa.

That the personnel of the U.S. Geological Survey is facing serious deterioration is indicated by the following statement of the Director of the Survey in his annual report: "The fact that there have been 77 resignations from the scientific force of the U.S. Geological Survey during the last year—17 per cent of the force—suggests inadequacy of compensation, and the percentage of resignations in the clerical and non-scientific force was even larger. This statement, of course, does not include separations to enter military service. The largest inroad upon the Geological Survey personnel comes from the oil companies; the final result of the pioneer work of the Federal geologists in applying geologic methods to the search for oil and gas is that a large proportion of the leading oil geologists the world over are U.S. Geological Survey graduates. Indeed, the future decline in popularity of the Geological Survey as a recruiting station for oil-company employees will be due simply to the fact that the experienced oil geologists who remain in the Government service are from personal preference immune to outside offers. The relation between Government salaries and outside salaries of geologists has been definitely determined in a compilation of the records of 29 geologists who left Government service after receiving an average salary of $2,271. The average initial salary of these men in private employ was $5,121, and after about two years of average service this compensation averaged $7,804, and eight of these geologists receive $10,000 or more. The disparity is even greater if consideration is given to the large financial returns from investments made by the private geologists in connection with their professional work, a privilege properly denied by statute to the official geologist. That the value of these men as specialists and consulting geologists is far greater to the country at large than to private corporations is undeniable. Furthermore, it is important to note that most of these geologists had persisted to the iimit of endurance with a magnificent spirit based on their love of scientific research and their desire to contribute to the sum of geologic knowledge. Most of them have been forced out of the service by sheer financial necessity. Unless adequate measures are taken to ameliorate the situation, the geologic staff is destined to suffer far greater deterioration of morale and depletion in its ablest, most responsible, most experienced, and most valuable members. The Geological Survey is passing into a stage when, wiht greater need than ever for systematic geologic work in the country, it is ceasing to be attractive to the young men of greatest ability, training, and promise. This situation deserves prompt and effective remedy, for it threatens most seriously to cripple this branch of the public service."

Our Northern Ontario Letter

The Silver Mines

In the silver mining areas of Northern Ontario the renewed Asiatic demand for silver has created another wave of enthusiasm. It is believed that any very sustained buying at this time will send quotations soaring once more. The most conservative producers are unable to discern any influence that would cause a recession of prices while the future appears to hold out reasonable promise of the demand over supply becoming even more pronounced.

Believing that the present condition will prevail for at least a few years and confident that no labor difficulties will develop during that time, the mine operators of Cobalt are not only becoming more aggressive in the local field but are evincing a desire to acquire prospective silver properties in the outlying districts, such as Gowganda and Elk Lake.

At the time of writing, negotiations between the Coniagas Mines and the Tretheway-Cobalt Company continue with fair prospects of the Tretheway being taken over by the Coniagas. It is learned officially that the deal, if consumated will include the mill as well as the mine of the Tretheway, at least with the exception of a few small milling parts. Insomuch as the two properties adjoin, the Coniagas would be in a position to work the Tretheway in conjunction with its own property and thus eliminate the present overhead expense with dual management. The finances would strengthen the treasury of the Tretheway and place that company in excellent position to concentrate its full energies on the development of its large acreage in the Gowganda silver area. The transaction is one that would appear to hold out advantages to each company involved for which reason the successful conclusion of the deal is considered probable.

It is intimated that the La Rose Consolidated has had a very successful year and that agreeable surprises are in store for the shareholders. The company has been a consistent shipper of ore throughout the past year, and it is understood that a part of the ore mined was high grade. The company has commenced the current calendar year by continued aggressive operations and the year 1920 promises to be prosperous Higher efficiency among the workmen, and high quotations for silver plus high rate of exchange on New York funds all serves to add to the company's prosperity.

The Crown Reserve is considering a plan to mine wide deposits of low-grade material, amounting almost to quarrying. In this way it is believed that some of the old abandoned workings of the mine may be turned to profitable account and a vast tonnage of very low grade material turned into a source of considerable revenue. In the meantime the company is proceeding with the development of the Canadian Kirkland property in the Kirkland Lake district and it is stated that excellent encouragement is being met with.

The Beaver Consolidated has been brought into favor to a greater degree than ever through the announcement that net profits at the company's Cobalt mine are running high and that operations may be enlarged, and also, because of the success attending mining operations at the Company's Kirkland Lake mine. It is stated that a considerable quantity of the ore recently opened up at the Kirkland Lake mine contains around $30 to the ton. Steady production is now established and bullion shipments are being made regularly.

In reference to the proposed light narrow-gauge railway from Elk Lake to Gowganda, the leading mining operators have stated that they are strongly in favor of the Ontario Government building a standard-gauge line. It is pointed out that the Elk Lake branch was never intended for a blind line and that it was only due to the war that the extension to Gowganda was held in abeyance. They declare that should the government be so inconsistent as to permit private enterprise to build the narrow-gauge road, it would perhaps forestall the possibility of getting a real railroad. The fact is emphasised that Premier Drury while on his December tour through the district of Temiskaming stated that he wanted to hear the views of those who were in a position to voice the opinion of any branch of industry. As to this, it is stated publicly: "In thus voicing the opinion of the leading mine operators of Gowganda in response to a general request which Hon. Mr. Drury extended to residents of the North while on his December tour through Temiskaming, the measure of attention which this recommendation receives will be accepted as the extent of the sincerity which actuated the request of the Premier."

In dealing with the railroad question, it is found that not a few of the claim holders in the Gowganda district entertain fears that opposition to the light narrow-gauge railroad is attended with some danger of discouraging one and failing to get the other. However, if the government is not prepared to proceed with the construction of the standard gauge road, it does not seem to be likely that they would under any consideration prevent the private narrow-gauge project. The fact is that the camp is greatly in need of rail transportation of some kind—even though it should ultimately be the narrow-gauge and entail the inconvenience and expense of rehandling freight at Elk Lake, the present terminal of the Temiskaming and Northern Ontario Railway.

Another discovery of silver is reported to have been made in the Kenabeek section of the Elk Lake district, on a claim situated in lot three of Cane township and adjacent to the north boundary of the township of Auld. It is stated that considerable cobalt occurs in the vein together with encouraging silver values. The rock formation like that at the Cane Silver Mines now idle, and at the Kenabeek Consolidated, is entirely diabase, lying between wide belts of quartzite.

One of the leading Cobalt mining companies is stated to have recently made an examination of the White Reserve mine in the Maple Mountain section of the Elk Lake district, on which property some exceedingly rich ore was recently encountered at surface.

Traffic to Gowganda is heavy, operators and claimholders taking advantage of the present winter roads to transport supplies to the camp.

During the week ended Jan. 16th, the Mining Corporation of Canada shipped 221 bars containing approximately 221,573 ounces of silver. At the present quotation for silver, plus 8 p.c. exchange on New York funds in which the company receives payment the value of the bullion shipment may be estimated at around $1.40 an ounce or approximately 310.200. This consignment ranks amongst the most valuable in recent months.

During the week ended Jan. 16th, three Cobalt companies shipped an aggregate of 3 cars containing approximately 241,349 pounds of ore. The following is a summary:

Shipper	Cars	Pounds
Temiskaming	1	103.990
Coniagas	1	76.272
Peterson Lake	1	61.087
Totals	3	241.349

The Gold Mines

In spite of the fact that the chaos of Russia and Eastern Europe is something which the average Anglo-Saxon resires to avoid, Northern Ontario is to-day witnessing the spectacle of a large part of the foreign element joining in a fairly general trek back to the East. Throughout the war these men worked at high wages, until now, with money belts fairly bulging with money the equivalent to a fortune in the land of their birth, these men are setting out upon a great new venture in an old land. For the greater part, fired with the optimism which is a part of success and plenty, they fail to possess the foresight to avoid becoming directly involved in the general shamble of Russia and Eastern Europe. It does not seem to be too much to predict that a large part of these men, once they realize the extent of the stress and the misery of the near East will automatically become advertising agencies for the Dominion. This, when they begin to realize the extent of the freedom the success and the lack of want experienced in Canada during their more or less brief sojourn in this country.

In the meantime, strange to say, the number of men employed at the gold mines is increasing. It goes almost without saying, that under such circumstances the percentage of those races which stand for stability are increasing while those now manifestly "red" or Bolsheviki tendencies are diminishing—swarming back into the great cesspool of misery which their kind has created. The impression in the North is that any who desire to return to the Near East should be permited to do so with all possible speed; because, it is believed those desiring to do so must be friendly to the doctrine of those now in control, else they would have no desire to return, at least not under present conditions.

The return to pre-war conditions in the Porcupine and Kirkland Lake districts is being made more rapidly at present than at any time during the previous year. With a lower percentage of foreigners employed, the efficiency of the workers is stated to be increas. The new year having thus commenced, it may continue so throughout the year, and within the next few months efficiency may be reasonably close to normal, apart of course, from the effects of prevailing high wages and high cost of material. As to this, however, the shortage of efficient labor constituted the chief burden of the mines in recent years.

Considerable discussion is heard regarding the possibility of the Dome Company applying for an extension of time on the option which it holds on the Dome Extension property. The past year having been unsatisfactory for carrying out the desired development work, the Dome is in a fair position to make such a request.

Official figures showing the Hollinger consolidated ore as containing an average of $9.15 a ton, with facilities for treating a maximum of 3,500 tons of ore daily when ready to run at full capacity, are interpreted as indicating a production of close to $1,000,000 a month just as soon as it is found possible to procure the desired number of men. At the time of writing it is understood that production is at the rate of 2,800 tons daily or at the rate of close to $9,000,000 annually.

In the Kirkland Lake district, interest is increasing in that part of the district lying east from the Tough-Oakes Gold Mines where there appears to be fair promise of the camp extending. Heretofore the Kirkland Lake camp has been confined chiefly to a strip of territory about two miles in length, running from west to east and terminating at the east boundary of Teck township. Now, however, it is considered probable that the auriferous zone may be found to extend far into the township of Lebel. As a consepuence of this number of deals have been negotiated and a number of others are pending.

The Lake Shore mine is now completely de-watered and operations are proceeding at a normal rate. January production is expected to rank with the early summer months, prior to the labor strike. The year 1920 promises to be a prosperous one for the Lake Shore.

The Fidelity Company is calling for tenders for drifting at the 145 ft. level situated in the North-east part of the township of Teck. The property is situated west from the Lebel-Kirkland.

Dr. C. E. Wettlaufer together with associates in Buffalo, N.Y., has purchased a property near Mud Lake in the township of Lebel. The Boston-McCrea Mining Company has also purchased a claim near Gull Lake in Lebel township.

On the Bidgwood property, lying east of Mud Lake, it is stated that the result of work so far done has highly encouraging and indicates the presence of mineralization over substantial widths.

In the Boston Creek district interest is again increasing. The Miller Independence continues to be the centre of interest. The main or central shaft has now reached a depth of 462 feet and is expected to reach the 500 ft. level before the end of the month. In the meantime, the electrical equipment is being installed, and before the end of February, the transmission of power over the line of the Northern Ontario Light and Power Company will commence and put an end to power problems. Also, preparatory to the advent of electric energy, the management is bending its efforts toward preparing for the resumption of work in "D" shaft in which goild tellurides were opened up in spectacular quantities last year. This inclined shaft was driven to a depth of 200 feet. Electric power will make it possible to add three or four machines and thus hasten development work.

W. E. Simpson, who had some nine years experience in connection with mining and metallurgy of gold tellurides in West Australia has decided to make a careful study of the somewhat similar occurrences in the Boston Creek district, and at present has headquarters at the Miller Independence Mines.

The Boston-Kennedy shaft is now down some 70 feet. The vein which was comparatively narrow at surface is widening out, bein close to four feet in gold.

The Boston McCrea has commenced cross-cutting at the first level and is calling for tenders to sink an additional 100 feet. Diamond drilling has been carried on steadily for the past several months and has shown the ore body to have straightened up considerably from its indicated surface dip to the south. The shoot is stated to have a decided rake to the East.

On the Catherine Gold Mine shaft sinking is proceeding, a depth of 30 ft. having been attained at the time of writing. Here, too, although not a great deal will be known until further work is done, the outlook is decidedly promising.

From the Larder Lake district comes reports that the Associated Goldfields Company may yield to the criticism of the press, and has prepared a report showing in more or less detail the result of work to date, and the blocked-out ore-bodies, together with a statement of average values and tonnage.

WHERE COMMON SENSE FAILS.

The Geological Survey which has proved to be such a potent factor in the development of Canada for nearly eighty years has just received a serious blow. Its officers carrying on their field-work under hard and hazardous conditions—in the last eight years no less than three have lost their lives in the field under trying circumstances,—have been content with the satisfaction of work well done although until recently hoping for some slight measure of improved recompense in the days to come. The hopes of years, however, have been dashed by the seeming inability of the Civil Service Commission to improve a foolish condition of affairs. In brief, the salary scale of 1908 is to be continued (as nearly as it will fit the new system) quite without any recognition of the normal curve of increased cost of living or even basic justice. As a direct result since October eight of the staff of the Geological Survey as a measure of self preservation have accepted appointments with private corporations; and still others are about to follow the same course. The point to be noted and emphasized is that because of their interest in their work these same men have in the past refused offers equal to those now offered, namely, double their present salaries, in the meantime hoping for a somewhat more liberal scale of salaries in the new classification.

Eight men leaving, out of a staff of twenty-five, is a loss of one-third,—and the end is not yet. The effect will be felt not in Ottawa but in the various parts of the country where they have been so busily engaged in assisting the mining industry. The men lost are drawn from the work of the various provinces as follows:—From British Columbia, 4; from Alberta, 1; from Ontario, 1; from the Maritime Provinces, 2.

How can these men be replaced? By no other means than by making the inducements such that additional men will spend from seven to ten years training at universities at their own expense. There are no short cuts possible in obtaining this training. As a matter of history, up till about 1913 there remained enough enthusiasm and hope of adequate recompense to interest a number of assistants in preparing themselves for geologists. But with diminishing hope of improvement in Government salaries the positive offers of private firms were too tempting to be refused. For instance, in 1916 alone, all three student assistants finishing their work for their doctor's degree, at once went into private work for their doctor's degree, at once went into private work starting on salaries at least equal to those of their former chiefs and greater than they could hope to obtain on the Dominion Geological Survey after five years. At the present time it is doubtful whether there are more than three men training in anticipation of work on the Survey. But this is not all. Even after completion of the required university training it requires commonly two or three seasons' field experience before a geologist obtains enough intimacy with any field to render his work of special value. In the case of each of the men who are leaving, the country loses the advantage of from five to twelve years' experience In point of time alone, then, it may be said that the work in the fields now being vacated, pending the development of assistants will be set back for twelve years But, note again, such assistants are not forthcoming, owing entirely to the lack of prospective remuneration.

Te loss within a few weeks of one-third of its staff is the worst blow ever received by the Geological Survey —the most powerful single instrument in the past development of the natural resources of Canada. Coming at the present crisis in the progress of the nation this is nothing short of a calamity.—*Ottawa Journal.*

THE TANTALUS COLLIERY-YUKON.

Mr. C. E. Miller arrived in Dawson the latter part of December from the Tantalus coal mine, where he has been acting as manager since last fall.

Mr. Miller reports the property in condition to begin operations in the Spring. It is planned to start about the first of April and continue throughout the season.

The Tantalus Butte properties lie two and a half miles south of the old Tantalus mine, and belong to the same company. They contain deposits of coal in the locality, possibly the largest in the Yukon.

The coal is of good quality and contains, according to Dr. Cairnes, less than 3 per cent ash

Capt. Miller is a pioneer coal miner of the Yukon. He discovered and opened up the Tantalus and Tantalus Butte mines, which he sold to St. Paul people some years ago.

METAL QUOTATIONS.

	Cents per lb.
Electro Copper	24½
Castings Copper	24
Lead	10½
Zinc	12 1/40
Tin	72
Antimony	13
Aluminum	34

ENGINEERING INSTITUTE OF CANADA.

Programme of the Annual General Meeting, Montreal, January, 27-29th.

The Montreal Meeting of the Engineering Institute of Canada, which will be in session when the "Journal" reaches the majority of its readers, promises to be one of the largest and most nationality important meetings yet held by the Institute.

The programem of the meeting reflects with much exactness those problems of most pressing urgency in Canada upon which the engineering profession is best qualified to consider and advise. Among the more significant subjects announced for discussion during the meeting may be singled out those of highway transportation, engineering education, and the problems of most efficiently utilising the water-powers and the forests of Canada. As evidence of the wide range of the engineer's province, as it is visioned by those who direct the policies of the Engineering Institute, will be noticed the inclusion of questions of public health, and the peace-time development of the newly discovered possibilities of aviation. The manner in which water-powers, the pulp and paper industry, the chemical industry, the public health, and the science of aviation, are linked up in the programme, indicates that neither romance or progress have yet departed from our midst.

The Programme.

The following programme, covering the three days of the convention, may be changed or added to to suit the exigencies of the occasion.

Tuesday, January 27th.

8.00 a.m.—Opening of registration at headquarters, 176 Mansfield street.

10.00 a.m.—Calling to order, annual meeting, appointment of scrutineers, reception of reports.

12.50 p.m.—Adjournement until 2.45.

1.15 p.m.—Luncheon at Windsor Hotel for members and ladies and invited guests.

1.50 p.m.—Formal welcome and greeting.

2.00 p.m.—Address, "Modern Highway Problems, by F. W. James, assistant chief engineer, Bureau of Roads, Washington, D. C.

2.45 p.m.—Resuming of business session, annual meeting.

4.10 p.m.—Reception of report of scrutineers.

4.20 p.m.—Address of retiring president.

5.00 p.m.—Inauguration of incoming president.

9.00 p.m.—Reception and dance, Rose Room, Windsor Hotel.

Wednesday, January 28.

10.00 a.m.—Calling to order, professional meeting, at headquarters. "The Gateway of the Profession.—"The Training of the Chemical Engineer," by R. F. Buttan, M.A., M.D., Sc.D., F.R.S., Professor of Cemistry and Director of the Chemical Laboratories. Mc. Gill University. "The Importance of Physics in Engineering Education," by A. H. Eve, D.Sc., C.B.E., F. R.S., Macdonald Professor of Physics, McGill University. Discussion by four authorities on technical education.

1.10 p.m.—Leave Windsor Hotel on special cars for Northern Electric Company's works.

1.30 p.m.—Luncheon, as guests of the president of the Northern Electric Company, Limited At the conclusion of the luncheon the members will be escorted in parties over the works, and will be at liberty to depart any time before the closing hour.

7.45 p.m.—Annual banquet of the Institute. Ross Room, Windsor Hotel.

Thursday, January 29th.

10.00 a.m.—Continuation, professional meeting at headquarters. "Engineering Activities of the Province of Quebec."—"Quebec's Water Power Policy and the Work of the Quebec Streams Commission," by Olivier Lefebvre, B.A.Sc., C.E., M.E.I.O., chief engineer, Quebec Streams Commission. "The Operation of the Quebec Public Health Act," by Theo. J. Lafrenière, B.A.Sc., C.E., M.Sc., Chief Sanitary Engineer to the Superior Board of Health of the Province of Quebec. "Quebec Highways," by Alex. Fraser, B.A.Sc., C.E., A.M.E.I.C., assistant chief engineer Quebec Department of Roads.

2.30 p.m.—Resuming of session, professional meeting, "Pulp and Paper."—"The Pulp and Paper industry," by Ferd. van Bruyssel, C.E., D.P.S. "Aviation."—"The Policy of the Air Board of Canada," by Lieut. Col. O. M. Biggar, B.A., K.C., vice-chairman of the Air Boards of Canada. "Quebec Forests"—"The Forests of Quebec," by G. S. Piche, A.M.E.I.C., Chief of Forests Service, Quebec Lands and Forests Department.

8.30 p.m.—Smoker, Ladies's Ordinary, Windsor Hotel.

NEW MINES INSPECTOR.

Mr. Thomas R. Jackson, of Nanaimo, Will Succeed Late Mr. Newton.

To fill the position rendered vacant by the recent death of Mr. John Newton, inspector of mines for the Coast Inspection District, the Provincial cabinet recently authorized the appointment of Mr. Thomas R. Jackson, manager of No. 1 mine of the Western Canadian Fuel Company, Nanaimo.

The new inspector is popular in the coal mine industry at Nanaimo, and his long practical experience peculiarly fits him for the new office. In 1902 he commenced coal mining at Extension and he has progressed steadily through all the various grades to the position of mine manager, being possessed of all the requisite certificates of competency. He is president of the Vancouver Island Mine Safety Association in the work of which he has always taken a keen interest.

COMMISSION ON COAL.

To Develop and Protect Industry in Alberta.

Calgary, January, 16.—The immediate formation of a commission to develop and protect the coal mining industry of Alberta was announced by Hon. Charles Stewart, Premier of Alberta, in an address made to the members of the Calgary Board of Trade.

This commission, Premier Stewart intimated, will strive to form a real understanding between miners and operators, to avoid strikes, increase markets and to develop the industry in general. It will be representative of the Government, miners and operators, and will be given sufficient authority to make its rulings effective.

BRITISH COLUMBIA LETTER.

Alice Arm, B. C.

A new townsite at Alice Arm is being planned to replace the one row used which is objectionably placed on a minefield. The survey of the new site now is underway. It is situated on the side hill northwest of the present townsite and is owned by the Alice Arm Development Company. Sufficient water is said to be convenient and the installation of other public utilities will not be difficult. In view of the mining development now in progress and the accession to the population expected this year with the commencement of new work on many of the properties tributary to the town of Alice Arm it is thought that the new enterprise not only is warranted but is a necessity.

Stewart, B. C.

Grant Mahood, who is just out from Stewart, reports that he accompanied the first winter shipment of ore from the Premier Mine, of Salmon River. It consisted of 300 tons. Total shipments from the Premier during the next few months are expected, says Mr. Mahood, to amount to between three and four thousand tons. Hauling by tractor was tried out but had to be abandoned and horse transport substituted. Mr. Mahood refers to good showings on the '49 Mine, Salmon River, where ten or twelve men are working and to development on the Big Missouri, where extensive development is being done with satisfactory results. He states that considerable interest is being taken in work in progress on the Lakeview Mine, situated on the Bear River side of the Portland Canal. This property was taken over last Fall under bond by F. Welch and associates.

S. G. Benson, owner of the White Mouse Group of Mineral Claims, situated about two miles beyond the '49, Salmon River, reports that, while in Vancouver, B. C. recently, he placed the property in the hands of a Syndicate which will start active development as soon as it is possible to get in with supplies over the snow crust. Richard Elliott, K. C., is at the head of the syndicate. He has had considerable mining experience, having been heavily interested in Bear River properties at the time of the excitement of about nine years ago. Mr. Benson states that the White Mouse has promising surface showings.

The Sunset Group is another Salmon River property on which development will commence as soon as conditions permit. A Vancouver syndicate is furnishing the necessary finances.

It is hoped that the President Group will be another the new properties opened up in the Spring. Situated on the wagon road, and with ore which has given encouraging assay returns, officials of the President Silver Mines, Limited, and looking forward to doing considerable work this year. Stuart Moore, secretary treasurer of the Company, has left for New York on business related to this property and to holdings in the Alice Arm section.

The Salmon River Mother Lode Mining Company, Ltd., has been incorporated with an authorized capital of $100,000 and with its head office at Vancouver, B. C.

Grand Forks, B. C.

A contract has been awarded for the driving of about 1,000 feet of tunnelling on the Little Bertha-Pathfinder Mining Claims, twelve miles north of Grand Forks. This property is an amalgamation of the Companies owing the Little Bertha and thePathfinder properties, which adjoin. Years ago each property shipped considerable high grade ore, the values running largely in silver. Mining experts who have looked the properties over have been impressed by the showings. The last shipments of ore went to the Greenwood Smelter in 1919.

Kamloops, B. C.

The Stump Lake District, situated half way between the towns of Merritt and Kamloops, B C., has been the scene of considerable mining activity during the past year. At the Mary Reynolds, where R. R. Hedley M. E. is operting, the year's development consists of a 74-feet drift from the shaft and a 140 foot tunnel, with a 30 foot raise and open cuts at the approach. A mountain wagon road two and one half miles in length has been built from the main highway at Rochford to the Mine, giving the company a short route for hauling. About 130 tons of ore have been shipped during the year, returns having been received on 97 tons. The average analysis of this shows the following value: Silver 51.2 ounces; gold, 0.143 ounces; lead, 1.4 per cent; zinc, 2.4 per cent; sulphur, 2.6 per cent; silica, 52.5 per cent; iron. 6.6 per cent; lime, 6.4 per cent.

Since the resumption of operations a few months ago on the property of the Donohoe Mines Company the Joshua Shaft has been unwatered and it is reported that the Joshua vein shows stronger at 420 feet depth than it did at the surface. Some mining has been done and some shipments made but the returns are not available. Major Moon, one of the shareholders has been made General Manager, and J. T. Knapp, M. E. is the superintendent. A working tunnel is to be driven to crosscut the several veins of the property and a new concentrating mill and other machinery is to be installed.

Some fifty or sixty claims have been staked in the Stump Lake District recently. Most of these have been taken up by Smith Curtis, of Kamloops, and associates who are understood to plan quite extensive exploratory and development work this year.

Fort Steele, B. C.

It is reported that the building of a concentrator in connection with the Victor Mine, Maus Creek, is about completed. This property has been under development for many years by R. Abernsthy, of Spokane, Wn., and associates. The ore is rather complex, the metallic contents consisting of agentiferous galena and zinc-blende associated with iron pyrite in a quartz gaugue. The quartz vein, which varies from a narrow width up to five feet, has considerable bodies of this characteristic ore at several points.

Slocan, B. C.

The Evening Star Mine, Dayton Creek, near Slocan City, is making favorable progress. The tunnel now being driven has followed the ledge for a considerable distance. Operations on the Silver Nugget, which together with the Evening Star, is owned by Hugh Sutherland, of Winnipeg, Man., are expected to start in the Spring.

Trail, B. C.

Ore and concentrates received at the Trail Smelter, Consolidated Mining and Smelting Co., amounted to 6956 tons of ore and 861 tons of concentrates. This brings the receipts at the smelter for the year 1919 up to 308,437 tons of ore and 12,041 tons of conccentrates, which is about the same as in 1918.

In the ore statement for the last ten days of the month of December one new shipper appears, the Lincoln at Blaylock, Slocan. The Sullivan Mine tonnage of over 2,000 tons, for the first time since early in September includes a percentage of lead ore.

Victoria, B. C.

Led by Major-General R. G. Edwards Leckie, G.O. C., who served with distinction in France with the Canadian forces and who retired recently from the military post of Officer Commanding the Western Canadian Military District, the Great War Veterans of British Columbia intends making strong representations to the Provincial Government regarding the placing of returned soldiers in the field as prospectors. General Leckie endorses the plan first outlined through by the Canadian Mining Institute and laid before the Dominion Government where it was not favorably considered. Briefly the proposition is that the Government shall employed returned men, who are physically fit, to go into the hills in search of mineral. To qualify them for their duties the establishment of a "prospectors's school" is advocated, where those who wish to participate may obtain instruction in elementary mineralogy and geology. After passing through this school the men would be formed into small groups, about ten in each, with one more advanced member as leader. Each group would be outfitted, provided with food, given the necessary prospecting equipment and sent to work in a locality selected by the government. General Leckie does not think that the cost of the government of the maintenance of the school and the "grub-staking" of the men would be excessive and feels that it would be a first-class method both of giving the unemployed something to do and of opening up the mineral resources of the Province. The proposal has not yet been formally presented for the consideration of the Government.

The announcement from Ottawa that an order-in-council has been passed, at the instance of the Department of Indian Affairs, throwing open Indian reserves for the mining of gold and silver is of special interest to British Columbia. Heretofore these lands have been rigidly closed to miners and to mining operations unless a surrender first was secured from the Indians affected, a procedure which involved negotiations with the Indians and an application to the Ottawa authorities through the Provincial Department of mines. Owing to the necessarily long-drawn-out character of such negotiations and the uncertainty of their outcome they have not often been resorted to and, particularly in this Province where the aggregate area of Indian reserves is quite extensive, this has meant a serious handicap to the development of mineral resources.

Recognizing this, Hon. Wm. Sloan, Minister of Mines, introduced legislation at the last session of the Provincial Legislature, amending both the Mineral and the Placer Acts. In respect of the Mineral Act Section 14, which defines the Crown and other lands upon which the holder of a free miners licence may not prospect or mine, was changed to the extent of eliminating the words "Indian reservations land" while alterations in conformity with the intent of the amendment, were made in the forms set out in the schedule to the Act for the guidance of those making records. An amendment along the same lines was made to the Placer Mining Act, Section 15, which makes reservations as to the right of entry on Crown and other lands, being amended by the striking out of the words "Indian and," so that the last three lines will read "and any land already lawfully occupied for placer mining purposes, and also naval and military reservations." These amending Acts, however, have not yet the force of law the Legislature very properly providing that they should come into effect by proclamation by the Lieut.-Governor-in-Council, owing to the fact that, as the Dominion Government has absolutely jurisdiction over Indian Lands, it was essential that it should take action before the Provincial preposals could be realized.

With the Provincial Legislature on record, and the legal machinery in shape as far as British Columbia was concerned, Mr. Sloan's next move was to induce the Federal authorities to move. Accordingly, while in Ottawa shortly after the session, he took the matter up and was successful in securing the promise which now has been implemented. The admission of prospectors to Indian Lands for mining purposes, therefore, is assured as soon as the Lieut-Governor-in-Council declares the amendements referred to be law.

As Mr. Sloan has not received a copy of the Order-in-Council as finally passd by the Dominion Government he declines to make any comment on its terms. These terms, as outlined by telegraphic dispatches, are that the Federal Minister is empowered to issue leases for surface rights on Indian reserves upon such terms and conditions as may be considered proper in the interests of the Indians and covering such area only as may be required for purposes of mining, such terms to include provision for compensating any occupant of land for any damage that may be caused thereon.

Any person who has authority under the provincial laws to prospect for and mine gold and silver may enter an Indian reserve upon receiving the necessary permit from the Indian agent and with whom he must deposit a certified copy of his provincial licence. Upon locating and recording a claim upon an Indian reserve and obtaining a lease for mining thereon from the Provincial authorities, the lessee must then apply to the superintendent-general through the Indian agent for a lease of the surface rights, at the same time submitting a plan and description of the lands and offering to pay a yearly rental of such amount as the Indian agent shall designate. Any timber required for mining purposes must be purchased at a price agreed upon by the Indian agent and the lessee.

The minister may incorporate in any lease such terms and conditions as may in his discretion appear necessary to safeguard the interests of the Indians individually or collectively, and if considered advisable, leases may provide that if the lessee should be convicted of the violation of any prvoision of the Indian Act or be guilty of creating any agitation or discontent among any of the Indians, the minister may immediately terminate the lease and the lease thereafter be regarded as a trespasser on the reserve, reasonable time, however, being given to remove fixtures and equipment if all rentals are fully paid.

NOVA SCOTIA NOTES.

The lessee of the Stirling Mine, Richmond Co., Cape Breton, reports that additional development has uncovered a continuation of the main ore body about two thousand feet from the main operation. $40,000 has been expended in developing the prospect, and the ore body has been touched by the drill at a depth of 325 ft. The ore, by recent analysis, is stated to run, zinc, 32.7 per cent; lead, 10.44 per cent; copper, 5.9 per cent; with ten ozs. of silver to the ton. How representative this analysis is of the general tenor of the ore values is we are not informed. The property is distant from Framboise Cove, south of Louisburg, about four miles, and is 35 miles from the nearest railway at St. Peter's. A line running from St. Peter's to Louisburg, connecting there with the Sydney & Louisburg Railway, has been surveyed, and the construction of this road has been mooted on several occasions. Such a road would open up a district of Cape Breton that has many possibilities agriculturally, and is apparently well mineralized.

The Anglo Coal Company, at New Campbellton, Cape Breton, has been operating approximately one year. Since the mine was re-opened a great deal of prospecting and cleaning-up has been done, and at the present time about sixty men are employed, producing up to one hundred tons daily.

This property is in many respects an interesting one. The coal seams worked occur on the extreme edge of the Sydney coalfield, and the coal-seam can be seen standing almost vertically on the pre-Cambrian spur which ends in the abrupt cliff of Cape Dauphin. As presumably the carboniferous sediments were laid down in quiet waters along the sides and valleys of the pre-Carboniferous uplands, the present vertical position of the coal measures, at their contact with the older rocks, is due to subsequent earth movements as the coal measures flatten out not far from the contact and proceed seawards with normal dips.

The mine is entered by slopes from the outcrops, which occur at a considerable elevation on the mountain side, and is connected with the shipping wharf in Kelly's Cove by a narrow-gauge railway. The surroundings of this mine are unusually picturesque, even for this district of Cape Breton. An interesting feature is that near the mine the Carboniferous Limestone crops conformably under the Millstone Grit and formerly, when the mine was operated by Messrs Burchell, a high-grade dolomite was mined and shipped to Sydney for use in the open-hearth furnaces. Not far away, also is one of those seasonal lakes, not uncommon in this district, which has a bottom of what is apparently an infusorial earth that posesses quite excellent polishing properties. Also in this district, as is not unusual in limestone formations, caverns are to be found, one well-known example being locally known as the Faery Hole. No better spot for Campbellton, as the Coal Measures proper, the Millston Grit and the Carboniferous Limestone crop on the Cape Dauphin spur within a superficial distance of less than a quarter mile, and a short walk will bring one on the mountain plateau of the spur—locally known as Blueberry Mountain—at an elevation of 1045 feet, affording an excellent prospect of the Bras d' Or Lakes and the Sydneys. Blueberry Mountain it may be mentioned in passing is a favorite haunt of the local Micmac Indians and is the reputed scene of many of the exploits of the Indian tribal demigod Glooscap.

The coal production of the Anglo Mine must be shipped by water, as there is no railway on the Baddeck slide of the Bras d' Or Channel. The present General Manager is Mr. John S. Barton formerly General Manager of the Minudie Colliery at River Hebert, Cumberland Co., N.S., and the President is Mr. J. C. Douglas, M.P., of Glace Bay.

At one time the mine was operated by Mr. James T. Burchell, who sold the property to the Harmsworth's who contemplated supplying coal to the Newfoundland paper mills in Newfoundland, but have not operated the mine. The present operators it is understood, have a lease of the property from the Harmsworth interests.

The several Conciliation Boards appointed to consider the questions associated with wage classification Scotian collieries are proceeding with their duties.

Discussion of a revision of the wage classification has been continued between representatives of the Dominion Soal Company and its employees since early in December, and an agreement has now been arrived at, which only requires ratification by the locals to go into effect. Details of the new classification have not been published but are stated to include 300 differing rates. The new agreement is to continue for a year, and contains provision for revision at specified intervals should circumstances require.

Following upon the increase in wages given to its employees, the Dominion Coal Company has announced an increase in the price of coal to domestic consumers in the Sydney District from $5.65 to $6.20 per ton. The workmen's rate still continues unchanged from the rate of 1908, namely $1.50 per ton, which today represents probably one-third of the cost of producing the coal. The increase announced is applicable to the colliery doctors and to the churches, who have customarily received preferential rates.

The Conciliation Board appointed to consider the wage question at the mines of the Nova Scotia Steel Company will shortly commence its work.

The high cost of coal production in Nova Scotia has its most serious reflex upon the production of steel and presents probably the most serious problem of the future to the steel industry, which, is should always be borne in mind, is the child of the coal industry.

It is announced that the Dominion Coal Company is shortly to proceed with the sinking of a new shaft to the Phalen Seam at Quarry Point, which is situated about 1¼ miles from he present Caledonia Colliery, on the cliffs overlooking the ocean to the southward of the mouth of Glace Bay Harbour. The Phalen Seam is expected to be about 600 ft. deep at this point, and the new shaft will be equipped to handle the coal from the submarine territory lying between the assigned barriers that bound the workings of No. 2 Colliery and No. 6 Colliery. The new shaft will form the main outlet for the submarine coal, the original Caledonia Colliery having been opened in 1866 to mine the land area, now entirely exhausted. It is amusing to go back to the evidence given before the Supreme Court in Sydney during the Steel-Coal trial in 1907, when it was gravely argued on behalf of the Steel Company that No. 6 Colliery was not operating upon the Phalen Seam. The workings of

Dominion No. 6 must by this time be closely abutting upon the workings of No. 4 Colliery, in submarine territory; but, as a matter of ascertained fact, the continuity of the Phalen Seam from the workings in the Glace Bay District to those at No. 6 Colliery was just as definitely established in 1907 as it is to-day, twelve years later.

PORT ARTHUR NOTES.

By J. J. O'CONNOR.

A deputation from the City Council of Port Arthur, headed by Mayor Blacquier, had a very cordial reception from the Hon. Harry Mills, Minister of Mines, when they waited on him recently for the purpose of placing before his attention some of the needs of this part of Ontario.

While the Hon. Mr. Mills did not make any definite promises, he commented favourably on the various suggestions made by the deputation, and it is expected that they will have his closest attention, and be implemented at an early date.

The main points urged by the deputation were as follows:

1. That the government aid iron ore mining by adopting the policy of the Nova Scotia Department of Mines, in providing core drills for prospecting purposes, and defraying half the cost of drilling.

2. That the Ontario government examine exhaustively the merits of the proposed Federal subsidy in aid of iron ore mining, and, if it is deemed worthy of support, to co-operate with municipalities, and other public bodies already promoting this measure.

3. That the government demand more attention from the Geological Survey of Canada, to the neglected mineral bearing regions of Ontario, more particularly this part of the province.

4. That he be pleased to instruct the Ontario Bureau of Mines, to include the mineral areas tributary to the head of the Lakes, in the field work of its officers.

5. That his Department supply much needed areal maps, at cost, to prospectors.

6. That he cause to be added to the staff of the Ontario Bureau of Mines, a competent official, whose sole duties it shall be to attend to adequate publicity of Ontario's mineral wealth.

7. That the Mining Act of Ontario be amended, so as to permit of Crown Patents being issued, instead of Licenses of Occupation, as at present, for land covered by water, in mining claims, where there is no interference with navigation.

8. That he cause to be established here, a branch of the Provincial Assay Office, for the purpose of facilitating the securing of assays, cheapening the cost, avoiding delays, and increasing the number made.

9. That the alleged practice of staking mining claims for the sole purpose of securing the timber on the lands, be investigated.

ONTARIO AND COAL.

An Informed Toronto Opinion.

Once an idea becomes firmly established, whether right or wrong, it receives general acceptance, and while conditions may change entirely, most people will still think that something different is impossible. Most of us hope to live to see the day when the whole of Ontario will be supplied with coal, whether raw or treated, from Canadian mines. This is by no means the impossible dream it is supposed to be at present. Those who are perhaps best informed on this question have, at various times, outlined plans whereby this may reasonably become possible. Mr. F. W. Gray, editor of the Canadian Mining Journal, is perhaps as well qualified to speak regarding the possibilities of Eastern Canada coal fields as any one, following his long connection with the producing companies of Nova Scotia. He has recently pointed out what must be done to place this coal on a competing basis in Ontario, and the problem resolves itself into one of greater production, where costs are lowered, and ocean transportation to the Great Lakes. Those who remember the large fleet which, in former years, carried coal from Sydney to Montreal, should only consider this transportation factor trebled and it might be surprising how well our own coal would stand up against that otherwise imported. We are in a position where we may hope to reduce our costs on eastern coal by increasing production and by better water haulage facilities, but it is very questionable if American coal can ever be placed here again much cheaper than the present price. Besides these factors, there is every liklihood that carbonization plants will prove a factor and with those established along the St. Lawrence River, we have possibilities of the greatest importance.

From the other side, it would appear that a greater measure of co-operation on the part of the mine owners in Alberta along with a fair amount of success with briquetting schemes, must eventually allow western coal not only to extend its market into the United States, but at least to meet competition at the head of the Lakes. These pictures are not dreams, but they will not come true very quickly if we do not realize that here is one place that by stopping the gap, we could save perhaps $100,000,000 on our trade balance in a year. With a hundred Canadian boats on the St. Lawrence, and a few more thousand miners in Nova Scotia, it might even surprise Buffalo where all the coal was coming from. Lest we should be forever begging, is it not worth trying for?

—Canadian Chemical Journal, Toronto.

GENERAL MINERAL PRODUCTION IN NOVA SCOTIA DURING THE MINES YEAR 1919.

By the courtesy of the Deputy Commissioner of Mines, we have been furnished with some statistics relative to the mineral production of Nova Scotia in the fiscal year 1919.

Gold production will not exceed 950 ozs. Nova Scotia, in common with the other gold-producing areas of Canada, has suffered from the incompatability between the fixed price of gold and the rising costs of production. This is the smallest gold production on record in Nova Scotia.

The most important new development of the year 1919 was the discovery of salt at Malagash. (See issue of 8th January, 1919, and May 14th, 1919, for full descriptions of this deposit by L. Heber Cole). Dr. Haves, of the Geological Survey, has also examined this deposit during the year, and further development is proving that the deposit is extensive, and that a portion of it, at least, is high-grade material. It is reported that occurrences of soluble potassium salts have been found associated with the Malagash area, and we hope to give further particulars of this in a later issue of the "Journal."

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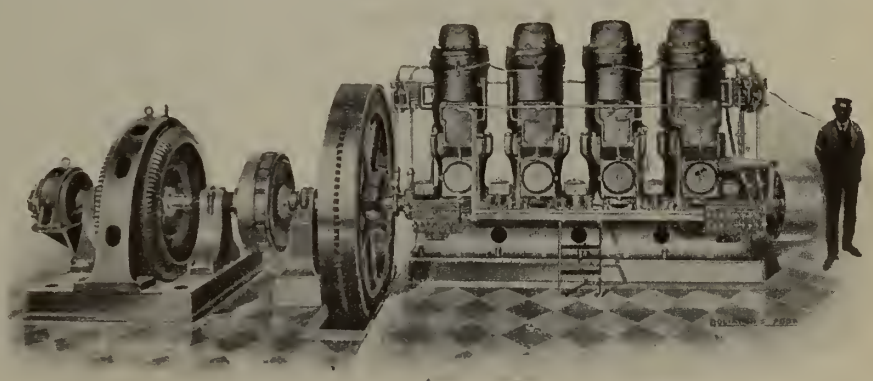

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The production of coal during the fiscal year may be stated as 5,005,000 long tons, compared with 5,211,000 long tons during the fiscal year 1918. This aspect of Nova Scotia's mineral production was fully dealt with in the last issue.

There was no production of scheelite or molybdenum. About 150 tons of manganese ore was mined and shipped, and about 50 tons of barytes was produced.

No iron ore was reported as having been mined in the Province, but iron-ore was imported to the extent of 646,000 tons—chiefly of course from Wabana, Newfoundland and ferro-manganese was also imported to the extent of 1,100 tons.

During the fiscal year, 334,500 tons of pig iron, 374,900 tons of steel ingots, 353,400 tons of limestone for flux, and 518,700 tons of coke were produced, all in connection with the iron and steel works of the province.

Structural materials comprised 12,900,000 bricks, 12,000 tons of cement blocks and 605,900 feet of tile pipe, the figures being approximate in each case.

About 6,700 tons of ammonium sulphate were recovered at the coke- ovens of the Dominion Iron & Steel Company at Sydney.

Gypsum mining has been at a complete standstill, but with the revival of building mining should be resumed as Nova Scotia contains large deposits of high-grade "plaster."

An interesting development of the year, although only officially announced in 1920, is the intention of the Dominion Iron & Steel Company to provide a brick-plant for the manufacture of fire-bricks and other shapes of refractory brick, for use in the metallurgical processes and the coking plant of the company. It is now publicly announced that an expenditure of up to $500,000 is contemplated in brick-making equipment and kilns. It is the intention to make silica bricks and the ordinary fire-brick, for the manufacture of both of which suitable materials have been found locally.

For some time the Steel Company have experimented with a small kiln with local clays and silicious materials. Quite good fire-clays, of moderately refractory character are found associated with the coal measures in Nova Scotia. For a good many years the Intercolonial Coal Company at Westville has made a fire-brick, much used locally, from a clay associated with one of the coal-seams being worked at Westville. The Nova Scotia Steel Company, also, about a year ago provided a small brick-making plant and has been obtaining a satisfactory fire-brick from Shubenacadie Clay (see "Iron & Steel of Canada," Oct., 1919, issue).

Large and really important deposits of silica rocks are found near Salt Mountain, Whycocomagh, and it is probably not too much to anticipate that if a silica brick industry is commenced in Sydney, the sale of the manufactured products may not be restricted to the plant uses of the resident steel companies, although these are very extensive in themselves.

The establishment of fire-brick manufacturies in Nova Scotia will do much to make the steel and metal trades in the province self-contained. The depndence of the steel industry on outside sources for refractories has been very severely felt during the war period, and will, of course, be still more felt, in view of the large increases in freight rates that may be shortly expected.

ALCOHOL FROM COAL.

Extraction on Commercial Scale.

Mr. Ernest Bury, of the Skinningrove Iron and Steel Works, read a paper before the Cleveland Institution of Engineers, in which he revealed that at the Skinningrove works he had succeeded in extracting ethylene, alcohol, and their derivatives on a commercial scale from coke oven gas.

The work is still to some extent in the experimental stage, but Mr. Bury has succeeded in producing a perfect motor spirit. Mr. Bury's process, if developed to its full extent, will render us largely, if not entirely, independent of outside sources of supply.

The practical working of Mr. Bury's process at the Skinningrove works, where 5,800 tons of coal are carbonized per week, has revealed an average yield of 1-6 gals. of alcohol per ton of coal carbonized. Having regard to the scarcity of liquid fuel, that in itself is important; it is national suicide to continue to burn any substance which might be converted into liquid fuel. He pointed out that the recovery of alcohol at the gas works of the country would yield 27,000,000 gals., or, taking alcohol and benzol together, the total quantity of liquid fuel available for extraction, through the carbonizing of coal would be 114,000,000 gals., as against the country's present total requirement of 16,000,000 gals. per annum.

The process of extraction by contact with sulphuric acid is not a new discovery, but Mr. Bury has been the first to establish it as a commercial proposition. His principal discovery is that the best results are achieved at a temperature of 60 to 80 degs. Cent., and in his process he has carried the utilization of heat from the coke oven plant to the utmost limit. Either, chloroform, iodoform, acetic acid, and acetone are among the derivatives he has obtained from this coke oven gas after the benzol has been extracted. Dr. J. E. Stead paid tribute to the brilliant young scientist, and also to the progressive policy of the company at whose works these experiments were carried out.

The Inter-Departmental Committee on Power Alcohol, in their report recently issued, stated: "We have received exhaustive technical evidence from representatives of the Ministry of Munitions concerning the investigations made by them during the war in respect of the extraction of ethylene from coal coke oven gases, and concerning quantitative results so obtained. Lord Moulton, in his capacity of Director-General of the Explosives Department of the Ministry, sat with us at one of our meetings when this subject was specially considered in relation to future output, the synthetic conversion of the ethylene into ethyl alcohol, and the estimated costs of the processes involved. The testimony of witnesses and records of work done indicate that there is thus available in Great Britain a large potential source of power alcohol, but further investigations are necessary in this connection, particularly as regards the conversion of the ethylene into alcohol, before definite figures as to quantities and price can be given."

The Shipton Electric Pig Iron and Steel Smelting Company, Limited, has been incorporated with an authorized capital of $250,000 and head offices at Vancouver, B. C. No definite information is available as to the immediate plans of this new concern.

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CANADIAN COAL MEN.

M. A. McINNIS.

Mr. McInnis has in a sense deserted his first love, inasmuch as he has transferred his very considerable energy from the work of producing coal in Cape Breton to the sale of coal in Montreal. "Mick" McInnis, as he is known to his friends—and they are many—commenced his coal mining experience as a boy at the Gowrie Mine at Morien, Cape Breton, a place that in those days ranked first in the coal-mining activities of the Glace Bay field, and will at some future date be again the scene of coal mining on a large scale, as a very extensive undersea coal tract is accessible from the vicinity of Morien. Later, he entered the service of the Warehouse Department as a junior, and rose successively to be mine manager and eventually Superintendent of No. 3 District of the Dominion Coal Company's mines. After having been in the service of the Dominion Company and its predecessors for over thirty years, and being still a young man, Mr. McInnis migrated to Montreal, and was for some months engaged in the service of the Fuel Controller in the work of facilitating the transportation and distribution of coal imported from the United States into Canada during the memorable coal shortage and severe weather conditions of the winter of 1917-1918, a period that should not be forgotten by Canadians, who were saved from something approaching disaster by the work of Mr. Magrath and his assistants, aided by the whole-hearted support of the United States Fuel Administration at a time when in the United States itself there was seen the phenomenon of "heatless Mondays" and other unprecedented occurrences.

Later, after an extraordinary instance of political bias, which raised objection to Mr. McInnis's employment because he has always been a Liberal in politics, Mr. McInnis entered into the business of selling coal on his own account, and has been as unqualifiedly successful in the coal sales business as he was in producing coal in Cape Breton, thanks to his complete knowledge of the business in all its ramifictions and to his capacity for unremitting work. Recently, he has been placed in charge of the consolidated business of the Lackawanna Coal Co., and the P. McCrory Co., which are now merged as the Lackawanna McCrory Coal Co., with offices at 192 St. James St., Montreal. Mr. McInnis is stilll a young man, and is a good sample of the men of Highland descent, who so largely compose the staffs of the Cape Breton coal and steel companies, and who also, to a very large extent have supplied the impulse that has developed the coal mines of the Canadian West. To those unacquainted with the ethnological survivals of Cape Breton, and the principles of self-determination that have always marked the settlers in that Island, we would mention that our friend's name is not Maginnis, nor, to hint at another racial sublety, is it MacInnes.—Ed.

THE STANDARD STOCK AND MINING EXCHANGE

Gold

	High.	Low.	Close.
Atlas	40	20	36
Apex	5	2½	3
Baldwin	39	20	30
Boston Cr.	32	19	20
Crown Croe	34½	30	30
Davidson	79	50	70
Dome Ex.	37	20	36
Dome Lake	29½	13	17
Dome Mines	16.20	11.00	14.00
Dome Con.	4¾	4½	4¾
Eldorado	1	1	1
Elliott	28	27	27
Gold Reef	6⅞	1½	5¼
Hattie	43		43
Hollinger Con	7.62	6.75	7.05
Inspiration	14	2	4
Keora	23½	9	18½
Kirkland Lake	56	34½	55½
Lake Shore	1.27	91	1.19
McIntyre	2.18	1.63	2.15
Moneta	18½	9¾	16¾
New Ray	19½	12	12¼
Pearl Lake	½		½
Por. V. N. T.	26	17	21½
Por. Crown	35½	25	29
Por. Gold	1½	⅞	1½
Por. Imperial	3⅜	1½	1¾
Por. Tisdale	3⅜	1½	1½
Preston	6½	3	3
Vipond	22		22
Schumacher	47	20	24
Tech Hughes	38	17	18
Thomson Krist	10¾	6½	7
Tough Oakes	1.00	95	95
West Dome	18	9	9¾
Wasapika	1.10	35	45
West Tree	30	9¾	10½

Silver

	High.	Low.	Close.
Adanac	27	6	6
Bailey	6½	3½	4
Beaver	54	31	54
Buffalo	50	45	50
Chambers Fer.	18	8	14
Crown Reserve.	61	30	44
Coniagas	3.25	2.25	3.10
Foster	6	3	3
Gifford	5¼	1	2⅛
Gr. Northern.	5½	2¾	3½
Hudson Bay Mines	60	53	56
Hudson Bay	42.25	30.00	45.00
Kerr Lake	6.10	3.85	4.40
Lorrain Con.	2	1	1
La Rose	51	28	45
McKinley.	75	43	63
Mining Corp.	2.45	1.50	2.00
National	17	9½	10½
Nipissing	14.50	8.75	13.65
Ophir	12	2½	3¾
Peterson Lake	22	7	20
Rochester	5	2	2
Right of Way	4¾	2	4½
Shamrock	1	1	1
Silver Leaf	5	1½	2½
Temiskaming	52	30	47
Trethewey	51	19	49½
White Reserves	20	11	17
Wettlaufer	7	3¼	3½
York	1	½	1

Miscellaneous.

Vac. Gas	32½	6½	24½
Rockwood	14½	2⅛	2½
Petrol Oil	72	50	50
Con. Min. & Smelt.	26.00	..	26.00
Star.	5¼	2	4

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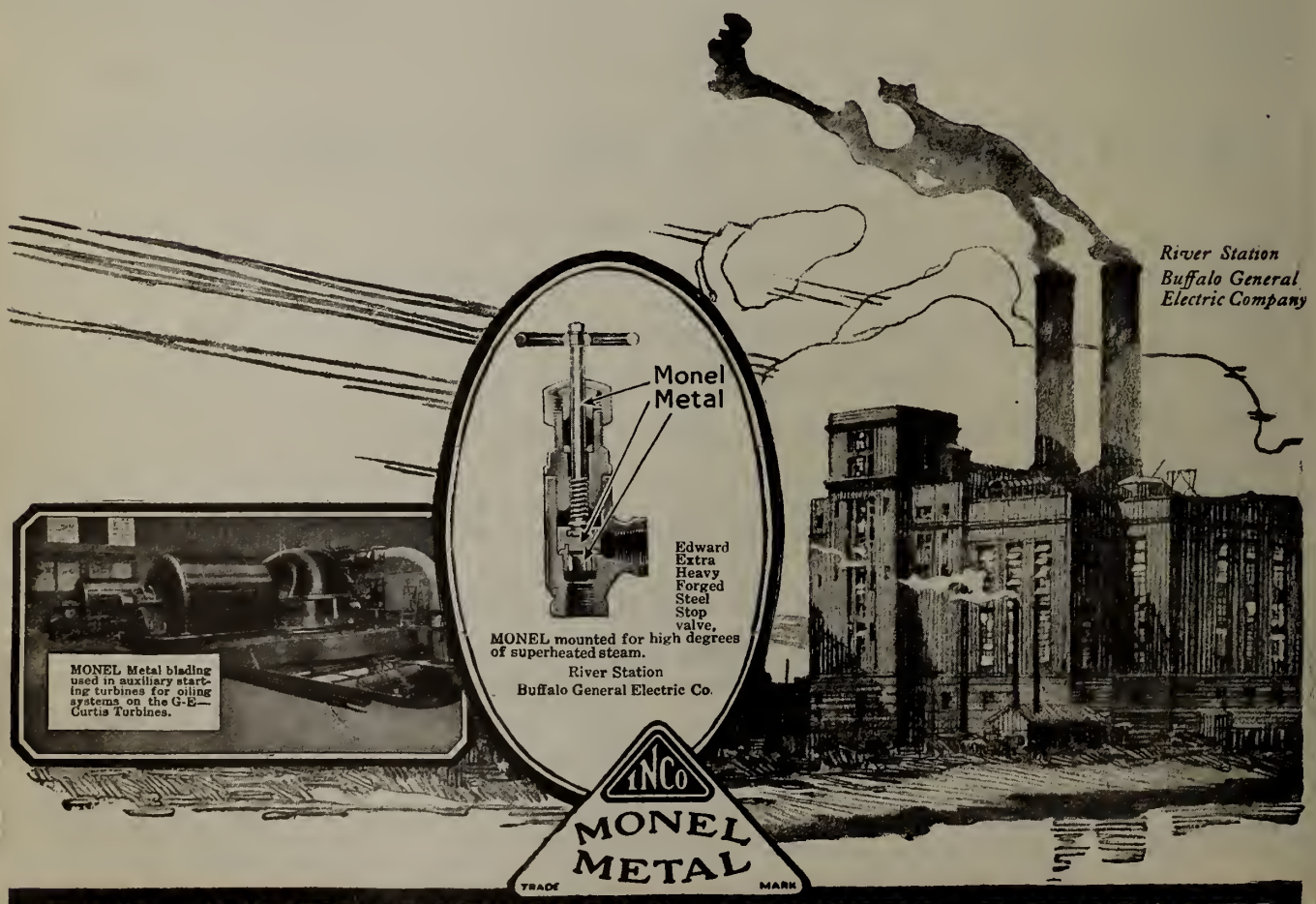

THE INTERNATIONAL NICKEL COMPANY

EDITORIAL

The Provision of Pit Timber

The relation between lumbering and mining has always been very close in Canada, and the subject is at this moment one of keen debate in Northern Ontario.

The branch of the mining industry preeminently interested in the timber supply is that of coal-mining as a suitable and moderately priced supply of timber for the support of roof and sides in coal-mines is a first consideration. This was well evidenced by the position of the coal-mines in Britain during the war, and the scarcity of suitable pit-timber is one reason why much attention is now being paid by French and Belgian and British colliery owners to the possible substitution of concrete as a roof support in coal-mines. For certain purposes, however, no really satisfactory substitute has yet been found for the timber pit-prop, although the greater use of structural materials in collieries is probable.

In Canada, the districts most interested in a supply of suitable pit-timber are the prairie coalfields and those of Nova Scotia, in particular the coal-mining districts of Cape Breton Island. As the coal-mining companies of Nova Scotia are now most heavily interested in timber lands, there is for the Nova Scotia coal-mining industry at any rate, matter for thought in an article on Canadian forests by Frank J. D. Barnjum, which is reproduced from "Pulp and Paper" in this issue of the "Journal."

Singularly, however, the timber lands owned by the coal and allied steel companies of Nova Scotia, do not contain quite the growth that is most suitable for pit timber, or more specifically, for pit props; as the timber on these lands is of comparatively large growth, and has been acquired by the companies referred to more as a reserve for general lumbering purposes than for the supplying of pit props. For example, the lands owned by the Dominion Steel Company in New Brunswick furnish board lumber, shingles and a large amount of barrel staves and package lumber for the shipping of nails and small-sized steel products. The very valuable lands in southeast Nova Scotia, controlled by the Dominion Steel Corporation, through its control of the Cumberland Railway and Coal Company, constitute one of the best general lumber reserves in Nova Scotia, from which such sizes as standard-gauge and pit-gauge sleepers are produced, together with heavy pit-timber and booms. The lumber properties acquired by the Nova Scotia Steel Company and recently largely increased by the purchase of the Rood, McGregor interests, are intended to provide lumber for car-building primarily.

Mr. Barnjum's article points out very conclusively the disappearing quantity of spruce timber in Eastern Canada, which he regards with trepidation because of its effect upon the life of the pulpwood industry. The growth that is suitable for pulpwood is precisely the growth that is required to furnish the ordinary pit-prop, and the coal-miner is, we believe, just as entitled to express concern at the prospect for pit-prop supply. The spruce of Northern Cape Breton is a small tree, of slower growth than in the districts mentioned by Mr. Barnjum, its habitat develops just those qualities of toughness and strength that are desirable in a pit-prop. The supply of pit-props in Nova Scotia has been steadily growing more restricted in Nova Scotia for some years past, and the cost has, of course, increased very rapidly, and is likely to increase with even greater rapidity in the future. The provision of a future supply of pit-timber is therefore a matter that interests coal miners in Nova Scotia very vitally, particularly in view of the likelihood of an enlargement of the number and extent of longwall extractions as the deeper and thinner coal seams are attacked.

The Legal Status of Workmen's Compensation Boards

Many surprising things have in recent months come out of Manitoba, but nothing more upsetting than Mr. Justice Mather's recent judgement that the Workmen's Compensation Board of Manitoba is a court. and that its constitution is *ultra vires* of the powers of the provincial government of Manitoba.

Mr. Justice Mather's judgment seems to touch the vital fact that lies at the bottom of our modern conception of workmen's compensation, which is that compensation for injuries sustained in and arising out of the course of employment is an inherent right of the workman, and therefore not subject to adjudication in a court of common law. This is why the recourse to common law proceedings is debarred by the

Workmen's Compensation Act of several of the provinces. It has been suggested that in Manitoba Mr. Justice Mather's judgment can be made to harmonise with the powers of the Provincial Legislature, and that the existing law can be made *intra vires* by an amendment giving an injured workman the power to elect whether he will submit his case to the Com missioners of the Workmen's Compensation Board, or will proceed under the common law; but while such an expedient might assist in the situation created by the recent judgment, it would strike at the root principle of the most approved and certainly most helpful system of disbursal of workmen's compensation yet devised.

If the Manitoba Act is *ultra vires* of provincial powers so are the acts of Ontario, Nova Scotia and British Columbia, and very large sums of money, touching the lives of thousands of dependents are involved.

The following opinion by a Winnipeg lawyer, taken from the Winnipeg "Free Press," seems not only to put the matter very clearly, but to indicate that the latest ruling on a novel point may not be sustained on appeal. The opinion referred to is as follows:—

"The effect of Chief Justice Mathers' ruling "that the Workmen's Compensation Board is a "court will simply be that the Dominion govern- "ment will have power to appoint the members "of the board, and that the province cannot ap- "point them as in the past.

"The same point arises in connection with the "public utilities commission.

"A view contrary to that advanced by Chief "Justice Mathers has been held by many author- "ities, and this is that Workmen's Compensation "boards are essentially administrative bodies vest- "ed with incidental judicial attributes to enable "them to pursue a simple and efficient course of "administrative work, and that such boards are "not courts because they are invested with some "of the formal functions of judicial tribunals. "The board is, according to this view, simply ex- "ercising such powers as the legislature itself "might exercise, but which for convenience the "legislature has delegated to the board."

There is another side to the general question of workmen's compensation, namely, that a unification of provincial laws, the adoption of a common scale of compensation, pensions and reserves, and a coordinated scheme of administration is likely to be one of the developments of the future. Already, the Workmen's Compensation Boards of the different provinces have formed an association for the study of these matters, and it will also be recollected that a unification of compensation acts and compensation rates was unanimously recommended by the Industrial Conference held in Ottawa last September. Mr. Justice Mathers' judgment is not likely to affect the enlargement of the general principle of workmen's compensation, and its delivery at this juncture will in the long run prove helpful, pointing out as it does some of the very wide powers that have been vested in Workmen's Compensation Boards, and indicating the possibility that the future may bring with it the necessity for federal supervision. As a practical instrument for the equitable disbursement of workmen's compensation, in the most economical manner and with the maximum avoidance of legal assistance and reference, the Workmen's Compensation Boards have proved their striking usefulness, and their retention—with some possible modification of their powers—may be assumed as very probable.

Lower Percentage of Mine Fatalities in British Columbia

Our Victoria correspondent reports a gratifying decrease in the rate of mine fatalities in British Columbia during 1919. There is always a certain reluctance on the part of miners to note the absence of fatalities or their decrease, for reasons that are understandable, but not quite explainable to those who are outside the freemasonry of the miners' craft. The time when fatalities are decreased is precisely the moment when watchfulness should be increased, for in mining, as has been said of politics, eternal vigilance is the price of safety. With this reservation, the record of British Columbia mines during 1919, is one on which the industry and those who govern it are to be congratulated.

The Editor during a hurried visit to a few of the Vancouver Island collieries, was most favorably impressed by the attention which is paid to first-aid and mine-rescue work and the inspectorial system of the Province, so far as it was possible to judge by hurried observation, seems to be both well staffed and well regulated. The coal-seams comprised within the Province of British Columbia are distinguished by a remarkable variety of geological occurrence; and the differing character of the mine gases, both as to quantity and composition is a circumstance that seems to have been well noted by the authorities. The little vest-pocket manual on the height of gas-caps, which was noted in the "Journal" of 24th December as being issued by the Department of Mines, is one indication of the interest which is taken by the Department of Mines in the education of the miners with regard to the peculiarities of the local mine gases.

Some Startling Facts About Canada's Forests

Raw Material for Wood Using Indus tries in a Very Serious Condition

By FRANK J. D. BARNJUM, Annapolis Royal, N. S.

(*From "Pulp and Paper."*)

Mr. Barnjum is not a stranger to Montreal as it is the city of his birth, being a son of Francis E. Barnjum who came to Canada from London, England, in 1856, and a nephew of Major Fred S. Barnjum who was one of Montreal's best known citizens forty years ago.

Mr. Barnjum's business carreer began with the firm of Taylor Brothers, in the old Union Building on St. Francis Xavier St., as office boy. He later moved to Maine, where his first timberland purchase was made twenty-eight years ago and from thtre to Nova Scotia, where he has been largely interested for the past twenty years.

* * *

The time has now fully arrived when an embargo or export duty should be placed on the large amount of fee land wood that is being shipped across the line from the principal pulpwood producing provinces of Quebec, Ontario and New Brunswick. (Pulpwood exports from Nova Scotia are practically negligible, amounting to only 770 cords in 1917, the last Government report available.)

These provinces now have enormous investments in pulp and paper mills which are increasing in number every year, and it seems incomprehensible that the owners and security holders of these splendid monuments to Canadian industry and brains should longer sit idly by and allow this steady stream of raw material to slip away from their very mill doors. The consumption of pulpwood in Canada has reached such enormous proportions that a halt should be called in such suicidal policy.

Surely Mr. Phillip T. Dodge, President of the International Paper Company, who is in a position to know better than any other authority, sounded a sufficient warning to Canada when he made the statement that the pulpwood supply of the Eastern States was practically exhausted and that they must look to Canada for their future supply.

There are two ways that the shipment of this wood can be prevented, one is by an embargo or export duty created by the Provincial governments, and the other is by a combination of the Canadian mills purchasing all this fee land wood year by year and making a division of the same on a basis of the shortest rail haul to the various mills.

The settler and farmer will also be benefited as with this wood all manufaetured in Canada he will have a market nearer home, not only for his wood but a bigger and better market for his farm produce as well.

To offset the tremendous loss of standing timber caused by the spruce bud worm in Canada during the past two or three years, no paper mill should cut a living growing tree on its own limits just as long as it can buy a cord of this fee land wood that is daily crossing the line, simply cutting the burned and blown down timber and salvaging such worm killed timber as is economically possible.

I am not cutting a tree on my own lands while I can buy a cord of wood; notwithstanding the fact that I have the largest amount of standing timber of of any pulp company in Canada, based on the capacity production of my mills, and to which holdings I am adding as rapidly as possible.

The million or more cords of wood that is being annually shipped to the United States, returning only about 15 million dollars, if made into pulp and paper here would not only enrich this country to the extent of more than eighty million dollars per year, but would prolong the life of all of our pulp and paper mills a period of at least five or six years beyond their present expectancy.

This large additional income is doubly important in view of the unfavorable trade balance between the two countries, and would to a large extent help to correct the present deplorable condition of exchange.

Canada is in a very independent position as the United States simply must have our paper—she has no alternative. Newsprint cannot now be landed in New York from Scandinavia for less than $170 per ton, 8½c per pound, and even then only in limited quantities. Our production has increased to such an extent that we are now producing a total of 800,000 tons of paper per year, which is very nearly half the consumption of the United States, and we shall very soon be producing much more than half, owing to the fact that many of the American mills will be forced out of business from lack of a wood supply. Strange as it may seem many of their mills do not own an acre of timberland. With the exception of the Oxford Paper Company, and the Great Northern Paper Company, the larger mills in the United States own timberlands which will provide a supply adequate only for a very few years. The greatest asset the paper companies have today who own timberlands, is their raw material supply. But the American mills should be stopped from drawing the life blood of our Canadian wood using industries. They can find no fault with such action as self preservation is the first law of nature and I am very sure if the case were reversed the American mill owners would have taken this action long before this. However friendly neighbors may be, it is hardly reasonable to expect the mill owner in one country to allow the raw material to be removed, almost from his mill yard, to supply the mills of another country with the possible closing down of his own industry.

Some may question the power of the provincial government to act, but the highest legal tribunal of the State of Maine ruled that it was constitutional for a state to regulate even the size of the trees a man may cut on his own private land. Anyone who bought land in this country bought it subject to the laws then existing, as well as to any regulations that might be imposed in the future.

Annual Increment Leaves a Net Loss.

The wood resources of Canada have been so grossly exaggerated that very few are aware how meagre our supply of available wood really is. I have spent a large portion of the past few years in a personal investigation of the Canadian situation, the results of which are so alarming that I have refrained from publishing my findings.

The theory of an annual growth that has been indulged in so freely in the past has simply become a

popular delusion. There is, of course, a gross growth, and a net growth under some conditions, but to offset this the annual wastage by fire, wind, insects and fungi, taking the country as a whole, far over-runs the gross growth. Consequently we are simply consuming our capital year after year.

If anyone has any question as to the enormous amount of this wastage, let him explore the woods of Ontario, Quebec and New Brunswick, where one can travel day after day and see nearly everywhere the vast destruction caused by the spruce bud worm alone. There are millions of acres in these provinces where over fifty per cent of the standing pulpwood has been completely destroyed.

To emphasize further this question of growth, it is only necessary to refer to the recent reports on the growth in some sections of Quebec, which show only about 30 board feet per acre, meaning about one 6 inch tree per acre per year. It has never been disputed that there is no actual accretion in virgin timber as the mortality more than offsets all growth. Furthermore, even in cut-over land when one realizes that it is only necessary to have an average of one ordinary sized tree per acre per year blow down, how easy it is to see that the annual growth is wiped out by this one process of destruction. I have seen thousands of acres laid flat by wind, not only in cut-over lands but also in so-called virgin stands. So much for wind.

Now with regard to the losses from forest fires, the spruce bud worm, borers and fungi. The figures are so appalling that I dare not commit the result of my findings to print, but these losses are so enormous that no one who is sincere will attempt to deny that they far over-balance any annual growth that there is in Canada or the United States. Cut out this mythical annual growth theory and what are we doing? As I said before, we are simply using up our capital.

One often sees the statement in print that we are "using more than three times our annual growth," while in fact, as previously stated, there is no annual growth to use, for the reason that enemies of the forest, cited above, destroy much more than the growth.

The timberland owner has the satisfaction of knowing that even if he has lost one half of his standing timber, by the ravages of the spruce bud worm, still what he has left is worth double the previous price per cord, as the destruction is country wide, and the consequently diminished supply will necessarily create an immediate and substantial advance in land and stumpage prices.

If some of the paper mills of the United States had not gone so far afield for their wood last year by invading the more remote sections of Ontario and Quebec, where the freight alone amounted to $16.00 or more per cord and accepted wood down to a diameter limit of one and one half to two inches, they would be short of wood to-day.

Logging by Aeroplane—Not Yet.

In some of the wild estimates of our supply of standing timber made in the past, they have simply taken the map of Canada, determined the number of square miles, and arbitrarily figured so many cords per acre. Now as logging by aeroplane has not been perfected as yet, there are only two ways you can get out wood, namely, by river or railroad. About all the more important rivers of Canada have been logged on and driven, from the very earliest days. Many of them have been practically stripped or cut out, while others are being operated pretty well back to their headwaters, so far remote that it takes two years or more to drive logs to the mills.

In the case of the railroads the condition is pretty much the same with the exception of possibly the Transcontinental, but inasmuch as this road was built beyond the height of land, there is very little wood available north of this road, as the rivers all drain away from it towards Hudson Bay. This leaves only the territory that lies south of the railroad, but as sawmills are springing up along this line, like mushrooms over night, and as fire is taking a heavy toll in this section, the paper mills will derive only a small supply from this source. Every time a railroad is built in a wooded country, more wood is burned up than is hauled out.

When talk is made about obtaining pulpwood from the cold northern sections that have not been opened up, where it takes 150 years to grow a four inch tree, where the snow falls to a depth of 15 feet and the thermometer registers 50 below zero, it will be only when pulpwood has reached a price more than $75.00 per cord. We hear Alaska suggested as a possible field for the making of paper, but all of the above handicaps apply to this section, except along the coast, as well as the fact that it is 4000 miles distant from the large paper consuming market.

All anyone needs to know is that in the United States more than 5,500,000 cords of wood are used annually for pulp alone, in order to realize that this appalling shrinkage in our capital stock of standing timber must necessarily all too soon wipe out the remaining supply.

Beyond Conception Is 5½ Million Cords

I want the reader to pause a moment when he reads this paragraph, five million five hundred thousand cords—not feet, but cords, used every year in the United States for pulp, and principally in the Eastern and Middle States. Few can realize just what this really represents, but to try and make this comprehensible, it means a solid pile of four foot wood, twelve feet high reaching clear across the continent, or a pile four feet high, nine thousand miles long, and yet we may travel for days on the railroads and hardly see a spruce tree. Personally I should not want to take the contract to furnish this amount for even one year, and where is it to come from after the next ten years?

Imagination can hardly grasp the real significance of the terrifying estimate of the annual consumption of all wood products in the United States, namely 244 million cords. Even this estimate of consumption is doubtless conservative, as it is impossible for the Government to obtain complete reports of all actual production.

Tremendous Losses by Fire.

In addition to this enormous amount that is being cut, fire is taking a terrible toll as well. Over a billion feet of timber was destroyed this present year in just one State—Montana. This means two million cords or nearly half the entire amount consumed for pulp in one year, destroyed by the fire fiend in one state. Last year the same thing happened in Minnesota, and this same thing has been going on since this country was first settled and to such an extent that 75 per cent of the original stand of timber has been destroyed by this same cause, and yet some authorities will still talk of an annual growth.

It is a curious fact that some of the coldest sections are the most prone to fire, such as Newfoundland, British Columbia, Northern Ontario, Northern Quebec, Minnesota, Alaska, etc. These fire zones are just as well defined as land and water.

Increase in Consumption Overlooked.

In many of the estimates that have been made as to the length of time our standing timber will last, the important question of the increase in consumption is quite overlooked, and as showing what an important factor this is, I will simply cite a 5 year period in the St. Maurice Valley, where the increase amounted to 200%, or at the rate of 40% per year.

Thus far I have largely discussed principally the pulp-wood consumption, and yet when you add to this the extraordinary demand we have in sight for lumber for new construction the world over, it simply adds to the danger that is facing this country from a premature exhaustion of a supply of raw material for our magnificent paper mills, which to-day are the second most important industry in Canada, and which with a proper and judicious guarding of our raw material, will shortly occupy first position.

The paper mills which have a wood supply will make large profits in the future, as there are so many American mills which have no supply of their own and will be forced out of business on that account, which will make a continued shortage of paper from this time on. Furthermore, no government can for any length of time, interfere with the natural law of supply and demand, or make a spruce tree grow in less than 50 to 75 years.

As showing what effect lumber and other products of wood may have on the price and scarcity of pulpwood, I will simply note that in some sections, owing to the abnormally high price of laths, pulpwood is being sawn into laths netting from $30.00 to $35.00 per cord for the wood at point of shipment.

Prophecy Has Come True.

In an article which I wrote three years ago when the publishers were complaining of 2¼ cents paper, I then stated that the question of the future would be not one of price, but of obtaining paper at any price. That prediction has already proved only too true in a much shorter time than I anticipated.

I have devoted the past 28 years to the study of the one subject of timberlands and wood supply, and during this period I have seen lands go from $1 to $15, $20 and up as high as $50 per acre for the same lands; and stumpage go for $1.50 for a mark of logs that only took 4 to the thousand, to a price of $20 per 1000 for a mark of 12 to the thousand; pulpwood from a low price of four dollars to a high of thirty-two dollars per cord, and spruce lumber from a low of twelve to a high of sixty dollars per thousand. Stumpage in New Brunswick even has been sold as high as $15 per thousand during the present year.

In 1890 they were cutting trees that took not more than six or seven to make a thoussand feet of lumber, while to-day they are cutting to such a small diameter limit that in many sections it takes 40 trees to make a thousand feet. I saw one pile of wood out on the Transcontinental containing 4000 cords, where the largest stick was 4½ inches and from that it ran to 1½ inches, with the average size running under 3 inches.

In one section of the Pacific Coast where the United States Government estimate a stand of eighty-six billion feet, the highest authority in the timber cruising line, and one who knows more of that particular section than any other man, from actual cruises says the figure 8 wants to be dropped, as there is not over 6 billion at the very most. Another example I have in mind is a certain territory which was estimated to contain 25 million cords of pulpwood and where, after operating 7 or 8 years, and cutting out only about 250 thousand cords, all the available wood was cut, and at a severe loss, so that further operations of the property was abandoned.

I have in mind another limit that had been estimated to contain 16 cords to the acre, that was examined by a very competent cruiser, who found it ran nearer 16 acres to the cord, as he expressed it. I can cite several cases where the shrinkage in estimates are just as striking as those above enumerated.

In connection with this phase of the subject, I cannot help thinking of the reply an old lumberman made when at one of the Canadian Forestry meetings in Montreal. The question of shortage in supply was being discussed, and one of the members suggested that we did not know what there might be for timber in the unexplored regions. The old lumberman replied that "in any section that the Canadian lumbermen did not know what there was, there wasn't anything."

More Attention to Mills than Materials.

The great trouble with the paper mills in the past has been that the management have been devoting their whole thought and time to speeding up their paper machines, installing new and improved machinery. and improving their water powers, all of which is of course, very desirable; but while they have been doing this they have lost sight of the most vital question, viz. a supply of raw material to keep these mills running.

The newspaper publishers are not without blame for the present shortage in newsprint, for every time they have fought a legitimate advance in price, they have made it more difficult and expensive for the mills to do business, especially under Government control and regulation, and with regard to price it is not nearly as surprising that newsprint has advanced from 2 to 4 cents per pound and higher than it is that eggs have advanced from 25c to $1.00 a dozen. A hen can be produced in a year, while these trees that are being made into paper have taken from 75 to 250 years to grow, and as they are becoming more and more remote from the mills, must necessarily become more costly to procure. Think even of the cost of toting supplies back into the woods, a distance of 70 miles, the cost of which in many instances, amounts from $50 to $60 per ton for haulage alone!

Newspapers must accept the inevitable, as all other legitimate lines of business have done, and simply pass the cost along by increasing the price of their papers and their advertising rates. The newspaper has become a public necessity—no one will do without it to-day, and papers will sell just the same, whether the price is, 2, 3, or 5 cents per copy. And when the paper mills are forced to use some annual crop as a substitute for trees in making paper (which time is not far distant) paper instead of costing 4 cents per pound will cost 24 cents or more. So far as the American publishers are concerned, it is of course immaterial to them whether newsprint comes from Canada or the United States, so long as they are assured of a paper supply while the trees last.

When the public begins to realize that this timber, which is being cut today as if it were an annual crop, has been growing from 75 to 250 years, and the only way it can be reproduced is by re-planting, planting with the present high cost of labor amounts to a matter of $12 to $15 per acre, to which must be added the cost of the land, which is from $3 to $10 per acre, something will be done. This brings the cost per acre of these plantations of tiny little seedlings from $15 to $25, with an annual charge for interest, taxes and fire protection for at least a matter of 50 to 75 years before another crop can be harvested.

In addition to this there is a possible loss from fire and the spruce bud worm, and other enemies; for it must be borne in mind that fire is always with us, and the bud worm returns in cycles of from 20 to 35 years. and further, that each recurrence, as the lands become harder cut, increases in violence.

Imminent Increase in Price of Timberland.

As soon as the above facts are absorbed, as they are beginning to be quite rapidly at the present time, timberlands will be selling on a much higher scale than they are to-day, and my prediction is that the biggest rise in timberland values that has ever been known, will take place within three years.

There is not a commodity in the world that is selling so much below its real value as an acre of timberland to-day. Think of a crop that has been 50 to 250 years growing, and that under most favorable conditions will take from 50 to 75 years to reproduce with all the attendant risks, and an actual cost of $75.00 to $125.00, selling today at $10 to $15 per acre for land and all, while an annual crop of cereal or potatoes brings from $15 to $100 or even more per acre, above cost of planting and harvesting, and without the land.

How to Remedy this Situation.

It is far better to look this question of a rapidly diminishing timber supply squarely in the face and try by practical methods to put off the day of reckoning as long as possible, and I advocate the following remedial measures:

An active campaign of education carried on by literature, and illustrated lectures, so as to reach all timberland owners and the public in general.

The creation of a strong public sentiment by various methods, so as to establish a greater appreciation of the value of forests to all, and a desire on the part of the public to help actively in preventing forest fires.

Improvement and enlargement of the present fire protective service.

Reforestation on a large scale by Governmental appropriation, regardless of cost.

Burning of slash under certain conditions and in certain cases.

Change the present wasteful methods of logging by a closer supervision of woods operations by intelligent practical foresters.

An embargo or export duty on raw material taken from fee lands; or the

Annual purchase of fee land wood by a combination of all the Canadian mills.

I will personally subscribe ten thousand dollars to the Canadian Forestry Association, if each of the other pulp and paper mills in Canada will subscribe a like amount, to be used in carrying out the work outlined above, under the direction of an Executive Committee to be appointed by the subscribers to the Fund. This will give us a fund worthy of the name and will enable us to do some real work.

I am giving freely of my time and money towards an educational campaign along these lines, as I feel that it is the duty of every Canadian citizen to do everything in his or her power to safeguard, preserve and perpetuate our forest resources as they are the backbone of our country.

Reforestation Will Help

With regard to reforestation, I am glad to note that the bud worm has not invaded this part of Nova Scotia owing largely to the fact that it is practically all spruce, the amount of fir being almost negligible, and probably also to the fact that the spruce is of such a sound, vigorous and rapid growth. I presume that the quality and growth here is due to the fact that soil and climatic conditions are ideal for spruce growing, the amount of precipitation being very great. Records at Halifax covering a period of 35 years show an average annual rainfall of 57 inches.

I have a sample section of red spruce tree in my office that shows a growth of 20 inches in 20 years, an inch a year in diameter. That is of course abnormal, but it is a fact that spruce makes the most rapid growth here of any section on this Continent, which hints at possibilities in reforestation that are not applicable elsewhere. This phase is well worth the serious consideration and careful investigation of the Canadian Forestry Association.

In the old days when railroads were first built in Nova Scotia and timberlands were of little value and there was no such thing as fire protection, this Province shared the fate of the rest of Canada and vast areas were destroyed by fire, but this is a thing of the past, as Nova Scotia has to-day one of the very best forest fire protective systems, and her citizens are thoroughly alive to the fact that timber is one of the most important assets.

BEDFORD McNEILL'S GENERAL & MINING CODE.

The well-known Bedford McNeill's Mining & General Code was for some reason not one of the permitted cable codes during the War. The prohibition on the use of this code has now been removed, and it is possible to use it again in cabling any English-speaking country. Those who have had occasion to use McNeill's Mining & General Code can best appreciate its adaptation to the needs of mining men. The code words themselves are sensible, being combinations of ordinary English words, and not, as many codes are, puzzling aggregations of unpronounceable consonants. Bedford McNeill himself died during the war as a result of exposure on war duty, but his widow survives him, and needs the revenue derived from the sale of the code.

W. R. INGALLS SEVERS CONNECTION WITH "ENGINEERING AND MINING JOURNAL"

The latest issue of the Engineering and Mining Journal announces that Mr. W. R. Ingalls, who was for many years Editor of this periodical, and has for a short period acted as Consulting Editor, has now severed his connection with the "Journal" and will devote his whole time to professional work.

Correlation of Pre-Cambrian Formations

By R. E. HORE.

As mining development and geological study go on new information is constantly being obtained concerning the geology of the Lake Superior regions. As the metal production of the Lake Superior states comes almost entirely from pre-Cambrian formations, those who explore Northern Ontario and Manitoba, also pre-Cambrian areas, benefit by the work done in the United States. An endeavor has been made by geologists of both countries to correlate information gathered by numerous workers and there has resulted a certain degree of uniformity in nomenclature. Contemplated changes in nomenclature in the United States are therefore of interest to some of the readers of this journal.

Classification of rock formation is properly based upon observed facts. As more and more new observations are recorded it becomes from time to time advisable to modify any classification. An attempt, however, has been made to leave undisturbed as long as reasonably possible the classification adopted by the U. S. Geological Survey for the pre-Cambrian formations of the Lake Superior States. Two geologists well known in Canada—Van Hise and Leith—are largely responsible for the classification used advantageously for several years past.

Other workers in the same region have made many observations which satisfy them that the classification adopted by Van Hise and Leith needs modification. There is a difference of opinion, however, as to the advisability of making radical changes in the accepted correlation. R. C. Allen, State Geologist of Michigan, proposes that revision should be made at once and presented his case before the Chicago meeting of the A. I. M. M. E. in September last. In the January 1920 bulletin of the Institute there are published some contrary opinions.

Whether changes are made by the U. S. Geological Survey or not the discussion will help to make it clear there are likely to be found difficulties in applying the classification used by U. S. Geological Survey. Studies in new areas and new studies in old areas show the necessity of keeping an open mind when undertaking to determine structural relations in our mineral areas. Existing classifications are useful if used, as Mr. Hotchkiss advises, merely as a starting point for detailed work. It is questionable, however, whether revision, as advocated by Mr. Allen, would not give a better starting point for new work, as well as give an opportunity for correcting inaccuracies in old descriptions.

In Ontario an attempt has been made to correlate some pre-Cambrian formations in widely separated areas, but it is recognized by the Bureau of Mines' geologists that it is wise to avoid general use of the names adopted for some of the formations in the areas first studied here and in Michigan. A few areas have been mapped in detail and local names are largely used. Thus at Cobalt there is a mapped area which serves as a basis for geological study for many miles of surrounding country. At Porcupine, Kirkland Lake and Sudbury there are other mapped areas which also serve as key areas. Correlation of the formations in any of these areas with those in the others and with those of Lake Superior is full of uncertainties and is fortunately of much less consequence to the mining industry than is the determination of the structural relations in the individual areas.

It is of course important that from time to time an attempt should be made to correlate facts observed in all parts of the pre-Cambrian, but so long as there is much uncertainty in correlation, the use of local names is preferable.

One of the reasons why the writer would be pleased to see the U. S. Geological Survey adopt Mr. Allen's proposal to revise the classification of the pre-Cambrian in Michigan is that readers of governmental reports often fail to appreciate the conditions under which reports are written. The geologist gets together all the known facts and attempts to classify them so as to permit a better understanding of them. His conclusions are not final, but should serve as working hypotheses. To be used successfully they should be taken for what they are and revised promptly when new observations show the need. For experienced geologists like Hotchkiss and Allen the revision of the Van Hise-Leith classification is quite unnecessary, for they know its limitations, but for many who seek information about mineral-bearing rocks a more up-to-date working hypothesis should be provided.

INTERESTING NOTES FROM PAPERS READ BEFORE GEOLOGICAL SOCIETY OF AMERICA—BOSTON, Dec. 29th.

By CYRIL W. KNIGHT.

That the Kennecott copper company in Alaska have 220,00 tons of copper ore blocked out in a glacier was one of the interesting pieces of information given out during the Boston meeting of the Geological Society of America which was held December 29th to 31st. This information was presented in a brilliant and notable paper on the geology of the ore deposits of Kennecott, Alaska, by Prof, M. Bateman, of Yale University. Prof. Bateman showed that the occurrence of the copper ore in the glacier is easily explained. The ore body proper occurs on limestone on a mountain. As erosion proceeded, blocks and fragments of the ore were carried down the side of the mountain into the valley and became incorporated in the glacier in great enough quantities to form a mixture of ice and ore sufficiently rich to mine at a profit. The Kennecott copper company is the only concern in the world which is carrying on such unique mining operations.

There were many other papers of interest presented at the meeting of the Society, one of the most noteworthy of which was an account by the President, I. C. White, of some results of deep drilling in the Appalachian oil and gas fields. It is probably not generally known that the deepest well in the world has been drilled in West Virginia. It reached a depth of 7,579 feet. Unfortunately at that great depth the rock caved, on account of the fact that no casing was used in the lower parts, and the hole had to be abandoned. The drillers had, however, arrived to within 600 feet of their objective—the Clinton Medina sand, in which oil and gas was expected to be tapped. The company which drilled the hole gave generous facilities to the United States government in connection with the accurate determination of temperatures at various depths in the hole. It was found that at a depth of 7,500 feet the

temperature was 168 degrees Fahrenheit. While this well ultimately proved a failure, because drilling operations had to be abandoned, nevertheless another well has been started to tap the same horizon, and this time the company is taking no chances, and will therefore case the hole to the bottom.

In connection with the work of the staff of geologists attached to the American army in France, during the Great War, some curious information was obtained by Colonel Brooks, who was in charge of the geological staff. Among other things Colonel Brooks was able to prove that the German army used divining rods in their attempts to obtain water behind the lines for drinking or other purposes. Documentary evidence is in the possession of the United States government that this superstitious and mediaeval method of finding water was in use by the Germans and that lengthy reports were made regarding the results obtained.

OIL POSSIBILITIES IN THE JAMES BAY REGION.

Of interest in connection with the development of northern Ontario is the possibility of the occurrence of oil in that part of the province lying south of James Bay. Although shales and limestones of Palaeozoic age have long been known to underlie this area, the age, succession and structural features were little known. In order to ascertain the oil possibilities of these sediments Dr. M. Y. Williams of the Geological Survey made a study during the summer of 1919 of the exposures along Mattagami and Abitibi rivers. In summing up the results of his investigations Dr. Williams states:

Extensive basins of sedimentary rocks of Palaeozoic age or later are commonly found to contain oil accumulations, which may or may not be indicated by oil seepages or springs. The extensive Palaeozoic area to the south and west of James and Hudson bays, is known to contain formations of the same age as oil-bearing formations elsewhere, but to date no oil seepages are known to occur. Owing, however, to the long period of weathering along the rivers, which may have dissipated any oil formerly present, and to the heavy burden of clay, silt and muskeg moss which covers the interstream areas, the lack of observed oil seepages is not to be wondered at.

The Trenton formation outcrops on the Nelson and Churchill rivers, the Niagara on the Nelson, the Albany and the intervening rivers, and the Salina and the Onondaga (''Corniferous'') on the lower Albany river and the Moose river with its tributaries. From analogy with other occurrences, these formations may be expected to contain oil. Economic accumulations, however, may only be looked for where there is an impervious cover to retain oil in the formation, and where the structure of the formations is favourable for oil accumulation.

In this region drained by the Moose river and its tributaries, the Onondaga limestone and the Salina shales are known to occur, but the Niagara and Trenton have not been observed, although they may be present beneath the outcropping formations. The Salina is not generally oil-bearing, but some of the lower dolomitic beds of this formation contain large quantities of oil in parts of southwestern Ontario, notably in Tilbury Township, Kent county. As the Salina consists of alternating shales and limestones, it is probable that suitable cover is present for any oil-bearing horizons which may be present. The Salina formation as a whole is generally well covered by younger formations.

The Onondaga limestone, which has been the most uniformly productive formation of southwestern Ontario, outcrops at the surface over wide areas, as already described, and for that reason an impervious cover is generally lacking. In the vicinity of the Long Rapids of the Abitibi river, and about 4 miles above the Long rapids of the Mattagami river, the Onondaga is covered in part by impervious shales. The areas known to be covered, howeveer, are comparatively small and unless larger areas occur beneath the interstream regions in the vicinity, it is scarcely likely that extensive accumulations of oil are present in the Onondaga. The shale areas, however,, probably indicate the deepest part of the basin (that is the greatest accumulation of sediments) and consequently a suitable location for testing the lower formation.

The structure in the Long Rapids region of the Abitibi river consists of a well-marked serise of low folds, the major anti-clines being represented respectively by the limestone areas near the head and the foot of the Long rapids. The axes appear to extend north about 65 degrees east, and the dips of the limbs probably average 6 degrees, although one was noted measuring 13 degrees. Smaller, subsidiary folds are superimposed on the larger folds, the whole structure being clearly expressed in the exposures on the islands and in the banks of the river. The proximity of the Pre-Cambrian gneiss reported about 4 miles to the northeast on the Little Abitibi river suggests that the folding is due to the unevenness of the underlying crystalline rocks.

On the Mattagami river the formations lie nearly flat.

Among the islands in the Moose river below Grey Goose island, a series of folds occur with axes running nearly east and west and with dips as high as 25 degrees. The large island, next to the lowest of the group, lies in a syncline but has at its head a sharp local anticline with dips to the north of 15 degrees and to the south of 25 degrees. The gypsum deposits appear to indicate a broad, low anticline, and the Salina red and grey shale and limestone series of the third lowest island of the Grey Goose group, evidently form the northern limb of another anticline. The alignment of the gypsum outcrops of Moose river, Gypsum ''mountain'' and of the French River valley suggest the location of one of the best marked anticlines in the region.

As Pre-Cambrian crystalline rocks out-crop at various places throughout the region east of the Abitibi river, it is scarcely probable that the Palaeozoic basin is very deep anywhere in their vicinity. It is more likely that the basin is deeper to the west, the centre possibly being near the centre of the Onondaga outcrops in the inter-stream region between the Moose and Albany rivers. It is doubtful whether a depth of Palaeozoic strata greater than 600 or 700 feet is to be expected even there.

A full report on Dr. Williams' investigations will be published by the Geological Survey, Ottawa.—*Geological Survey Bulletin.*

Mr. A. D. Matheson, the Asst. Manager of No. 1 Colliery of the Dominion Coal Company, has been appointer Manager of Caledonia (No. 4) Colliery, succeeding the late Mr. John Casey, whose death was reported in the last issue of the ''Journal'' Matheson was Underground Manager at Caledonia for a number of years previous to his appointment as Asst. Manager at No. 1 Colliery.

Report of Coal-Mining Industry Commission, Province of Alberta, 1919

To His Honour The Lieutenant Governor-in- Council:

The undersigned Commissioners appointed by Your Honour by Commission bearing date the fourth day of June in the year of Our Lord One Thousand Nine Hundred and Nineteen, in accordance with the powers contained therein beg leave to report that they have held sessions at Edmonton, Calgary, Drumhuller, Wayne, Edson, Lethbridge and Blairmore, and have examined seventy-four witnesses, being, in the estimation of your Commissioners, a fair representation of all pesrsons interested in the Coal-mining Industry, including the general public.

Your Commissioners have made inquiry into and upon all matters pertaining to or concerning the Coal-mining Industry of the Province of Alberta, and have considered various resolutions, correspondence, and exhibits, which have been submitted bearing on the questions under investigation. All of these are herewith respectfully presented for your consideration, together with a copy of the evidence taken.

Your Comissioners herewith submit their Report, which has been made from the evidence submitted, and are of the opinion that the following matters have an important bearing on the Coal-mining Industry.

1.—*Extension of Markets.*

Many mines only operate one half of the year or less. If more continuous operation is obtained, the result will be a reduction in the price of coal to the consumer and steadier employment to the workman.

2.—*Working Agreements and Method of Handling Disputes.*

Provisions for making working agreements, the settling of disputes and such matters that employer and employee deal with, are not satisfactory.

3—*Housing Conditions and Sanitation.*

At many mines the living and housing conditions, and matters pertaining to health and sanitation, are not in a satisfactory condition.

4.—*Educational Facilities.*

In some camps the educational facilities are inadequate.

5.—*Loss of Capital Investment.*

Much capital expenditure has been lost on account of failure to obtain reliable information about properties and marketing condition before operations are commenced; and also owing to lack of sufficient capital being provided to carry on operations to a successful issue.

6.—*Loss of Market.*

A considerable loss of market has been sustained owing to—

(a) Cessations of work;
(b) Shortage of railway cars;
(c) Misrepresentation as to size and quality of coal.

7.—*Sub-leasing.*

Sub-leasing of coal leases issued by the Federal Government has the effect of unnecessarily increasing the cost of coal to the consumer.

8.—*Freight Rates.*

Existing freight rates militate against the marketing of Alberta coal in Manitoba and the United States.

9.—*Purchasing, Mine Equipment and Power.*

Mine equipment and power, under the present system, are too expensive.

10.—*Conservation of Coal.*

Large quantities of coal have been and are being lost through improper mining methods, as well as through cessations of work.

11.—*Hospitals.*

In many mining camps the hospital facilities are inadequate.

As the natural resources are not vested in the Crown in the right of the Province, but in the Crown in the right of the Dominion, or in private ownership, it is difficult for your Commissioners ot determine what should be done with many of the questions which have been brought before them. Your Commissioners are of the opinion that, for the best interests of the mining industry in this Province, steps be taken at as early a date as possible to have the natural resources vested in the Crown in the right of the Province.

Your Commissioners further submit for your consideration the following recommendations, and unanimously recommend that the same be provided for, as far as possible, by legislation at the coming session of the Legislature:

Recommendations.

1. (a) That employees be required to use every effort to see that all coal is mined properly, and free from impurities, so that the best product will be obtained from the working face.

(b) That employers be required to see that all coal is properly prepared and graded before shipment.

(c) That railway cars are properly cleaned before being loaded.

(d) That better facilities for more prompt dispatch of cars from the mines to the point of consumption be obtained.

(e) That all invoices for coal sold, either by owners or dealers, shall have inserted on them the size and kind of screen over or through which such coal passes, and the name of the mine from which the coal is supplied.

(f) That in order to get correct weights, better provision be made for the taring of railway cars.

(g) That steps be taken to establish testing stations in different Provinces, particularly in Manitoba, so that the buying public may be given information as to the uses and values of different coals.

(h) That a complete system of advertising Alberta coal be undertaken.

(i) That attention be given to the question of storage of coal by both consumer and dealer.

2. That a permanent Commission be appointed and given power by legislation to make working agreements and provide for the settlement of disputes.

3. That living and housing conditions and matters pertaining to health and sanitation be dealt with by the said Commission.

4. That the said Commission co-operate with the Department of Education with a view to seeing that satisfactory educational facilities are provided for all children of school age.

5. That before mining operations are commenced, the question of the advisability of opening a mine in any particular field, as well as the question as to the amount of capital required to open in that field, be referred to and approved by the said Commission, and that the administration of the regulation passed by Order-in-

Council P.C. 2303, by the Federal Government, a copy of which is herewith attached, be vested in the said Commission.

6. That all matters pertaining to loss of market be placed under the jurisdiction of the said Commission.

7. That sub-leasing of coal lands, leased by the Federal Government, be prohibited.

8. That the services of an expert be obtained to investigate the question of freight rates, including the question of a preferential rate on slack coal, and a reduced rate on coal during the summer months previous to the movement of grain, and that the report of such investigation be submitted to the said Commission, with a view to bringing the facts before the Railway Commission for adjustment.

9. Your Commissioners are of the opinion that considerable saving would be attained if owners would establish some central purchasing agency, thereby standardising equipment; also that a considerable saving would be attained if the power used were obtained from central power plants located in the various fields. The carrying out of these suggestions, in the opinion of your Commissioners, would decrease the cost price of coal, and would not only be a saving to the consumer, but, in addition, would tend to increase the market.

10. As this Province has within its borders the largest known coal resources in the world, the conservation of this heritage should be zealously guarded. Your Commissioners therfore recommended that you obtain authority from the Federal Government for the same Commission to be given full powers for the safe-guarding of this national asset.

11. That districts be formed, and proper hospital facilities be provided, in the various mining fields.

12. That legislation be enacted at the coming session, making provision for the appointment of a Commission which would be representative of—

(a) Owners;
(b) Workmen;
(c) Consuming Public;
(d) Provincial Government.

That such Commission, in addition to the matters above mentioned, have such authority as may be given to it from time to time by Regulation.

That such Commission also be made responsible for the proper equipment and running of mines to ensure safety.

Evidence has been submitted with respect to Old-Age Pensions and CompulsoryHealth Insurance, but your Commissioners have not obtained sufficient evidence to reach a final conclusion, and recommend that the matter be further investigated.

Dated at Edmonton this twenty-third day of December, A.D., 1919.

John T. Stirling, Chairman.
Walter Smitten,
John Loughran,
W. F. McNeill,
Harvey Shaw.

Extract from Order-in-Council P.C. 2303, dated the twenty-first day of September, A.D., 1918, being the Regulation referred to in section 5 of the Recommendations:

"The lessee shall, before opening any mine on the lands described in the lease and before extracting any coal therefrom, submit to the Minister plans and specifications showing in detail the manner in which it is proposed to open up, develop and operate such mine, and if the location contains more than one seam of coal detailed information shall be furnished as to the particular seam which itis proposed to develop. No work shall be commenced for the recovery of coal, and no coal shall be extracted until such plans and specifications have been approved by the proper officer of the Department. The procedure to be adopted in opening up and operating a mine on the lands leased, as well as the particular seam of coal which shall first be operated shall at all times be in accordance with the provisions of regulations duly approved by the Minister, and failure to comply with the requirements shall render the lease subject to cancellation in the discretion of the Minister."

MARKED DECREASE IN BRITISH COLUMBIA MINE FATALITIES DURING 1919.

Only twelve fatal accidents occurred in the coal mines of British Columbia during 1919. This is a new record of a very satisfactory character. Never before in the history of coal mining in this Province has it been equalled. In point of number of deaths it has been paralleled once in the last twenty years. This occurred in the year 1905, but it is to be remembered in considering the statistics of that year that there then were little more than half as many men employed in and around the mines as now is the case.

This anouncement regarding the operation of the coal industry of the Province was made yesterday by Hon. Wm. Sloan, Minister of Mines. That he was gratified is scarcely an adequate expression of his sentiment. He trusted that with the evident growing interest manifested by miners in the acquirement of knowledge of mine gases and their greater appreciation of the importance of the "Safety First" principle, a further reduction in the fatality rate might be be looked for. Mr. Sloan complimented Mr. George Wilkinson, Chief Inspector of Mines, on the evidence of the efficiency of Mines' Inspection Staff of the Provincial Bureau of Mines.

Of the twelve accidents referred to four were the result of falls of rock; four resulted from falls of coal; and an equal number occurred in the handling of mine cars in haulage. The fatalities were divided among the Collieries as follows:

Canadian Collieries (D) Ltd., Cumberland.. (All of whom were Orientals.)	5
" Extension..	2
Canadian Western Fuel Co., Nanaimo, B. C...	4
Crow's Nest Pass Coal Co., Coal Creek..	1
	12

An estimate of the fatalities per thousand of employees would put the percentage at approximately 2.2 as compared to the average of the past ten years of 5.098. This year's average, therefore, compares very favourably with that of Great Britain and other European countries, which is worthy of special note, when it is borne in mind that in the coal fields of the United Kingdom and of the Continent there are so many more miners actively engaged that it takes more than one serious accident to materially affect the general average at the end of a given period.

Only one fatality occurred in the mines of the Crow's Nest Pass District during 1919. This again is a record. If the mines of Eastern British Columbia Field be considered apart from the rest of the Province, it is the lowest mark since the first year of their development, over twenty years ago.

Mr. Wilkinson notes, in his report, that the majority of these twelve fatal accidents could have been avoided had ordinary care been exercised.

Still another record has been established by the metalliferous mines of the Province in 1919. There were but six fatal accidents throughout British Columbia in connection with the metal mining industries. This is the lowest in the history of metalliferous mining in British Columbia.

It is estimated that fatalities per capita of employees will work out at approximately 1.2 per cent. in comparison with an average over the last ten years of 3,899.

These accidents are tabulated as follows:

Falling down shafts, chutes, raises etc.	5
By breaking compressed air pipe	1
	6

The majority of these accidents, too, were avoidable had ordinary care been exercised.

ASBESTOS.

The mining and manufacturing of asbestos is well illustrated on a recently published volume entitled "Asbestos, from mine to finished product." In this book sixty plates are used to reproduce scenes about asbestos mines in Canada and manufacturing plants in the United States. Some excellent photographs of different types of raw asbestos are also shown. The Asbestos and Mineral Corporation of New York are the publishers.

Several plants are used to depict scenes in the Quebec asbestos mining areas. These give a very good idea of the way the material is mined and treated there and of the necessary plant.

A series of plates is used to show specimens of asbestos from all parts of the world. In each case the properties of the material are mentioned. Regarding the Canadian asbestos the publishers say "this material is a true chrysotile asbestos of great tensile strength and silkiness, and must be distinguished from asbestos found in other parts of the world." The photographs show that some asbestos of comparatively little value closely resembles in appearance the Canadian asbestos. Low tensile strength and harshness of fibre detract from the usefulness of asbestos from many places.

A series of plates used to illustrate the manufacture of asbestos gives some idea of the processes of making asbestos lumber, paper, etc. Particularly interesting are the views showing the spinning of asbestos for textile purposes. These photographs from a modern asbestos textile manufacturing plant indicate clearly some of the qualities essential in asbestos and show why Canadian asbestos is so highly valued.

Anyone interested in asbestos will find useful information in this book, which by the way is very well printed on good paper and attractively bound in cloth. The Asbestos and Mineral Corporation has published a limited edition for complimentary distribution.

THE RAINY LAKE GOLD AREA, ONTARIO.

By J. J. O'CONNOR.

For over twenty years the lower Seine River gold-bearing area, has been practically an abandoned field. It is coming back to its own very fast. The current year is certain to see extensive developments carried on, that, in the opinion of the best informed, will place it in the permanently producing class.

The pioneer spirit of adventure that first brought this field into notice, was displayed by citizens of Duluth and other Americans, in their operations on the United States side of Rainy Lake, at Rainy Lake City, Bell City and other bustling camps of the early '90s.

Many old timers will recall the trip made from Tower to Rainy Lake, in the winter of 1896-97, by sleigh and dog team, by the late Capt. W. H. Mack, of Cleveland, Ohio, an account of which, he published in the "Marine Review" of that period, under the heading "A Golden Cruise," in which he described the venture most graphically, and the quest that prompted it.

The operations on the American side of the Lake, naturally directed attention to the Canadian side, and by 1895 mining activity was well underway, on such well known properties as the "Foley" "Golden Star" "Ferguson" "Olive", and others, Mining was carried on at the "Foley" and "Golden Star" on quite an extensive scale, under the greatest difficulties, for some years.

Several mills were erected, from two of these, the "Foley" and "Golden Star", over $200,000 in bullion was shipped.

Transportation costs were the great handicap in the early days. All supplies had to be brought in via Kenora, on the Canadian Pacific Railway, over 200 miles away, over the Lake of the Woods, Rainy River, and Rainy Lake, necessitating transfers at Fort Frances.

The mining system then in vogue, was not well suited for the development of the maximum of possibilities. Modern methods of gold recovery, greatly increase the possibilities in this field, while transportation facilities are revolutionized, and are now ideal.

The gold-bearing area is situated one mils south of Mine Centre station, on the Canadian National Railway, and connected with it by a good waggon road . It is one mile wide, and four miles long, extending in a north-east, and south-westerly direction, bounded on the southern extremity, by waters navigable for steamers from Fort Frances, 40 miles to the westward, on the Canadian National Railway.

The country rock of the gold-bearing area, is an altered granite. The quartz veins, of workable value, occur altogether in the granite rock, with the exception of the "Golden Star" which is along a small dyke extending from the main mass of the granite.

The only development carried on during the past five years, has been done by private parties, mainly in high-grading on the "Isabella" and "Ferguson" properties.

Most of this has been done during the past eighteen months,. Very gratifying results have been obtained from this work, with only the crudest kind of appliances.

The showings made by this work are remarkable. They have uncovered several veins, 18' to 2' in width, showing visible gold in many places.

The veins vary in width from a few inches up to 8 and 9 feet. Over 60 of these have been located with-

in the gold-bearing area. Visible gold has been observed in 18 of them, fine gold in numerous others, and 23 of them are considered undoubtedly rich in irregular shoots, by men competent to voice an opinion, after careful examination.

Highly favourable report have been made on different properties in this field, by such well known mining engineers and geologists, as the following: Frederick Gleason Corning, Horace G. Cole, J. H. Chewett, R. A Kerr, E. P. Rathbone, and Horace V. Winchell.

The Swedish-Canadian Mines, Limited, have taken over the "Foley" and will operate it to capacity during the current year.

It is confidently believed by the best informed mining men, and mining engineers, who have spent more than one season in making critical examinations of the whole area, that there is no more promising ground in Ontario, than the Rainy Lake field. With prudent mining, and economical management, the field has a bright future.

ENGLISH ENGINEERS VISIT CAPE BRETON COLLIERIES AND STEEL PLANTS.

General Sir Newton Moore and Mr. F. W. Harbord, the well-known English metallurgist, visited the collieries of the Dominion Coal Company, the shipping piers at Sydney and Louisburg, and the Steel Plant at Sydney during the week ending the 24th. Later they visited the collieries and Sydney Mines Steel Plant of the Nova Scotia Steel and Coal Company, and returned to Halifax, calling at the Trenton Works of the Nova Scotia Company en route. At Halifax, General Moore and Mr. Harbord will meet Col. Grant Morden and Mr. Benjamin Talbot, who is also prominent in the technical progress of steel manufacture in Britain. These gentlemen are members of the Advisory Board of the Dominion Steel Corporation, the other members being Sir William Beardmore, Viscount Furness, and Mr. Henry Steel, with Col. Lorne Hamilton as Secretary of the Committee.

ANNUAL MEETING OF THE CANADIAN MINING INSTITUTE.

The Secretary of the Canadian Mining Institute has issued a final notice of the 22nd Annual General Meeting of the Institute, which will be held in the King Edward Hotel, Toronto, on Monday, Tuesday and Wednesday, March 8th, 9th and 10th next. Members are strongly advised to make their hotel reservations early, and Mr. Cyril W. Knight, of the Provincial Bureau of Mines, Toronto, who is Secretary of the Local Committee, will be glad to make such reservations, if he is notified in time.

DRESSES AND ADDRESSES.

Bradley Stoughton, secretary of the A. I. M. E., has an apt way of classifying addresses. At a recent meeting of the San Francisco section of the institute he said that public addresses are of two kinds: One is like a mother hubbard dress—it touches only a few places but covers everything. The other is like a modern gown—it touches everywhere but covers nothing.—E. & M. Journal.

PERMITTED EXPLOSIVES
British Order.

In the Explosives in Coal Mines Order of the 14th November, 1919, the explosives which have passed the Rotherham Test are listed as follows:—

PART I.

Explosives.	Permissible maximum charge in ozs.	Pendulum swing in inches.*
Ammonite	18	2.44
Ammonite No. 1	24	2.42
Ammonite No. 5	26	2.41
A. 2 Monobel	22	2.44
Bellite No. 1	20	2.74
Cambrite No. 2	24	2.00
Denaby Powder	18	2.74
du Pont Permissible No. 1	18	2.82
Dynobel No. 3	18	2.50
Dynobel No. 4	30	2.35
Essex Powder	38	2.17
Expedite	32	2.62
Haylite, No. 2	18	1.96
Haylite No. 3	16	2.44
Kentite	18	2.64
Monarkite	18	2.30
Monobel No. 1	10	2 81
Negro Powder No. 2	20	2.21
New Fortex	10	2.61
Rex Powder	20	2.61
Roburite No. 4	18	2.86
Samsonite No. 2	26	2.49
Samsonite No. 3	24	2.42
Seamex	36	2.54
Stomonal No. 1	20	2.68
Stomonal No. 2	30	2.57
Super-Cliffite No. 2	30	2.53
Super-Excellite No. 3	36	2.73
Super-Rippite	18	2.53
Thames Powder	32	2.78
Thames Powder No. 2	23	2.59
Viking Powder No. 1	26	2.44
Viking Powder Noo. 2	18	2.50

PART II.

Bobbinite.

Permitted only for the purpose of bringing down coal in certain mines, and only until 31st December, 1920.

* This is the swing given to the ballistic pendulum at the Home Office Testing Station by firing at it a shot of 4 ounces of the explosive. It may be compared with the swing of 3.27 inches given by a shot of 4 ounces of gelignite containing 60 per cent of nitroglycerine.

PROPOSED MONUMENT TO MINE EXPLOSION VICTIMS AT STELLARTON, N. S.

A proposal is mooted to raise the sum of $10,000 to erect a monument in joint memory of the victims of the explosion at the Allan Shaft Mine which occurred in January 1918, and those who died in the disasters of 1873 and 1880 at the Drummond and Ford Pits respectively.

Northern Ontario Letter

THE SILVER MINES.

The year-end annual reviews of the leading metal authorities in London and New York tend to strengthen the belief of the silver mine operators that the quotations for silver during 1920 may be expected to continue high. The point is emphasized that Great Britain and the United States, now being in possesion of the greater portion of the world's gold, must be expected to cling to it as long as possible and thus fortify their standing, as creditor nations. This leaves but the one precious metal—silver, to meet the demands of the Eastern countries. With production declining, and with low stores, not only does a continuation of the present high quotation appear probable, but a possible increase is indicated.

Comparatively speaking, wages are high in Cobalt. Machine runners are being paid $5.50 a day, made up of $4 regular wage and a high price of silver bonus of $1.50 a day. As a result of the high cost of labor, the non-produeing mines having no product to balanee aecounts, are laboring under a real handicap. The produeing mines, of course, in receiving inereased priee for their silver are still left with added profit after the bonus is dedueted. The condition is one that has appeared to retard to a certain extent the scope of operations among the small prospective silver mines.

The Beaver Consolidated has made another rich strike at a depth of 510 feet, and altogether with the several other discoveries reported within the past three or four months, offers reasonable promise of the year 1920 being a profitable one for the company. Some exceptionally rich ore is being bagged.

As indicated in reference to negotiations between the Coniagas and the Trethewey Companies during the past two weeks, as reported in these columns, the Coniagas has succeeded in purchasing the Cobalt mine of the Trethewey Company. The price is stated to be $100,000. On Jan. 31st a special meeting of the shareholders of the Trethewey Company will be called for the purpose of considering and, if approved, ratifying the agreement already entered into by the directors. From this date forward, the Trethewey will concentrate its efforts in exploring and developing its property in the Gowganda district.

At the Chambers-Ferland, as a result of work being carried on in the No. 4 workings, a substantial tonnage of low grade ore is being developed. In addition to this work, a cross-cut is being driven south through the territory lying between the Nipissing and the La Rose. Up to the present only one shift has been engaged on this work, but it is proposed to add to forces and make more rapid headway. As yet no new veins have been encountered, with the exception of a number of small stringers. In regard to the reported negotiations for the tailings pile on the Chambers-Ferland, the holders of the option with whom is associated H. Cecil, have let a contract to M. P. McDonald for the sampling of the tailings pile. The option price is stated to be $55,000. The deal will probably hinge upon results obtained in the present sampling operations.

The McKinley-Darragh has been compelled to close down its pumping equipment for the winter, and thus discontinue the treating of the sand tailings pile in the bed of Cobalt Lake. The flotation plant, however, is to be utilized in treating tailings from current operations. These tailings, in part only, have formerly been treated in a small flotation unit in the mail mill, but will now be diverted to the big flotation plant. The small flotation unit will be closed.

Diamond drilling at the 310-ft. level of the Adanac has so far failed to produce any satisfactory results. The hole is being driven entirely in the diabase formation and the chances of encountering commercial deposits of ore is considered meagre.

The Crown Reserve Mining Company is making good headway in the exploration and development of the Canadian-Kirkland property in the Kirkland Lake district. It is learned that a high degree of efficiency for the size of the operation has been established in the cost of work. In spite of the strike which commenced June 12th and continued until fall, the property, since early in May has been equipped with a mining plant, and work carried to the first level.

In the Supreme Court of Canada, Mr. Justice Middleton has reversed a decision formerly rendered in connection with the litigation involving the Bailey-Cobalt mine. The present judgment is sweeping, and leaves the company free to accept the offer recently made by A. J. Young to merge the Bailey with the Northern Customs Company. This will probably now be carried out; unless, of course, the opposing faction succeed in appealing the case. As to this, there appears to be a good deal of uncertainty.

Mr. Justice Middleton's judgment, after upholding the power of the Court below to sanction the offer made by A. J. Young to acquire the assets of the Bailey Cobalt Mines, Limited, proceeds as follows:—

"It remains to consider whether the offer should be accepted. In substance it provides for the turning over of all the assets to a new Company; this company will pay the creditors in full, the largest creditor limiting his claim to a fixed amount; shares in the company will then be given to the shareholders of this company. The creditors welcome the offer as it procures them payment in full when they expected a loss. The shareholders—save a few represented by Mr. Laidlaw—are anxious to accept, for in this they see their only chance to obtain anything. The minority—putting the matter bluntly—seek to prolong litigation in the hope that, some one may be forced to buy them off or may be induced to do so for the sake of peace. This is not presented nakedly but made of thin cloak of optimism and many charges of fraud and misfeasance against their having the largest claim as creditors. For here truth could not appear naked and remain unashamed.

The other creditors and shareholders prefer the speedier and more certain solution proposed to the prospect of long drawn out and highly problematical litigation. The attacked creditors make some concession in inducing their claim perhaps not as much as in the opinion of some they ought to do, but they will go no further. Mr. Laidlaw's clients propose no alternative save a cash settlement with them. They can procure no better offer, and ask the Court to compel the great majority of those concerned to throw away the substance in an attempt to grasp that which seems very like a shadow—though called a hope and an expectation.

I adopt the words found in the judgment already referred to, and think that when a very large majority of the shareholders desire that the offer should be accepted, it is the duty of the Court to give effect to their wishes.

Then should terms be imposed? There is nothing in our Statute analogous to the provisions which guided Mr. Justice Kay—on the contrary there is the provision in the Ontario Act, under which the Company was incorporated, by which the Company has power to "sell of dispose of the undertaking

of the company of any part thereof for such consideration as the company may think fit, and in particular for shares, debentures, or securities of any other company having objects altogether or in part similar to those of the company," if authorized by the vote of 2/3 of the stock of the company.

This ought to be the guide, if there is to be any guidance by analogy, rather than a provision in an English Act not found in our own.

But I would go further and would determine that the shares were always subject to this control by the majority and that the liquidation did not destroy this charter provision but made it subject to the approval of this Court and the superior rights of the creditors.

The appeal should be allowed, and the matter should be referred back to the Master to carry out the sale. The liquidator should have his costs out of the assets. No other order should be made as to costs.

During the week ended Jan. 23rd, four Cobalt companies shipped an aggregate of five cars containing approximately 353,135 pounds of ore. The Larose was the heaviest shipper, with two cars:

A summars follows:

Shipper.	Cars.	Pounds.
LaRose	2	144,186
Northern Customs	1	87,910
Temiskaming	1	81,095
Crown	1	39,944
Totals	5	353,135

During the corresponding period no bullion shipments were reported.

THE GOLD MINES.

The gold mining industry and the problems met with at the leading mines have ceased to be regarded as temporary. The management of the various mines throughout the North have long since considered the industry to be permanent. However, economic conditions have been unfavorable, and adverse influences have occurred with such frequency as to necessitate temporary shifts to offset the abnormal and changing conditions. Public men, in connection with road-building, assistance in attracting workmen to the mines, and in dealing with duties on mining machinery, and so on, have shown little or no interest, and have for the industry no advantages. This attitude has not helped to create the very desirable impression of permanency.

However, although public men and the government are offering a minimum of assistance, the mining companies themselves are building their future upon permanent foundations; and this determination to deal in a permanent way with the industry bids fair to shame the government into at least some measure of departure from its present lethargy.

The Dome Mines is reported to be making good headway in the exploration of the Dome Extension. While work has long since been carried onto the Dome Extension at the 600-ft. level, the first intimation that mining operations had been carried across the line at the 1150-ft. level came this week. Net production at the Dome as a result of milling operations is stated to be running high and by March 31st, the close of the company's fiscal year, a large cash surplus will likely be shown The officials of the Porcupine Crown and the Crown Reserve Mining Company have concluded a visit to the Moneta property. As to the possibility of the Porcupine Crown acquiring control of the Moneta, opinion is divided. This week an unofficial rumor is in circulation to the effect that the deal is not likely to go through but that the Moneta interest themselves are considering the installation of a mining plant to be followed by exploration work at their own initiative.

The question of the option which the McIntyre-Porcupine holds on the Plenaurum property is a live topic at present. As to whether or not the deal will go through or another extension of time be granted has not been stated officially.

In the Kirkland Lake district, one of the most interesting developments is found in the result of work at the Ontario-Kirkland mine. At a depth of 500-ft. a considerable amount of work has been done and several thousand tons of commercial ore is stated to be in sight. Altogether about 1000 feet of underground work has been done. According to official advice to the Journal, a good deal of the ore will average close to $20 to the ton. The development is interesting and important in that it opens up added possibilities in tha area lying immediately south from the present producing zone.

During 1919, according to the annual statement just issued by the Lake Shore, the profit and loss account shows a deficit of $47,000. Net profits for the year amounted to $38,273.49 and the balance brought forward for 1918 of $44,978.08. The labor strike which lasted throughout the whole of the summer was a serious handicap, in spite of which the mine produced close to $300,000. Mill heads averaged close to $25 a ton. During the year two dividends were paid amounting to $100,000 in addition to which was $25,000 put aside as "provision for contingencies."

In the Township of Lebel activity is increasing. It is stated by interested parties that about eight new companies will be formed within the next few weeks for the purpose of exploring mining properties in that township. The territory which is attracting interest is a strip about two miles in width and running from West to East through the township.

J. A. Hough, mining recorder for the Larder Lake and Swastika districts for the past thirteen years has tendered his resignation, to take effect March 1st. Mr. Hough, it is understood, feels that the salary attached to the office is inadequate, and the political situation too uncertain to allow him to remain in the service any longer. He will accordingly devote his attention to mining.

In regard to the question of the construction of light railways in the North, the Canadian Light Railway Construction Company through Mr. J. W. Solloway requested publication of the following:—

In view of misleading statements appearing in the public press in reference to the use of light railways for outlying districts of the North Country, we beg to submit the following for your information.

The situation in the North Country is as follows: For the past ten years, railway extensions, good roads, et., have been promised for these districts or the subject in some form has been under consideration by various Governments but very little has been done.

The idea of building light railways is to give undeveloped districts immediate transportation facilites. The contruction of light railways is only temporary. Their operation

will assist development of water power and of the mining industry. When the business increases to warrant same the light railways can be turned into electric or standard roads. The light rails and equipment can be transferred to new fields to be used again as a method of assisting development.

The idea is to use light railways to assist the development of new and undeveloped districts. They are cheaper to build and maintain than macadamised roads, and at the same time do the business on short hauls up to their capacity of a standard railway and the operation of same is a commercial and business proposition. The plans of the Canadian Light Railway Construction Company are only to build branch lines (not trunk lines).

Light narrow gauge railways embody three economic principles.

Low cost of Construction, Maintenance and Operation. In addition they can be quickly laid down and run over almost any kind of country. They proved to be the most economical and successful method of transportation adopted by the allies during the war. Commercially they have been used in France, Belgium, Germany and Russia for the past twenty years as feeders to the main railways, and it is proposed to use them in the same capacity in this country.

The Canadian Light Railway Construction Company are not advocating light railways in preference to Government owned standard or electric roads.

G. W. V. ASSOCIATION AT COBALT ASKS FOR EXTENSION OF SPECIAL LICENSING PRIVILEGES TO RETURNED WAR VOLUNTEERS.

Following is a Copy of Resolution passed by Cobalt Branch G. W. V. A. at a regular Meeting, held on Jan. 19th, 1920.

Whereas a great number of Prospectors and Miners in Northern Ontario voluntarily enlisted in His Majesty's Canadian Expeditionary Force and went Overseas and fought in the Great War:

And Whereas upon their return and demobilization they are obliged under the Law at present existing, to outlay large sums in order to perfect their Titles to Mining Claims held by them prior to their enlistment, in order that the same may be secured by Patent and the Titles to the same as indefeasible;

And Whereas upon their demobilization they find that they have not sufficient funds to make the outlay necessary in the premises in order that their interests acquired before enlistment be protected;

And Whereas prior to their enlistment they duly paid their Miner's Licence Fees, and for the recording of their Mining Claims, and had they not enlisted would have been in a position to have complied with all the provisions of the Mining Act of Ontario;

Therefore be it resolved that the Temiskaming Branch of the G. W. V. A. hereby endorse the following position of the Prospectors and Miners namely:—

That the Government relieved such Prospectors and Miners so having enlisted from the performance of any Assessment work upon Mining Claims which we staked out and recorded, and upon which thirty days' assessment work had been performed prior to the enlistment of the recorded holder or owner thereof, and that the provisions of the Mining Act of Ontario with respect to the performance of working conditions and surveys and Patents be waived, and that the said Prospectors and Miners so having enlisted be granted a Patent freed from the necessity of performing the balance of such assessment work or from the necessity of paying the fee to the Crown in other cases necessary before Patent issues, and that in the event of any of their Mining Claims being situated in unsurveyed territory that the Crown pay the cost of the survey of the same in order that Patent shall issue to such recorded holder or owner.

And be it further resolved that in the event of such Prospector or Miner being a partner or holder of an interest in a Mining Claim with a civilian, or one who has not served Overseas in the Great War, in default of such civilian, or one who has not so served, performing his due share of the assessment work required under the provisions of the Mining Act of Ontario, and filing proof of the same in accordance with the provisions of the said Act, then within thirty days after such default the Prospector or Miner so having served may file a notice with the Mining Recorder in the Mining Division in which such claim is located to the effect that he desires to complete the assessment work required by his defaulting partner or partners, and upon such notice so having been filed the Mining Recorder of Mining Commissioner may grant to such Prospector or Miner so having served sufficient time according to the exigencies of the case to permit him to complete the assessment work of his defaulting partner or partners, and the whole Mining Claim shall thereupon vest in the Prospector or Miner so having served.

And be it further resolved in the case of a Returned Soldier wishing to, or being capable, of, completing the work on his already existing Claims, he may forgo the above grant, and shall be entitled to stake three more claims on his new licence, which he was deprived of doing owing to his having so served, and be given a free Patent **without cost**, said Claims to be staked within one year of the date of the new Amendment of the Mining Act of Ontario being passed, the said right to apply to any Prospector or Miner who may not have been the possessor of a Claim or Claims at the outbreak of the War;

And be it further resolved that it is the feeling of this Branch of the G. W. V. A. that equivalent consideration be extended to the Prospecting and Mining Industry as has been shown to the agricultural community."

A Reasonable Feature.

Regarding the above, the request for consideration as regards working conditions appears to be favourably regarded in the mining districts. That is to say: The prospector who lost a lot of time in the service of the country seems to be entitled to protection for work which he would otherwise have been able to complete.

The Objectional Feature.

As regards the second last paragraph in the above resolution, the Bureau of Mines must be prepared to reject it. Were such to become law, it would mean that several hundred thousand men in Canada would be privileged to stake out three mining claims and secure a free patent. It would probably mean that unscrupulous interests could hire thousands of these men who are not interested in mining, have them stake claims and secure patent in return for a more or less small amount of money. It might mean that a million claims, or approximately four million acres of land would become tied up, without the necessity of work or payment.—J. A. MeRae.

Dr. Jas. S. Stewart, who has been in charge of the Edmonton office of the Geological Survey, has tendered his resignation. Dr. Stewart has been specializing in the gas and oil possibilities of the great plains of Alberta and the northwest and while not on special field work was engaged in Bureau of Information work. After 10 years' experience with the Geological Survey and with the highest attainable university degree. Dr. Stewart is leaving a salary of $2,100.

John R. Cox, of the Topographie Division of the Geological Survey, has also resigned to join the S. Pearson and Sons Petroleum Company. Several student assistants in the Topographical Division have also signed contracts.

While little has so far appeared in print it may be said that the work of the division interlocks with that of the geologists, and a loss in one affects both.

—Ottawa Journal.

TORONTO NOTES.

(From Our Staff Correspondent.)

Dr. W. G. Miller Emphasises Canada's Possession of Strategic Minerals.

Addressing the Royal Canadian Institute in Toronto on Jan. 10th, Dr. W. G. Miller, Provincial Geologish, outlined some of the outstanding mineral products, including the virtual control of gold by the British Empire, with about two-thirds of the world's output. In iron and steel, he said, the Empire does not show up so well only about eleven per cent of the world's iron and ten per cent of its copper, being produced in the Empire. In silver and lead, however, the Empire produces about seventeen per cent of the world's output, but in certain Canadian minerals the Empire controls the world supply. These are nickel, cobalt and asbestos. About one-seventh of the whole world's supply of coal is found within the borders of the British Empire, but in petroleum the Empire is a small producer, with prospects, however, of great expansion. Search, under Imperial auspiees, is being made for petroleum in various parts of the world, inceding even Papua in the South Pacific.

It was pointed out by Mr. Miller as a curious fact that before the war, while Great Britain possessed virtual control of certain minerals there were no facilities for refining them, and the bulk of the ores were exported. This state of affairs, whieh he described as most unsatisfactory, applied to such minerals as tungsten, but during and since the war, conditions have altered and the Empire has now sufficient refining facilities to supply all its needs.

"As regards Canadian mineral industry," he said, "it may be said to have had a rapid and satisfactory development during the last two decades and holds out great promise for the future. For example, during the past two or three years, discoveries of important mineral deposits in northern Manitoba, a province that has heretofore been considered only from an agricultural standpoint, showed the great possibilities there are in our vast unprospected regions. Other Sudburys, Cobalts and Porcupines await the prospector and miner in these regions surounding Hurson Bay, and extending to the Arctie regions. Great regions of promise for the miner lie tributary to the Paeifie and on the eastern seaboard vast mineral resources are yet to be utilized.

Announcement was made this week by Mr. Sweeney, of Northern Securities Limited, Toronto, which controls the Nipissing Extension Mines, Limited, that he had purchased the Thompson-Gowganda property in the Gowanda district, a property in which Premier Borden, Sir Edmund Osler, Hon. Dr. Pyne, E. A. Kemp, Lieut.-Col. Hendrie and others formerly held large interests. Mr. Sweeney states that the deal has been completed and that a new company of Canadian and American capitalists is now being formed to operate the holding.

Gilbert Sheridan, ("Shorty"), one of the popular old-timers of the Porcupine, was married at Trinity Church, Galt, recently, to Miss Evelyn Turner, daughter of Mr. and Mrs. Turner, formerly of the Dome, but latterly residing at Galt, Ont. Mr. Sheridan was for years on the Dome staff and more recently has been in charge of the Hollinger stores. Mr. and Mrs. Sheridan will reside at Timmins.

Among the Canadians mentioned this week by the British War Office for distinguished services in the war is Lieut-Col. "Joe" Boyle, the former widely-known Klondike miner. Col. Boyle, who was head of the Canadian Klondike Mining Company at Dawson City, will be remembered as having organized, equipped and despatched to the front his own machine gun detachment at his own expense in the early stages of the war. He served chiefly in Roumania where he became a national hero through being able to save several Roumanian deputies from Boleshevists. He also rendered valuable assistance to the royal family. The Colonel's old home is in Woodstock Ont., he being a son of the late Charles Boyle who was prominent in Canadian racing circles.

Toronto mining men were interested in the announcement from Winnipeg this week that Provincial Engineer L. B. Copeland had left for the Copper Lake Gold district, where he will have charge of the construction of a winter road from Herb Lake to Copper Lake, in the gold district. The length of the road will be about fifteen miles. It was also stated that Engineer V. H. Campbell would leave shortly for the Rice Lake Gold district for the purpose off making a survey for a road in that district from Lake Winnipeg to the Rice Lake district.

A meeting of the Toronto branch of the Canadian Mining Institute was held on Saturday when preliminary arrangements were made for the annual meeting of the Canadian Mining Institute to be held in Toronto probably on March 8, 9 and 10. Indications are that this will be one of the most successful and interesting meeting the Institute has ever held. It was also decided to invite students resident in Toronto who are members of the Mining Institute to attend the periodical meetings of the Toronto branch without extra fee.

Alexander P. MacAuley, a well-known Toronto mining engineer has been awarded $100,000 damages by the United States Supreme Court in his suit for malicious prosecution and false arrest, against Theodore P. Starr, New York jeweller. MacAuley was arrested in St. Louis in 1917 and held on suspicion of being a notorious confidence man. Starr was held responsible for the mistake and the prosecution and action was taken against him by the victim.

According to the report of Major Birkett, Resident Mine Manager for Nipissing Extension Mines, made to Northern Securities, Limited, in Toronto, No. 2 shaft has been continued to a depth of 100 feet and a station 10 feet by 10 feet has been cut at the 90-foot level. Forty-three feet of cross-cutting to connect with the new vein has been done and a drift to explore the known vein in the No. 2 shaft and has been started for the purpose of picking up a chute of ore. It is believed that the present work has carried the engineer to the edge of a chute where a 30-ounce assay was obtained. The veins in No. 2 shaft and the drift of the 20-foot level are said to show silver values and the Manager says that there is no geological reason, as shown by the performance of the veins in Cobalt, why the veins should not develop into producers.

Northern Securities, Limited, Toronto has issued a statement in regard to the Bailey Cobalt Mines, stating that the Company has been in litigation for five years, but that during that time the mine has been kept free from water and in the charge of a caretaker. An offer has been made by certain large interests to form a new company and amalgamate the Bailey Mine with the Northern Customs Mill.

Proposed Air Service for the North Country.

Toronto mining men were interested in the announcement from Cobalt that Messrs. Bishop and Barker, the noted Canadian airmen, through Captain Staler, had asked the Temiskaming Board of Trade of New Liskeard, to use its influence for the establishment of an airplane service in the North country. The board's annual meeting endorsed the project, contending that such a service would be of great assistance in the mining and lumbering industries. The necessity for Hydro power and a trunk road and extension of the Nipissing Central Railway were outlined as the urgent needs of the district. In connection with the proposed air line it is said that a proposition has been made looking to the installation of five machines for an outlay of $50,000 at a point of points somewhere along Lake Temiskaming which would enable mining men who have to make more or less frequent trips under conditions of hardship into such districts as Matachewan, to cover the distanec in an hour or so.

The aeroplane would not only carry a couple of men into the back mining areas, but would carry packs and baggage as well and thus obviate the hardships attendant upon the use of the tump-line and the rough going generally.

James Nelson, a pioneer operator in Baden township in the Fort Matachewan district, is in Toronto. He recently encountered some very high grade gold ore on his property and he has three men at work following up his find and he is in the city arranging to take in a good steam prospecting plant and possibly a diamond drilling outfit before the snow goes, in order that development work may be carried on aggressively during the coming summer. Mr. Nelson is arranging for the organization of a company for the purpose of taking over the property and carrying on active mining operations.

The Hughes McElroy Gold Mines, Limited, in which several Toronto mining men are interested, has just been granted a provincial charter. The company will take over the nine Hughes claims in McElroy Township on which considerable development work has already been done and on which a limited amount is now in progress in the way of sinking test pits on two of the veins of the property. This property adjoins the Mondoux property on the north the Mondoux having recently been transferred to other Peerless Gold Mines, Limited, which is controlled by Alexander McKinnon and Sherley Ogilvy of Montreal. It will be recalled that there was a big discovery of gold on the Mondoux last fall. Eight drill compressors have been installed, together with three boilers and hoist and several camp buildings are under construction, while a good road is being built through from Larder Lake.

A REPLY TO THE CIVIL SERVICE COMMISSION.

Editor, Citizen:—A statement from the Civil Service Commission in regard to the Geological Survey appeared in your paper yesterday with the request that it be given wide publicity. In substance it asserts that "the British Petroleum Company, a powerful corporation. etc., approached a member of the Geological Survey staff who had been receiving $2,-600, but who under the classification will at once increase to $3,300, and offered him $6,200 to start with. Another on the same salary was offered $5,100. Both these men admit that the new schedule is fair and as liberal as the government is justified in offering for their services."

The above statement is so wierdly inaccurate that one wonders whether the commission has taken to kidding the public. It is true that one of the men who is leaving is receiving $2,600 in the Civil Service. The rest of the statement is absolutely contrary to the fact. The fortunate individual with a salary of$2,-600 "who under the classification would be at once increased to $3,300" received an official notification from his deputy on December 29th that he had been classified by the Civil Service Commission as an associate geologist, for which position there is a beginning salary of $2,580. Of the six other men who accepted outside positions, one at salary of $2,700, was reclassified at a beginning salary of $3,300, three at salaries from $2,300 to $2.500 were classified as associate geologists, two at salaries of $2,100 and $2,300 as assistant geologists, beginning salary $1,680. None of these men would, it is true, have received lower salaries than they had been given previously, but only one was assured of a substantial increase. Six men accepted outside positions soon after. The commission asserts that the government cannot compete with such salaries and that the nation would not sanction it. We believe that the nation would have endorsed the modest recommendations of the deputy minister of mines that each of these men be raised to the class above that in which his old salary fell.

The Civil Service Commission is faced with a difficult task in their attempt to apply a scheme of reclassfication to such a large and intricate organization as the Civil Service, and in this effort they deserve support. They have made the mistake of underestimating the value of the services of trained geologists. Theoretically, the reclassification as applied to them was fair; as put in practice by the commission it was not. An assured and immediate increase of twenty five per cent in their salaries would have retained the services of nearly all of the seven desrters. A rigid application of the schedule issued on Dec. 29th will, no doubt, work the other way.—L. REINECKE. Ottawa, Jan. 20th, 1920.

METAL QUOTATIONS.

Fair prices for Ingot Metals at Montreal, January 28th 1920.

	Cents per lb.
Electro Copper	24½
Castings Copper	24
Lead	10½
Zinc	12
Tin	73
Antimony	13
Aluminum	34

Industrial Use and Limitations of Respirators, Gas Masks, and Oxygen Breathing Apparatus

By A. C. FIELDNER.
(*By permission of the United States Bureau of Mines.*)

During the last year the Bureau of Mines has received many inquiries regarding the use of army gas masks in the industries for protection against poisonous and irritating gases. These inquiries show a general belief on the part of the public that this type of mask will protect the wearer, under all conditions, against any gas whatsoever and even in absolutely irrespirable air to the exclusion of the more cumbersome mine rescue breathing apparatus or the air helmet with hose connection to pure air. This erroneous belief will no doubt be further confirmed by millions of discharged soldiers who have been trained in the use of the gas mask and have been taught that it gives them absolute protection against all gases used or likely to be used in warfare. These men will not realize that out in the open air of the battlefield, the percentage of gas in the air can never be nearly as large as may occur in the confined spaces of a factory operation. A mask may afford complete protection under outdoor conditions and break down at once when used indoors where a gas container has burst and filled a closed room with gas. It must also be remembered that the absorbents in the army respirator, which filter out the poisonous gas, are especially designed for the gases used in warfare, and as a matter of fact do not protect against the more common industrial gases, as, for example, illuminating, natural, producer and blast furnace gas.

In view of these limitations of the army gas masks, which, if not realized, will lead to serious accidents and fatalities, the Bureau of Mines is issuing this brief statement of the industrial use and limitations of dust respirators, gas masks, and oxygen breathing apparatus.

Dust Respirators.

More or less protection from dust and liquid mists is obtained by the use of a simple dust respirator, which removes these particles of dust or mist by means of a filter of moist sponge, cotton or wool pad, porous paper or even a very fine mesh metallic gauze. The respirator may inclose the mouth and nose only, or it may be combined with a face mask containing eye-pieces if the eyes must also be protected. The simple "pig snout" respirator containing a moist sponge has been on the market for years. It is highly uncomfortable to wear, is rather insufficient for removing fine dust, and most workmen prefer to tie a large handkerchief over their nose and mouth. Some improvement has been made in recent years, but on the whole a really efficient and comfortable dust respirator that workmen will wear continuously is yet to be devised. There is an urgent need for such a device for safeguarding the health of workmen in the mining and metallurgical industries and in other dusty trades.

All of the present type of "pig-snout" respirators have an utterly inadequate filtering area. The inspired air is of necessity forced through this restricted area at a high velocity which prohibits the use of an effective filter because of the high breathing resistance it would have.

It has been shown that the injurious quartz particles which become imbedded in the lungs of "hard-rock" miners are no larger than one to ten thousandths of a millimeter. Dusts of this degree of fineness require an extremely fine meshed filter, very much finer, indeed, than cotton or silk gauze or moist sponges as are commonly used.

A really effective dust filtering mask can be made by using rather dense felt or paper filter of large area, say 100 to 200 square inches, and attaching this with a hose connection and check valve to the facepiece of an army gas mask of the Tissot type. By using this large area the velocity of the inspired air through the filter is low —consequently the breathing resistance is quite low and the filtering efficiency becomes very good.

Army Gas Mask.

The army gas mask consists of a facepiece of rubber and cloth fabric, containing eyepieces and connected by means of a flexible rubber tube to a canister containing charcoal and soda-lime for filtering out the poisonous gas from the inspired air. The canister is supported in a knapsack slung from the neck.

The army gas mask is by no means the unusual protective appliance that is popularly believed. It does *not* afford universal protection against all gases, nor can it ever be of use in low-oxygen atmospheres. It furnishes no oxygen to the wearer and can only remove comparatively small percentages of poisonous gas from inhaled air, usually less than 1 or 2 per cent. Higher percentages may penetrate the canister and "gas" the wearer. The standard army gas mask will furnish protection against percentages not exceeding one or two per cent of the following gases in air: Sulphur dioxide, hydrogen sulphide, chlorine, carbon bisulphide, nitrogen peroxide, aniline vapor, benzyl bromide, benzyl chloride, chloracetone, chlorpicrin, hydrogen chloride, phosgene, sulphur chlorides, xylyl bromide, stannic chloride, titanium tetrachloride, silicon tetrachloride, hydrogen cyanide, benzol, gasoline vapor, and carbon tetrachloride.

It will be seen from the above that the mask has a wide field of usefulness in the chemical industries, around smelters, roasters, and acid plants where sulphur fumes are given off, and in the industries using chlorine and bleaching powder, and in rubber factories for sulphur chloride, carbon bisulphide and other volatile organic solvents The army canister also contains cotton filter pads which remove irritating and poisonous dusts, which increase its usefulness around smelters where sulphur and arsenic fumes must be removed.

The army mask furnishes no protection whatever against carbon monoxide, which is the poisonous constituent of mine gases after fires and explosions in coal mines and of blast-furnace, producer and illuminating gases. For these purposes oxygen breathing apparatus or air helmets must be used.

It is expected that a carbon monoxide mask will become available in the near future which may be used for protecting against low concentrations of this gas.

Ammonia is another gas that will penetrate the standard army canister. However, a special chemical may be placed in the army canister which will adapt it for use around refrigerating plants.

Use of Army Mask by Firemen.

Whether or not firemen should adopt the general use of the army gas mask has been a much discussed question. Tests made by the Chemical Warfare Service and by the Bureau of Mines proved conclusively that the mask, when fitted with a canister containing filter pads, would protect the eyes and throat from the irritating and choking constituents of smoke. Men wearing the masks have remained in small rooms filled with dense smoke from small fires of wood, wet straw, pitch, rubber, and sulphur, for periods of thirty minutes without any discomfort whatever. These tests have been repeated by fire departments all over the country; as a result most of them have pronounced the mask safe, and have accepted it as a final solution of the vexing problem of smoke protection.

However, despite these tests, it must be kept in mind that the gas mask has pronounced limitations. It provides no oxygen if the wearer should step into a burned-out atmosphere, nor, will it protect against carbon monoxide, which may be present in fatal proportions in a closed room where a fire has been smoldering for some time.

The usual smoke test made by burning rags, wet straw, pitch, rubber, and sulphur for thirty minutes or an hour in a room, will not as a rule generate enough carbon monoxide to cause any effect. Consequently the results of all these tests were favorable to the mask.

Recently a long-time test was made in the Bureau's 1,000 cubic foot gas chamber at the Pittsburgh experiment station, in which a smoldering fire of 6 pounds of moist rags and excelsior was kept going without allowing it to burst into flames for a period of 4½ hours At the end of one hour the chamber atmosphere contained 0.37 per cent carbon monoxide; in two hours, 0.62 per cent; in three hours, 0.95 per cent; and in 4½ hours, 1.13 per cent.

Some of this final air was drawn through a gas mask canister, then through a large bottle in which was placed a canary bird. The bird collapsed in half a minute. This experiment demonstrates that the gas mask will not protect a fireman under all conditions, and that it must be used with some caution.

The final solution of the problem of a mask for firemen will be the construction of a special canister having about three times the volume of the present army canister and containing in addition to the present filling of charcoal, soda-lime, and filter pads, special absorbents for ammonia and carbon monoxide. With such a canister a fireman could safely enter any atmosphere in which a safety lamp would burn.

Probably the strongest argument for the use of the present Army type of gas mask by firemen is that it will be a great help to them in the majority of cases, and that at any rate a fireman has to take chances in line with his duty.

Oxygen Breathing Apparatus and Air Helmets.

The self-contained oxygen breathing apparatus or air helmet can never be displaced by a gas mask for use in atmospheres deficient in oxygen. Such atmospheres are encountered in mine rescue work, in gas mains, blast furnace stoves, producer-gas or water-gas apparatus, etc. Aside from the lack of oxygen, carbon monoxide is also present, for which the gas mask is useless.

Air helmets or oxygen breathing apparatus should also be used instead of the gas mask for entering tanks, towers, and other closed spaces containing large quantities of irrespirable or poisonous gases, as, for example, a gasoline tank containg some residual liquid. The concentration of vapors produced by volatile liquids in closed containers sometimes is too high to be removed entirely by gas-mask absorbents. The only safe protector in such places is a self-contained appliance or air helmet in which the wearer does not breathe any of the irrespirable atmosphere.

Importance of Expert Advice on Protective Appliances.

On account of the many factors entering into the use of protective respiratory appliances, the importance of competent advice on the selection and use of such appliances can not be over-estimated. In connection with the Bureau of Mines' work of safeguarding the health of miners and workmen in the metallurgical industries, a general investigation of respirators, gas masks, and breathing appliances is being undertaken at the Pittsburgh experiment station of the Bureau. This research will be conducted by experienced chemists and engineers who had charge of gas-mask research in the Bureau's war-gas investigations and subsequently in the Research Division of the Chemical Warfare Service, U.S.A. In the 1,000 cubic foot gas-chamber which has been built at this station, breathing appliances can be tested on men in any gas desired.

The industrial respirator investigation will include:

(1) Advice on the suitability of the standard Army gas mask for use in various industrial gases.

(2) Approval of industrial gas masks and respirators when properly submitted to the Bureau by the manufacturer in accordance with a schedule to be announced later.

(3) Instruction of workmen at plants in the use of masks and respirators in a manner similar to that now being given by the Bureau in the use of oxygen breathing apparatus.

The A. B. C. of Iron & Steel: The Penton Publishing Company, Cleveland, Ohio edited by A. O. Backert. Third Edition. Cloth. 8 by 11 inches by one inch. 374 pages with Directory and Index. Price $5.00.

This book opitomizes the technique and business extent of the iron and steel industry of the United States, and contains a series of chapters, each written by an authority in his particular specialty, on various branches of the industry, commencing with the mining of the iron-ore, dealing fully with transportation and fuel supply, with the basic processes of iron and steel manufacture, and with all the branches of fabricated steel. Chapters are included on malleable iron, steel castings and electric steel.

The book also contains statistics of the American iron and steel industry, and a complete directory of tion and fuel supply, with the basic processes of iron the iron and steel works of the United States and of Canada, classified by firms and also by products. A complete index is attached.

The book is printed on fine stock and the illustrations are numerous and good. The article on Transportation of Ore on the Great Lakes contains a number of historical photograph showing how the transportation facilities of the Great Lakes have developed from small schooners of 15 to 20 tons burden to the great 10,000 ton freighters that are now used.

This book should be of considerable utility to all who have occasion to do business with the steel industry, and to advertisers of steel plant equipment.

The Microscopal Investigation of Coal

An address on the above subject, illustrated with lantern slides, was delivered by Mr. James Lomax at the December meeting of the Past and Present Mining Students' Association, at the Wigan and District Mining and Technical College. He said that a microscopical examination could give the chemist useful information regarding the various coal constituents. It was owing to the great difficulty in making a slice of coal sufficiently thin for microscopical use that coal had not had the attention of microscopical investigators which it would have received if the preparations had been quite as easy to prepare as in the case of other rocks. If a preparation from a sample of coal was to be made it would be useless to heat it in the same manner as an ordinary rock specimen. It was essential that the preparations should be so large cut usually from parting to parting, that when all were cut and finished they could be arranged in their order, showing a more or less thin transparent slice from floor to roof. When the preparations were held in front of a suitable light all the various laminae would be seen in colours according to their composition and density, the colours ranging from a light yellow to a deep ruby red. Generally the more yellow and red yellow, the higher the coal's volatility and the less the carbon contents. The preparations if viewed only in the manner indicated, were of some value. Moreover, on closer examination every lamina could be resolved into its original form, although it might be highly flattened and compressed. With the aid of palaeobotany it could be determined to what kind or genera of plants any given part of a seam owes its origin, what changes have occurred in the plant succession during the deposition ofthe vegetable debris now forming our coal substance. He had come to the conclusion, after an exhaustive study of a large number of seams, that almost all had had their origin in vegetable matter grown and deposited on the spot where it now rested. To his mind there were very few seams that owed their origin to drifted vegetable matter, and these showed a structure totally different from the seams they were considering.

It must be apparent to all who have studied the question that coals are not of equal value, this being impossible since it is to the plant remains that we owe our coals. Study of a recent peat bed of any considerable thickness will show that the growth and deposition of plant remains in the bed are not homogeneous, but that for a length of time the lower portion was composed mainly of the remains of equisetinae, oak, and other ferns, willow, &c., on the top of which came a deposit composed mainly of the remains of birch, hazel, and other shrub-like plants, this again being succeeded by a deposit of sphagnum, then again by cotton grass, willow, and other shrubs, a thick bed of the remains of pines, covered by a mixture of sphagnum seirpus and grass-like plants. Such a deposit is similar to that of the deposition of the vegetable remains during the carboniferous times, allowing for the difference in character and species of the plant remains. Such being the conditions we can expect a difference between one part of a seam and another, and also between seams in different horizons, and this being so there is bound to be a difference on carbonisation , and constituents of each distinctive class of vegetation will still have their effect on the coal substance when carbonised. This is the reason why one class of coal may be quite as good as another of like heat value for a specific purpose, but would be useless for another, such as coking for metallurgical purposes. All bituminous coals do not coke, or if so, do not possess the properties of metallurgical coke. Hence it may be said that the various coals are individually adapted to one or more specific purposes from which they cannot be diverted without disadvantage.

In order to illustrate how the microscope can be made useful take the question of generating power, the prime requisite being heat. In this case one class of coal which possesses a certain value per unit may seem just as suitable as another of a like heating value. The lantern slides give an idea of the different varieties of coal. One is taken from a bright and brittle humic coal which gives off a large volume of gas and liquid volatile matter, comparatively rich in benzine and its homologues. It is not my intention to go very deeply into the microscopical structure of the fuels, and I am only pointing out the distinguishing features. Such coal as the specimen under consideration is nearly always found next to the floor of a seam, and is chiefly composed of finely divided fragmentary plant debris. The plants from which the remains originated would be of a low order, and more or less small and dwarfed. Such coal on carbonisation contumaces and swells, forming at a low temperature a pasty mass, and if carbonised in a vertical retort the gases made in the lower part of the retort are with difficulty passed through to the upper part. Such coals very often form an almost solid mass in the middle portion of the retort causing it to hang, obstructing the passage of any further fuel. In using such coal great attention to this point is required, very often continual picking and stirring with long pokers being necessary. The coke is soft and spongy the spongy cavities being formed by the imprisoned gas made whilst the material has been in a semi-plastic condition. In addition to gas such fuel is not good for steam raising purposes, for, as in the retorts, it swells and contumaces, stopping the air pasages through the fire bars, which necessitates the use of the poker, causing to be made a large volume of black smoke in which the largest part of its heating properties is carried through the flues into the comparatively cold chimney stack, and onward into the atmosphere. Another picture shows coal similar in calorific value, volatile contents and ash, but which is microscopically different in composition. It is not as soft, and it is bright banded and laminated, the bright bands being sometimes formed of jetonised wood tissues more or less iregular in many of which the tissues are well preserved. These show them to be the remains of fairly large stems or branches chiefly of a Cordaitean species. The fine laminations are resinous bodies, and fine leaf laminae with here and there a few microscopores and magaspores. Such coal is seldom near the floor of a seam, but is generally found one-third the distance between the floor and the roof, and it may, as found in many seams, continue to the roof forming two-thirds of the thickness of a seam, or, as more generally is the case, give way to a spore coal. Such fuel gives a large volume of gas and a higher yield of volatile liquid products, especially

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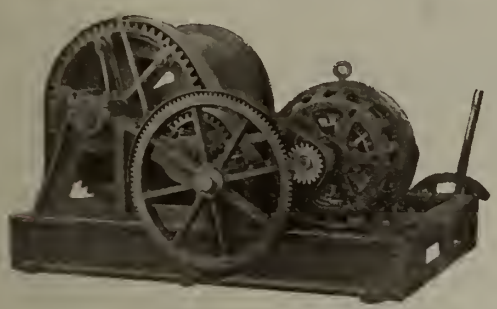

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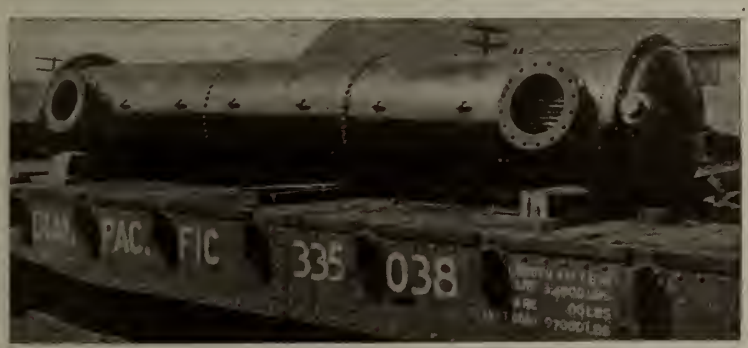

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of the benzine series. The tar oils are lighter and are more easily distilled, and the residual pitch is less than that obtained from the other or very soft coal; although if the same soft coal could be distilled without becoming pasty it would probably give quite as good results.

The next case of coal is much different both microscopically and macroscopically, being more compact and tough, and it does not break up in dice or cube-like pieces. It is laminated with alternating dull and bright looking bands, and it splits with a more or less slaty sleavage parallel to or along the bedding planes. Microscopically the laminae or alterating bands are found to be composed of layers of leaf-like humus, constituting the bright part, the dull looking part being composed of the flattened remains of fructiferous organs of a lycopodaceous nature in the form of megaspores and microspores. There may be, as is often found in some seams laminae of a resinous nature which are clearly the remains of resin droppings or exudations from resin ducts of some species of plants of that age. Such coals are the best both for steam and for gas-making purposes. They do not swell or become pasty, and consequently when used in a furnace or retort they do not obstruct the passage of air or gas through the thickness of coal on the fire bars or in the retort. The volume of gas made from this class of coal is fairly large, there being a high calorific value and illuminating power. The liquid volatile contents is also high, but contains a percentage of naphthalene. The residual tars are higher in proportion than in the soft coals, there being consequently more pitch. Such coals make excellent coke both for ordinary and also for metallurgical purposes.

Another class is the hard, tough, bony, grey-black looking coals, these being classed as hards. Macroscopically they are known to be composed of finely laminated bands, very regular, and extending over large areas, being found as a rule in thick seams (in the middle of the seam) and having both below and above one or both of the coals already mentioned. Generally from the floor upwards the soft coal gives place to the harder or less soft and this in turn to the Hards under consideration which may be classed: (1) The soft bright coal near the floor, humic coal with little or no structure, (2) the next bright and a little harder and more laminated, semi-humic coal, in which the microscope shows remains of leaves and resinous bodies, (3) more hard coal with bright and dull looking laminae, semi spore coal, (4) spore coal.

The latter when seen in thin sections is found to be composed of microscopores and megaspores, while it is variable in thickness, sometimes pasing quickly into semi-spore or into humic coal, or it may be placed with lenticles of cannel, or cannelois coal. In some seams it forms the root coal, which is overlain in its turn by a more or less thick sandstone. It will be seen that we have in one seam four distinct classes of coal, the constituents being distinct and different from one another, and each producing different results on carbonisation. Anyone with a little practice can with accuracy distinguish and pick out all the four varieties. It is not meant to be understood that all seams are composed on similar lines, but in general most of the thick seams say over 5ft. or 6ft. in thickness are built up in the manner indicated, while others are composed of humic or semi-humic constituents, and may never have more than humic constituents, some may extend to the semi-spore condition, and some may be composed almost entirely of spores, this condition very often prevailing when the workable portion is preceded below by a thin band or stratum of bassy or inferior coal which represents the portion that is humic and semi-humic in other seams. From "Science and Art of Mining."

A SOUTH AFRICAN VIEW ON THE USE OF HAMMER DRILLS IN SHIPPING.

In the course of the discussion by the South African Institution of Engineers of a paper on "Hammer Drills for Rock Boring," by Mr. H. S. Potter, Mr. J. H. Veasey gave a large amount of information with respect to modern methods of stoping and suggested that it might prove economical to adopt a smaller diameter of hole and replace hand drills by light pneumatic hammer drills. In this connection he pointed out that during the year 1918 over 20,000,000 tons of ore were mined from stopes on the fields of the Rand, and which about 8,000,000 tons were produced by hand and about 12,000,000 tons by machine. Assuming eight tons per machine shift, 312 shifts per year, two native operators per machine, and four holes to a shift's work, it would require 4,800 machines and 9,600 native operators drilling 6,000,000 holes to break this 12,000,000 tons. If it were possible to do the some work with machines requiring only one native per shift, the saving to the industry on these 6,000,000 holes would be about 9d. per hole less cost for native labour, a total of £225,000 during the year, with 4,800 fewer natives. Assuming that these 4,800 natives would be available for other work, about 1,200 of them could be employed on light one-man stoping machines, which at eight tons per machine-shift would yield 9,600 tons per day increased output, or 3,000,000 tons per annum, while the remaining natives, viz., about three-fourths of the total, would be required for steel carrying, shovelling, and tramming the increased output. Again, in regard to the 8,000,000 tons obtained from hand stoping, it is difficult to say how many natives were actually employed on this work. But if it is assumed that one native breaks about 300 tons per annum, it would appear that about 27,000 natives were so employed. Neglecting the odd 7,000 as being engaged on work which might be entirely unsuited for light machines, and assuming that the remaining 20,000 could be used in connection with light machine stoping—allowing, as before, three-fourths of the total number for steel carrying, shovelling, tramming and incidental work—5,000 of these natives would be available for light one-man stoping drills, which at eight tons per machine-shift, and 312 shifts per year, would break 12,000,000 tons, an increase of 50 per cent, over hand work. It must not be inferred that any reduction in cost per ton mined has been foreshadowed in this last comparison. Hand stoping is one of the most economical methods of mining on these fields, and it is not suggested that a light machine and rig, requiring only one native per machine shift, will be cheaper so long as the old average is adhered to for a shift's drilling. Also it must be remembered that many concerns would not be justified in making the capital expenditure required for the necessary equipment of machines, rigs, hoses, steel and pipe-lines. At the same time it is believed that if these light one-man drills are allowed to do all they can in the hands of trained operators, light machine stoping will eventually be cheaper than hand stoping.

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EDITORIAL

Misplaced Parsimony

It has been intimated that certain of the members of the Geological Survey who have been compelled to resign their positions because of the insufficiency of the salaries permitted to them under the revised classification of the Civil Service list, may be given extended leave of absence, and that Canada may not entirely lose their future services. In case this intimation may create an impression that the incident is closed, some additional facts should be presented, for the information of the public, because we believe that the present anomalous position of the government geologist is primarily due to a widespread ignorance of his functions on the part of the public. The citation of particulars in one or two typical cases may bring enlightenment, and, while it has been considered best not to mention names, the particulars given will be sufficient to ensure identification by those interested.

One of the members of the Survey who has resigned, is the author of the most complete and scientific monograph on the Wabana iron-ore deposit. His work in this connection is accounted worthy of note in every bibliography on iron-ores that has since been published. His original speculations on the part played in iron-ore deposition by low forms of animal life have received recognition in later works. The application of these speculations to the origin of sedimentary iron-ores may quite conceivably lead to the discovery of important new deposits, and may also be of great assistance in determining the extent over which known deposits may be expected to be found by deductions from the probable extent and shape of the area of original deposition.

Another important work of this geologist is on the revision of the City of St. John, N.B., sheet, a district of much interest to geologists, and one which it is surmised may throw light on the area of deposition of the carboniferous sediments that may extend from Rhode Island to Grand Lake, Newfoundland; and the subsequent earth movements, followed by erosion and the deposition of newer sediments that have de-limited the coalfields of the maritime provinces as we know them to-day. Such studies are, of course, the preliminary to the location of the hidden coalfields of the maritime provinces.

A further recent duty of this geologist has been the revision of a portion of the sheets of the Sydney coalfield.

To digress, for the purposes of further elucidation, it may be mentioned that in the case of the comparatively small coalfield of the Nanaimo district, the Geological Survey has provided no less than four most excellent maps, dealing respectively with the topography, the stratigraphical geology, the superficial geology, and the economic geology of the field. Of particular interest and usefulness to the miner is the sheet on economic geology, which shows the crops of the seams, the course of the folds and their continuance under the sea, and the delimitation of the economic working of the coal-seams by depth of cover and by the influences of the anticlines and synclines.

For comparison may be mentioned the sheets of the Sydney Coalfield which are compiled from surveys made in 1874-6, corrected to 1898. Not only are these sheets woefully out of date, as regards the revisions and new data revealed by actual mining and borings, but no attempt has ever been made to show the seaward course of the anticlines and synclines, or to show the economic delimitation of the undersea coal-seams, as affected by depths of cover, undersea outcroppings, and the seaward course of the folds.

If one-quarter the work had been spent on the Sydney coalfield that has been spent (and very properly spent) on the relatively smaller and less valuable deposit at Nanaimo, many of the purely technical questions that have been the subject of animated debate in recent months would never have arisen; and the problems of the undersea coalfield would have been half solved by being more accurately displayed and understood.

Three years or so ago, the gentleman we have in mind was detailed to supply some of the crying deficiencies of the Sydney sheets, and now, with his work half done, the only man who has any close acquaintance with the geology of this district is compelled to resign. Why? He is thirty-seven years of age, married, with ten years service in the Survey; the highest scholastic qualifications, an enviable scientific record and unique acquaintance with some of the neglected problems of the geology of the maritime provinces, and a salary of $2,400 per year: C'est pour rire.

This instance is typical, and we propose to give others equally glaring, only we have some respect to the patience of our readers.

The maximum salary of the senior members of the Geological Survey is $4,200. There are men in the survey with nearly forty years experience, and international reputations, who haev reached this giddy pinnacle of affluence, and have had the pleasure of seeing many men get rich through their labours. There are men, and have been men, in the Geological Survey of Canada whose labours and deductions have added millions upon millions to our national wealth, and it has been their lot to sit by like cloistered monks vowed to penal poverty, seeking presumably,—otherwise their salaries are not explainable—to free themselves from breaches of the tenth Commandment.

THE SELECTION OF MINE INSPECTORS.

According to reports from Cobalt, the local Miners' Union is undertaking the task of finding suitable men to fill vacancies on the staff of mining inspectors of Ontario. They propose to recommend to the Minister of Mines that men selected by the Union should be appointed inspectors. They apparently are of the opinion that the Minister might be prevailed upon to patronize the Union instead of appointing men properly qualified to fill the positions.

The duties of an Ontario mine inspector as defined by the Mines Act are such that careful selection of inspectors is essential. If instead of selection according to qualifications we are to have the political party or class favoritism mode of selection, the recommendations of the Miners' Union will be in order.

The regulations governing the operation of Mines in Ontario impose duties and responsibilities on the inspector that could not be properly delegated to many miners or mine managers. They assume on the part of the inspector not only general engineering training, but special knowledge and interest in the safe and efficient operation of mines and an ability to guard the safety and health of the workmen without imposing unnecessary burdens on the mine managers. The inspector is frequently called upon to make important decisions concerning the application of sections of the Mines Act, for instance in the case of rules for protection of miners it is provided that "the following rules shall be observed and carried out at every mine except in so far as the Inspector of Mines may deem the same not reasonably applicable."

The inspector is empowered under the act to make such examination and industry as **"he may deem necessary"** to ascertain whether the provisions of the Act are complied with. He may order the immediate cessation of work in and the departure of all persons from any mine or portion thereof **"which he considers unsafe,"** or to allow persons to continue to work therein on such precautions being taken as **"he deems necessary."** He may exercise such other powers as may be necessary for ensuring the health and safety of miners and all other persons employed in or about mines, smelters, metallurgical and mining works. In conducting inquiry with respect to any accident he has power "to compel the attendance of witnesses and the production of books, documents and things and to take evidence upon oath."

The many provisions of the Mining Act devised with the intention of guarding the safety of workmen necessitate on the part of the inspector a very good knowledge of the machinery used in mining and of mining methods. It has been found advisable to invest the inspector with a good deal of authority and therefore in addition to his qualifications as a safety engineer he must, to succesfully fill the position, be quite free of labor or company influences R.E.H.

EN PASSANT.

THE Montreal Meeting of the Engineering Institute of Canada, held from the 27th to 29th January, was a most successful gathering. More perhaps than any other technical body in Canada the Engineering Institute reflects the common interests and aims of the Canadian people in their two great racial sections of French and English-speaking peoples. The genius of the French people for the exact sciences, and their eminenee in mechanical arts, in mathematics and general engineering is prominent in Canadians of French descent, and the leading position taken by the Province of Quebec in the development of water-powers, highways, and the ganglion of transportation that is known as the City of Montreal, are not mere outgrowths of geopraphical position, but are also evidences of the native talent of the citizens of Quebec Province. The speech of Major-General Mitchell at the Annual Dinner in proposing the toast of the Province of Quebec, in which he described the part taken by the 22nd Regiment at Courcelette; and the graceful diction of the ex-Speaker Marcil in response, was an incident of much significance, and indeed of much hopefulness.

MUCH prominence has been given by newspapers to the indisposition of certain members of the United Mine Workers of America in Nova Scotia to ratify the agreement made between the U. M. W. Executive and the Dominion Coal Company. The wisdom of this extended publicity is to be doubted, especially when it is known that on the occasion of every new agreement on wages made between the labour leaders for the time being, and the coal companies, such disagreements have taken place. These disagreements usually take the form of a local adjustment, and the procedure is a well-known and recognized one. It is a great pity that efforts at labour conciliation should be hindered by giving wide publicity to matters of purely local detail, as thereby the general public is unnecessarily disturbed and fictitious importance is given to subjects that are of only local

and passing significance. An instance of this undue alarming of the public was the prominence given to a small strike at Minto, N. B., where all the three parties concerned, namely the miners, the Company and the Conciliation Board bungled an easily adjustable situation, largely through over-estimating the importance of the incident.

A SIGNIFICANT event is the overture made to the "salariate" or "new poor," as the middle-class people of Britain are now known, by the British Labour Party. How much of the present social unrest is traceable to the anomalous position of the lower professional and official classes in corporate and government employment is uncertain, but much of it probably originates with men whose position is very helpless and very irritating. Corporations who will attend to the demands of labour, insistingly and threatingly made, often forget the clerk and sub-foremen, on whose loyalty and personal comfort so much of the machinery of corporate organization depends. These men are the great buttress of modern society against the dissolving forces of these days, and, if through forgetfulness, or more unworthy motives, employers neglect to take care of these men, the forces of unstabilization will increase even more quickly than they have so far done.

SOME interesting information concerning the present cost of producing gold on the Mother Lode in California is contained in the recently published review of mining in that state. The State Mineralogist, Mr. F. N. Hamilton, quotes cost figures for several properties and states that any company working Mother Lode ores for less than $4.75 is doing it at the expense of the future of the property or because they have ore blocked out ready to mine for a long time to come and do not have to carry on current exploration and development. At the Morgan mine, where an ore shoot 30 ft. thick and 150 to 165 ft. long is being very profitably worked, the operating cost is $5.14 per ton and the development cost 65 cents per ton. The itemized cost statement for the Morgan mine for July 1919 and the preceding six months gives a good idea of the present cost of mining a large ore-body in California.

STRONG OPPOSITION TO ENGINEERS' BILL IN BRITISH COLUMBIA.

The British Columbia Prospectors' Association adopted ten resolutions at a recent meeting held at Nelson, B. C. The resolutions were a part of a petition to be placed before the Minister of Mines and Provincial legislature at the coming session. Among the resolutions was one asking for the "rejection of that section in the Engineers' Incorporation Bill that would compel foreign mining companies to employ local mining engineers."

Not only are members of the Prospectors' Association strongly oposed to this section of the Bill but many prospectors who are not members are outspoken in their opinions of this section of the Bill.

The other resolutions were as follows:—

Request for district ore-testing plants and free assays for prospectors, powder at cost to prospectors, a winter school of mine for the interior, accessible district engineers reports, a division of the Eastern District, the application of trail and cabin buildings as assessment work toward grants, the allotting to returned men of the half shares of delinquent partners, the prosecution of parties who misuse prospectors' cabins.

A resolution asking for a special transportation rate on small ore shipments will be presented to the railway companies and the Railway Commission and one asking for a special rate for such lots will be presented to the Consolidated Mining and Smelting Company of Canada.

THE BRITISH COLUMBIA CHAMBER OF MINES; NEW OFFICERS FOR 1920.

The officers elected for 1920 at the recent annual meeting of the British Columbia Chamber of Mines, are as follows:

Honorary President, Col. the Hon. E. G. Prior
Honorary vice-president, Hon. Wm. Sloan.
President, Dr. E. T. Hodge.
First vice-president, W. H. Hargraves.
Treasurer, Wm. Godfrey.
Executive: C. E. Cartwright, S. J. Crocker, F. J. Crossland, G. S. Eldridge, Major Fleck, B. G. Hawkins, Dalby Morkill, H. P. McCraney, G. W. Pettapiece, Noble W. Pirrie, W. W. Thomas, A. M. Whiteside, F. E. Woodside, P. W. Turnbull, N. Thompson.

Mr. A. M. Whiteside, the retiring president, predicted a big boom in British Columbia mining this coming Spring and stated that New York people were aware of this. He complimented the retiring executive on its excellent work during the past year, and spoke of the good accomplished by the convention held in Vancouver last Spring. From his own knowledge he could say that many of the activities in the Portland Canal district were definitely traceable to that Convention.

Mr. Whiteside could see no reason why Vancouver should not have as palatial buildings as those in Spokane, built of British Columbia materials.

Dr. E. T. Hodge, the newly elected President, on taking the chair for the first time expressed his appreciation of the honor conferred on him, and stated that the Chamber of Mines had a work of immense importance before it. He said that it was their duty to advertise to the world the minerals which B. C. actually had. They must also maintain the cordial relations which already existed with the governing bodies of the Province. He pointed out that apathy shown towards the work of the Chamber was not from the outside world, but rather from the citizens of Vancouver, who needed to be aroused to a sense of their own welfare.

"Mining will make Vancouver into a Metropolis" he said "and the Chamber of Mines should be situated in a building worthy of the work being done, in a main street of the city, where exhibits could be shown to visitors and those interested."

Mechanical Loading Devices for Underground Work

A Successful "Mucking" Shovel in Michigan.

The present, and prospective, shortage of men who are willing to undertake hard manual labour underground, has led mine managers to turn their attention to the perfecting of mechanical devices for underground use in substitution for manual labourers. A further compelling reason for studying the possibilities of these devices is the shortened working day, which requires intensive production if anything like full interest is to be earned on the plants that have been designed to handle greater quantities than it is possible to produce in a shortened working day.

The limiting conditions attendant upon the design and operation of mechanical devices for use underground are much more irksome than in the case of overground operation, because, in addition to the limitations of size imposed by the restricted area of mine passages, and a further restriction of weight required in order to achieve portability underground, there are considerations of ventilation and the presence of mine gases that limit the motive powers that may be used.

The conditions attending iron-ore mining and, in some favoured instances, copper and precious-metal mining, are less limiting than those associated with coal mining, and therefore the evolution of mechanical loading machines has proceeded most rapidly in metal mining.

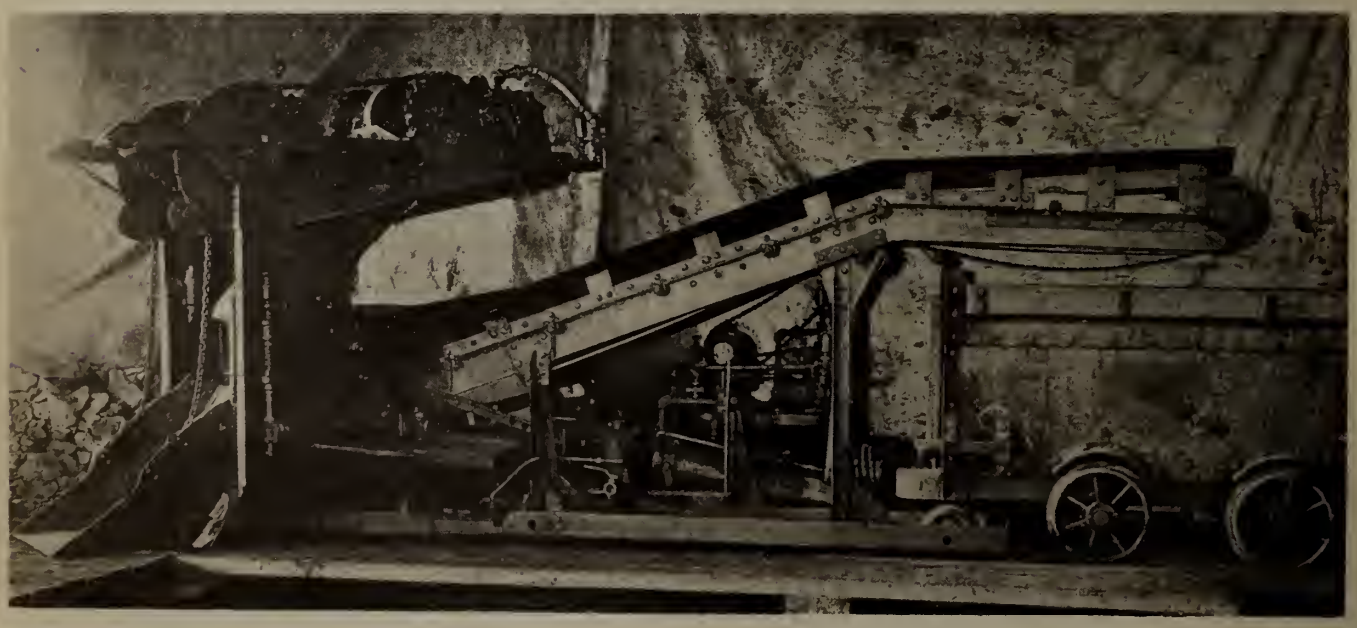
The accompanying photographs show a mucking machine that was recently put into operation in a Michigan copper mine, and is giving satisfactory service. It loads from 15 to 30 tons of ore an hour, depending on the depth of the bank. It is operated by compressed air, and has a reach of eight feet on either side of the centre line of the track. The photographs show the machine in three working positions, viz., empty, loading and loaded. We should be pleased to put any of our readers into touch with the designer of the device. It was designed and built at the mine where it is in use, and is shown in the photographs as it appeared when ready to leave the shop.

Loading shovels have been successfully operated for some time past in the mines of the Nova Scotia Steel Company and of the Dominion Steel Company at Wabana, Newfoundland. In these instances the great height of the seam,the width of the passages, and the tremendous blasts that are made provide an unusually favourable condition, as underground conditions go, for the use of a mechanical loader.

The Dominion Coal Company has also tried a shovel of a smaller type in its coal-mines at Glace Bay, and will in course of time evolve a satisfactory device, but the conditions of operations are very onerous, and probably a greater deterrent than anything else is the attitude of the workmen towards the introduction of these labour-saving machines. The further extended use of these devices will, however, be compelled by the growing and probably permanent shortage of unskilled labour in this district, and by the necessity to cut the costs of coal production by the adoption of every possible means.

It is also understood that the Hollinger Mines are experimenting with a mechanical loader, having been impelled to this by a similar shortage of suitable labour. At the Sullivan Mine, in British Columbia, similar experiments are being conducted.

About eighteen months ago, and before the signing of the Armistice, the "Journal" pointed out the liklihood of a growing shortage of unskilled labour. and the possibility that an exodus of south-European



Empty Position of Shovel.

Loading Position of Shovel.

labourers following a conclusion of peace might be accompanied by an influx of British-born immigrants of a type unsuited and disinclined to replace the men who it was anticipated might return to Europe. This forecast has been fulfilled, altho' the continued unsettlement of southern Europe has delayed to some extent the efflux of labourers. It was counselled at the time referred to that investigation of the possibilities of mechanical devices in substitution for manual labour would be repaid. The necessity to look into this question is now much more urgent. In the case of many large-scale mining operations on this side the Atlantic it has for some time been, and will continue indefinitely to be, not a question of getting unskilled labourers at a price, but of getting them at all; and those executives that proceed with the greatest rapidity to provide mechanical devices are most likely to show a good balance sheet.

Shovel Loaded.

The Zinc and Lead Deposits of Gaspesia

A Paper Read Before the Montreal Section of the Society of Chemical Industry.

By J. C. BEIDELMAN.

Extending out in the Gulf of St. Lawrence with the Baie des Chaleurs as a southern boundary, is the Gaspe Peninsula—the oldest settled portion of the Dominion of Canada but yet so sparsely populated to-day that at places civilization reaches only several miles inland from the coastal line.

This Peninsula is 160 miles long and 75 miles wide and with the exception of the few miles above mentioned along the coastal line, it is a mountainous wilderness—void of all roads or inhabitants, and development has been at a standstill since Sir William Logan made his exploratory trip across the Peninsula in 1844.

Running in a northeasterly and southwesterly direction, and a considerable distance north of the Centre of the Peninsula, are the Shickshock or Notre Dame Mountains, the northeastern extension of the Appalachian chain. These mountains are very rugged and their peaks rise from 2,500 to 4,200 feet above sea level, consisting of rocks from Pre-cambrian to Devonian, which have been folded and faulted to a marked degree and in turn pierced by eruptive rocks, thus in an ideal manner producing conditions that are extremely favorable to the deposition of ore.

On the southern slope of the Shickshocks at the headwaters of Berry Mountain Brook, a tributary of the Grand Cascapedia river, and in a region showing great faulting, is an area of land with numerous fissure veins carrying sulphides of both zinc and lead.

The zinc and lead field is situated 46 miles in a northerly direction from the village of Cascapedia, Que., and is confined, as far as known, to the projected Township of Lemieux, County of Gaspe, P. Q. Following the east bank of the Grand Cascapedia river from the village of Cascapedia to the junction of the River and Berry Mountain Brook, a winter road has been built which is sadly in need of repair and whose grades, commercially, are impossible until depressed, which is easily accomplished. From this point a road is now being constructed connecting the zinc and lead fields with the winter road. This portion of the road is being made with low grades and suitable for tractors.

A railroad has been surveyed from Matane to Gaspe through the centre of the Peninsula, and the surveyed lines run within six miles of the present zinc and lead development. A portion of this railroad has been built, but the remainder has been held up owing to the financial situation.

For a number of years numerous stories had been circulated about discoveries of gold, copper, zinc and lead ores in the interior of the Gaspe Peninsula, and specimens of copper, zinc and lead had been exhibited as coming from said discoveries. These discoveries when investigated proved to be worthless until the year 1909 when several prospectors discovered lead and zinc float in large quantities on the side of a hill some fifty miles in a northerly direction from Cascapedia The float principally galena, as the sphalerite had been leached, was found to exist to the top of the hill and a slight but unsuccessful effort was made to locate the source of the float. These efforts were soon discontinued and no further effort was made until the following year (1910) when James McKinlay staked the hill and proceeded to search for veins. These efforts were only partially successful as far as the prospectors were concerned, as they paid particular attention to the soft rock (slates) and were adverse to disturbing the hard rocks which were the veins proper, but their efforts although misdirected, unknowingly outlines several rich values of ore.

Prospecting was carried along in the same loose manner for several years but no further discoveries were made, although trenches were cut in the slates and carried to within a few feet of the now so called main veins, but in no case did they cut these veins. One trench actually was carried up the hill at an angle of about 30 degrees and pierced the cropping of a vein at the crest of the hill two feet, and was then discontinued. This trench was 150 feet long in solid slate and the vein was visible to the naked eye at all times. Another trench cut the slates for a distance of twenty feet and jumped a space eight feet wide, and was then carried out for twelve feet further. The writer asked one of the prospectors why he left this "hump" of eight feet between the trenches, and he answered it was to keep the water from one trench draining into the other trench. This space of eight feet that the prospectors had never disturbed was a solid vein of ore. Where the prospectors' forge stood fifteen bags of solid galena were bagged from one shot "at grass roots."

This roughly outlines how ignorantly the work of prospecting was carried on in this area for five long years. In the fall of 1915 an effort was finally made to open up the area in a systematic manner, and development has been carried on until the present writing with great success.

Ore Occurrence.

The country rock of the zinc and lead area is Devonian and consists principally of slates, sandstones, porphyries, syenite and basalt. The rock in which the zinc and lead sulphides occur is generally a slate considerably tilted and greatly fractured with areas of porphyry close at hand—relatively. On the northern and eastern portion of the field proper, quartz-porphyry is present in very large flows. In fact, some of the hills at this point are all porphyry in the shape of lacoliths and dykes large and small, which have disturbed the country to a marked degree.

A detailed statement of the geology of the zinc and lead field is given in Prof. Adhemar Mailhot's report on the "Geology of a portion of the projected Township of Lemieux, County of Gaspe, P. Q." published in the Quebec Mines Report for 1917. In this report Prof. Mailhot (Ecole Polytechnique) deals with the geology in an able manner and in great detail, he having spent two summers in this field making a special study of same.

The fissuring in most cases is across the strike of the slates, filled with a quartz matrix, a small amount of dolomite being present. These quartz fissure veins crop strongly, and the system can be traced for a distance of over three miles by float, outcrops and openings, and wherever encountered impress one with

their strength. In all cases, these veins are well defined and show zinc and lead ore in about the same quantity and quality, and at every point where a vein has been opened to any extent, the metal contents have increased with depth.

The principal, and practically the only real development in the field, is the Federal mine. This property has made great progress in its development and has proven at least sixteen different veins within an area a little over fifty acres with widths of from four to to sixty feet and traceable on their strike in some cases for over three thousand feet. These veins generally strike a little east of north cutting across the strike of the slates.

The present camp of the Federal mine is situated on the crest of a hill 450 feet above Berry Mountain Brook. This hill is fractured to a remarkable extent, showing a regular network of veins, each carrying practically the same zinc and lead contents.

At a number of places in the drifts and crosscuts of the Federal mine the slates are crushed to a marked extent by cross-fissuring and then cemented with a dolomite quartz carrying a good percentage of blende and galena. This breccia follows the strike of the veins and at places is over 100 feet wide. The blends and galena contents are lower than the metal contents of the veins proper but add greatly to the mineable area of the property, and will be very valuable assets whenever development is pushed on a very large scale, thus allowing of ore being mined whose metallic contents are considerably lower in zinc and lead than the main veins as new exposed.

One peculiarity of the breccia is that the mineral bearing solutions did not in any way attack the shattered and splintered fragments of the slates, and in all cases, the edges of these slates no matter how small are sharply defined.

Eleven hundred feet a few degrees west of south of the main shaft a vein is cropping sixty feet wide with an apparent horse of slate in the centre of same. This vein is known as the "McKinlay vein" and is cropping on the flank of the hill with crags 50 feet high, decomposed and leached but still showing the usual zinc and lead contents. This vein is also visible on on the road below the main croppings, thus giving a vertical height of 110 feet of exposed ore which is all below the bottom of the main shaft.

One half a mile south of McKinlay vein, while grading a road, the vein system was cut 560 feet below the elocar of the main Federal shaft, thus proving that the slates have been enriched quite uniformly where fractured and to depth.

North and northeast of the Federal shaft prospecting has uncovered several additional veins---the extension of the main vein system—with ore contents practically the same. One half a mile northeast of the Federal shaft another shaft has been sunk to a depth of 64 feet, piercing a vein averaging nine feet in width thus showing a further extension to the length of the vein system. At this point the same general conditions were found to exist concerning the quantity and quality of ore uncovered. This vein has been proven to extend to be northeast of the shaft over 1120 feet, and to the southwest 1200 feet, thus adding nearly one half mile of vein averaging over five feet in width (as proved by trenching) and showing ore of good quality but badly leached for the entire distance.

Float is visible on the strike of this vein for nearly 1500 feet further, but owing to weather conditions, trenching has ceased for the winter months.

South of the Federal shaft about three miles, road grading uncovered a vein carrying zinc and lead with the same general north and south strike. This is of great interest, owing to the fact that this is the first indication that the veins were cutting the basic rocks.

North of the Federal shaft about 500 fefet, a vein has cut syenite-porphyry and is traceable for 400 feet, but is "narrowed up" while passing through the syenite-porphyry.

Several veins at this main camp of the Federal are traceable for two and three thousand feet, while others, owing to the overburden are only traceable for from 300 to 700 feet.

One mile west of the Federal shaft and on a hill of the same general character as the hill on which the main camp is situated, a large quantity of float carrying the usual zinc and lead contents is found. The slope of this hill is towards Brandy Brook with a higher ridge between it and the main vein system at the Federal camp thus accounting for another occurrence of ore which has not been opened up at present.

In all the veins so far opened amethystine quartz is a part of the vein matrix. It seem to run with the strike of the vein in the form of veinlets and vugs and is generally barren of ore itself, but may be in very close proximity to very rich ore. The purple coloring is caused by a small amount of manganese.

Character of Ore.

The sphalerite and galena encountered in all of the openings and workings in the zinc and lead fields is of the highest grade, being equal to the ores of the Joplin Missouri field which are considered to be the highest grades of zinc and lead ores mined, and is of a honey yellow color generally. The sphalterite shows a zinc content of from 62 to 65 per cent with an average of less than one half (½) per cent iron. This is not only the average of the surface ores but in the underground workings on the main Federal vein the same average is carried out.

The ores, both zinc and lead, are in no way complex, and their treatment is simply one of concentration as at the present time they are free of silver, barium, arsenic, antimony or any other complexity whatsoever, other than that of separating the lead and zinc concentrates from their silicious gangues, which is easily accomplished owing to the considerable difference in specific gravity between the two sulphides—specific gravity of galena being 7.4 to 7.6 and of zinc blende 3.9 to 4.1.

The lead and zinc sulphides are mechanically combined at places throughout the veins, but not chemically, and at places large masses of lead and zinc sulphides exist that simply need hand sorting. A small amount of carbonates both smithsonite and cerrussite is found on the surface but only traces are found on the 100-foot level of the main vein. Considerable fine grinding will have to be provided for, as a portion of the ore is disseminated through the gangue in a finely divided state. The value of the ores does not lie in the saving of all these fine particles, but this operation with the aid of the soil flotation process will add materially to the amount recovered.

The usual bug-bear in zinc concentration—iron—will not be a disturbing factor as there is too little of it to be of any harm. This remark refers to all development in the district up to the present writing, but what the future will bring forth, I cannot state, but believe the iron contents will continue to be very low.

The zinc found in the breccia outside the main vein is sometimes of a brown color similar to the Joplin

"color" but upon analyzing same it was found to contain the same zinc contents as the honey-yellow blende.

As one of the veins approaches the porphyry area to the north, a varying amount of chalcopyrite is present in same, and this is the only ore so far discovered in the entire field that has any other valuable metal present in quantity, besides zinc and lead. The copper at spots is as high as four and five per cent and would lead one to believe that as depth is obtained on the veins of this section and porphyry is encountered, that copper values will be present to a more or less degree. This condition is found solely in the northern portion of the field and only when the veins are accompanied with or near porphyry.

In Bulletin 154 issued by the Bureau of Mines at Washington, D.C., Mr. Clarence A. Wright in cooperation with H. A. Bushler, State Geologist of Missouri, outlines the generally accepted practice of milling the "Joplin" ores as follows:—

"Concentration of the ore is commonly effected "by crushing to ½ inch and roughing and cleaning "the crushed material over two or more large Cooley "jigs of the Harts-type, and running the finer sands "over the usual types of sand and slime tables."

This practice, in addition to regrinding the "chats" and tabling the product, is followed by treating the slimes by flotation. This general scheme of concentration is particularly adapted to the Gaspe ores owing to their great similarity to the Joplin ores and to the further fact that the grains of blende and galena in the Gaspe ore separate from their gangue much more readily than the Joplin ores. This is due entirely to the gangue of the Gaspe ores being much more friable than the Joplin vein matter.

Owing to the character of the deposits in the Gaspe field, mills with greater degree of efficiency in concentration are made possible and can be built with the idea of permanency instead of being built for only a few years, which is the practice in the Joplin field—an average of three years being the life of the ordinary Joplin zinc and lead mine.

Development.

Numerous pits and trenches are in evidence over the field showing a great amount of surface ore but the main development consists in the Federal and Bois shafts and the undergrounds works from the first named shaft. A shaft has been sunk on Federal hill 142 feet (160 feet on the vein) from which drifts were run north and south (the strike of the vein being a few degrees east of north) and crosscuts driven east and west, making a total underground footage of 1816.6 feet.

The north and south drifts are driven on the strike of a very strong vein cutting the slates at right angle to the strike and dipping 78 degrees to the west. The vein is faulted but in no place does it show any material narrowing. Several veins intersect the main trunk system and wherever sampled carry the same general zinc and lead contents. The main vein on the 100 foot level is robbed to a considerable extent of its values by leaching and I confidently look for higher values on the 200-foot level. The ore at the bottom of the main shaft shows less leaching than at the 100-foot level and the blende has a lighter color.

This development "blocked out" above the 100-foot level in two veins a large amount of ore of an average value of $10.00 pe rton and accounted for a very large amount of probable and possible ore. The main vein was drifted on in ore for 870 feet before turning to the east to break through to "air," and showed an average width of twelve feet of ore. From end to end of this 870 feet the ore body was continuous with here and there some very rich bodies extending over considerable areas. The average metal contents of the 870 feet together with the shaft, as proven by channel cuts, was 8 per cent metallic zinc and 4 per cent metallic lead—exclusive of the rich spots in the vein, or 13.33 per cent of 60 per cent zinc concentrates and 5 per cent of 80 per cent lead concentrates, as Joplin figures its ores. This compares very favorably with the contents of the Joplin-Oklahoma field as the above percentage of concentrates in the "mine run" of the latter field would be considered very high.

Mr. Walter Harvey Weed, mining geologist of New York and for over 20 years with the United States Geological Survey, examined the district in detail. I have taken the liberty of quoting from his report on the main property as follows:—

"The ore occurs in well defined fissure veins whose out-"crops on the cleared tract are distinct and traceable across "the claims..... while no definite statement as to the gen-"etic relation of ore and rock is perhaps warranted, an ex-"erica makes me feel positive that the observed geological "relations are extremely favorable."

"The conditions just noted together with others which need "not be described here, show movement indicating deep frac-"turing and persistence of ore values downward."

"I see no valid reason why these deposits should not be "as rich 1000 feet down as at the surface."

"There is practically no pyrite or marcasite in the ore. It "does occur, however, but in scanty amounts."

"The ore seem in the underground workings is typical of "that seen in the other veins nearby From the statement "already made, I have shown that the property has a con-"siderable body of commercial ore already opened up but this "is only a very small percentage of what may be expected "from deeper and more extensive mine development; more-"over, the property has possibilities of a large tonnage from "other veins and from other claims as yet unprospected."

"The quality of the ore at every point is excellent and it "has no troublesome components."

"Concentration of the ore will in my opinion be easy be-"cause of its simple mineral composition and favorable mech-"anical analysis."

"This development is merely indicative of what future "work may show. The probable greatest value of the mine is "its undeveloped portion."

"The geological evidence indicates that the ore will extend "a great distance downward. A depth of 1500 feet or 15 years "supply for a 200-ton mill from this one ore shoot is quite "possible"

Dr. A. P. Coleman, Professor of Geology, of the University of Toronto, visited the zinc and lead field during the past summer and was very much impressed with the ore occurrences and the general geology of that section of the Peninsula, and in a paper written for publication makes the following statements:—

"Now folded and faulted sediments acted on by masses of "eruptive rocks which have cooled slowly and at great depths "furnish the natural conditions for the formation of ore dep-"osits. In northern Ontario or British Columbia such condi-"tions would be considered very promising; but in Gaspe "until recently nothing of value has been reported."

"On the mountain top several veins cut the slate and por-"phyry and have been opened up by stripping as well as work "underground."

"The most promising sulphide in the ore is zinc blende "of a honey yellow color, almost free from iron, unlike the "dark brown or black blende found in other parts of Can-"ada. Galena comes next in amount. The gangue minerals "are quartz, often amethystine, and dolomite; and along with "the vein matter there is sometimes a breccia of slate frag-"ments cemented by spar containing some ore, evidence of "important faulting in connection with the veins."

"The conclusion is reached that the mine has a large body "of ore of unusually high quality"

"The mine itself has been examined and reported upon by

"the well-known American mining geologist and engineer, "Walter Harvey Weed, a very competent authority."

"As a vein has been cut in roadmaking in the valley, 560 "feet below the outcrop at the camp, the ore may be expected "to go to considerable depths, perhaps, as suggested by Weed, "even to 1500 feet, making the mine one of the great zinc "deposits of America."

"As the tunnel is only 92 feet below the surface this is "only a very small percentage of what may be expected from "deeper and more extensive mine development."

"Te ore assays about 8 per cent of zinc and 4 per cent of "lead, and the association of minerals permits an easy sep- "aration of the two metals. It is compared by Weed to that "of the Joplin district of Missouri, and in general character "it is surprisingly like the ores of that famous zinc mining "region, in spite of the fact that the geological features of "the two districts are as different as possible. At Joplin the "zinc ores occur in flat sheetlike deposits at no great depth "in carboniferous limestone, which is very little disturbed "and nowhere pierced by eruptive rocks; while the Federal "ores are in well defined veins reaching a known depth of "hundreds of feet in slate, squeezed and faulted and pen- "etrated by eruptives from which the metal bearing solutions "are supposed to have come."

"The Shickshocks give promise of becoming a valuable asset "to the Province of Quebec instead of a barrier to enterprise; "and it may well be that the mines of the heart of Gaspe "may before long surpass in value the forests or the fish- "eries of its coastal regions"

Adhemar Mailhiot, Professor of Geology at the Ecole Polytechnique of Montreal, in his report to the Quebec Provincial Government for the year 1917 concerning the zinc and lead field states:—

"The galena in the veins of the projected township of Le- "mieux occurs in the shape of grains of all dimensions from "small flakes very thinly disseminated among the zinc-blende "and the gangue to cubes measuring two inches. Some- "times it forms with the blende solid masses weighing over "one thousand pounds. The gangue of the metalliferous veins. "formed of quartz and dolomite makes the ore very easy to "concentrate by the ordinary mechanical processes."

"The blende of the deposits in Lemieux County is very "pure and almost free from iron; its color varies between "waxy yellow and reddish brown."

"As the deposits are fillings of great fractures of the "earth's crust, it would seem that they must go down to "the base of the slatey sedimentary rocks."

"There are outcroppings of ore not distant from each other "between which are differences of level of several hundred "feet and it is almost certain that the highest deposits go down "in depth to the level of the lowest ones."

"Some veins have been followed for distance of about 3000 "feet and it is probable that they extend still further under "the cover of superficial deposits"

"Then the natural inference is that these veins must go "down to a considerable depth, for it is generally admitted "that the length of a fissure is proportionate to a certain ex- "tent to its depth."

The only chemical by-product that will be commercially produced from the above character of ores is sulphuric acid, which is quite an item to the smelters at the present time treating the Joplin-Oklahoma zinc ores, but the character of the zinc concentrates renders it possible to produce cheaply from said ores the highest grade of spelter—free from all deleterious ingredients, thus commanding a ready sale and giving the British Empire reserves of the highest grades of spelter comparing favorably with the "Horse Head" and "Bertha" brands of spelter manufactured by the New Jersey Zinc Company and the "Mascot" brand of the American Zinc and Lead Company.

From what I have seen of other zinc fields, I am strongly of the opinion that the present area will prove on development to be one of the few zinc and lead fields of the world producing a high grade zinc blende, minus the usual complex ores, and if the depths are sustained, as I thoroughly believe they will be, then this field has a future before it of tremendous possibilities

THE SILVER ISLET MINE IN LAKE SUPERIOR.

By J. J. O'CONNOR.

The Nepigon Mining and Lands Company, owners of the famous Silver Islet Mine, have granted and option to United States interests on all of their holdings comprised in the Wood Location, at Silver Islet, including the land covered by water, this location covers about ten thousand acres.

It is the intention of the parties taking the option to unwater the mine to a certain depth, to enable them to extract the ore in the roof of the mine, and to carry on systematic explorations on the mainland, where several promising veins are known, and on which considerable testing work had been done under the old operations. Vein values, that under the old regime had no attraction, are now well within commercial possibilities. The abnormally high price of silver, and the improved methods of recovery, more than counterbalance the increased costs of production, and offer a very promising future.

The roof of the Islet has been thoroughly tested by driling, and is known to contain well over three hundred thousand ounces of smelting ore. Many schemes were planned for taking out this ore, but none were ever undertaken, or at least, put into operation. At one time a cargo of bricks were brought up from Southhampton. with the intention of constructing an artificial roof, but this scheme was abandoned, and the bricks were afterwards used in the construction of the Roman Catholic church in Port Arthur, in 1881.

Silver was discovered on the Islet by a man named Brown, in the employ of Thomas Macfarlane, M.E. in 1868, while placing pickets for a land surveyor.

The first silver mining was done in 1869, when 5/1-4 tons of ore were taken out, valued at $6 976. Eight men were employed in mining during the winter of 1869-70. The Islet is exposed to the fullforce of the storms of Lake Superior, the weather in the spring of '70 was such that the boarding house and all other structures were washed away, and for a time the miners were in rather a hopeless condition. When matters got straightened away in the spring, they took out ore to the value of $25,000 in one week.

These operations were carried on under the superintendance of Thomas Macfarlane. He visited the Montreal owners of the property, and requested them to advance $40.000 to enable him to fortify the works against the storms of Lake Superior. They refused this request believing it to be impossible to carry on successful mining operations, and placed the property on the market for sale.

A sale was made for $125,000. and the first payment of $50.000 was paid in gold on September 1st. 1870. Mining was proceeded with, and $108 000 worth of silver was mined and shipped before the close of navigation that year.

From this time on mining was carried on, on a very extensive scale. A 40 stamp mill was erected on the main land, in 1874, and the ore conveyed to it by scows, and tram. A villiage of quite extensive proportions grew up at the Islet several hundred miners with their families making up the population.

Mining was continued with varying degrees of success, until March 1884, when they were compelled to close down for want of fuel. The steamer "Hulbert"

carrying their winter's supply of coal to operate the mine, was storm-bound at Marquette, Mich. and did not reach the Islet until the opening of navigation. Finding operations at the mine closed down the coal cargo was discharged at the C. P. R. Horn elevator dock, Port Arthur.

During the time the mine was in operation there was mine dand marketed $3,250,000 worth of silver.

The closing down of this property, saw the end, for the time, of one of the most picturesque and daring silver mining ventures ever undertaken.

It is confidently believed by well informed mining men, that this famous old property has a profitable future yet in store.

Manitoba Notes

Gabrielle Mines Ltd.

The "Journal" is informed by the Secretary of the Gabrielle Mines Ltd., that Major Pelletier has been placed in charge of construction work, and left Winnipeg on the 12th January, via Riverton, with all supplies and equipment necessary for the re-building of the permanent camp site. New buildings are to be erected, and some of the old ones made habitable. Water and ice supplies are being arranged for next Summer's work. The purchase and installation of permanent machinery will be decided upon when Mr. J. B. Tyrell, the Consulting Engineer of the Company, returns from England. Those in charge of operations are proceeding to develop the mine so as to avoid unnecessary expenditure, and propose to study the character of the deposit from every angle before committing the Company to large outlays. The management of the Company express the belief that the showing of the former operations, and the later development of the property, warrant the confidence of those who have invested in the enterprise. From the investor's standpoint, the engagement of a competent and reputable mining engineer as a permanent consultant is the best guarantee that the property will be made to yield any values that are contained in it.

Pan Extension.

Completion of the camp buildings, and progress with the foundations of the boilers, and permanent power-plant of this Company are reported by John Beckman, the Managing Director.

A New Flotation.

The Bingo Mines, Ltd., is the latest mining flotation in Northern Manitoba. Capitalization is $2,000,000. Development shares of par value of one dollar are being offered at fifty cents. The advertising literature of the new venture is not marked by any restraint, and it is several times mentioned that the Bingo property contains "the richest vein in the richest camp since Cripple Creek". The mine is situated near the Rex Mine, in the Herb Lake District of Northern Manitoba, distant about 82 miles from Le Pas.

Reported Discovery of Improved Method of Electrical Transmission.

The Winnipeg "Free Press" announces that Captain J. W. Dorsey, Asst. Professor of Electrical Engineering at the University of Manitoba has completed experiments which enable him to publish the the discovery of a new principle in electrical transmission which will reduce present costs of transmission by at least one-half.

"The principle," said Capt. Dorsey, "involves the use of an electric arc, several types of which I have invented as long as eight years ago. I have since been working on the application of this arc and a solution of one of the long-standing problems of electrical engineering. The principle gives rise to the invention of a number of new types of power machines. It may be applied from the time the power leaves the turbine generators to its use in electric motors in distribution centres."

Capt. Dorsey's experiments were interrupted when he went overseas with the 9th Americans in 1917. He was wounded at Chateau Thierry. Since his return from the war, he has applied himself to the carrying out of his experiments.

Gold Pan.

A general meeting of shareholders to receive the report of the President, J. H. Ashdown, will be held February 10th. At present a force of eleven men is employed on the exploration work.

TORONTO SECTION. A. I. ELECTRICAL ENGINEERS

(Lecture By Prof. A. E. Kennelly)

A lecture of unusual interest to electrical engineers took place at the regular meeting of the Toronto Section, the American Institute of Electrical Engineers. held at the Enginers club, Friday January 30. Professor A E. Kennelly D. Sc. of Howard University delivered a lecture on artificial power and transmission lines.

During the past thirty years of the electrical industry a marvellous advance had been made in electrical theory and transmission-line formulae had been very thoroughly worked out by Heavyside and others. Much of this mathematical theory was of little use to the practising engineer owing to its complexity, and recourse has been had to more simple formulae, derived for practical uses.

Hyperbolic functions were of great use in the practical applications of electrical theory, and the speaker developed the mathematics of these functions at some length.

Of much use also to the engineer were the artificial lines built for laboratory investigation. By proper construction these could be made to duplicate actual full-scale conditions, and served to investigate the phenomena of transmission telegraph and telephone lines up to 500 miles in length or over.

Profesor Kennelly while in the city is also speaking at the meeting of the Royal Canadian Institute on Febrnary 7th, on the subject of "Research in Engineering."

Personal

Mr. J. B. Tyrell is expected to sail for Canada by the "Adriatic" ex Southhampton for New York, January 28th.

Our Northern Ontario Letter

The first month of 1920 closed a favorable record for the producing mines at Cobalt. From the results achieved, and the preparations under way it is already possible that a greater number of mines will contribute to the 1920 output than was the case in 1919. It is interesting to find all the 1919 shippers continuing to produce, with the one exception, the Adanac. New shippers will probably include the Bailey-Cobalt, Lumsden, Nipissing Extension and Hargraves Consolidated. Among these the Bailey has the greatest indicated possibilities, but the other three mentioned properties are conceded to have a good deal of merit.

The Mining Corporation of Canada is continuing its aggressive policy of endeavoring to acquire new prospective mines in the newer fields. It is planned to carry out an exploration program on claims acquired last fall in the township of Butt, district of Nipissing. This work will be for the purpose of exploring for radium-bearing ore, encouraging quantities of which were discovered in that township late late last summer. The company, in addition to keeping in touch with the newer fields in Northern Ontario is also active in the Port Arthur district as well as in British Columbia.

The sampling of the tailings pile on the Chambers-Ferland property has been completed, and it is understood the holders of the option are considering the erection of a 300-ton flotation plant. As to this, no official statement has been issued. It is generally believed, however, that the deal will go through.

At a meeting of the shareholders of the Tretheway-Cobalt Company held Jan. 30th the agreement entered into recently by the directors authorizing the sale of the Cobalt mine of the Thetheway Company to the Coniagas Mines, Ltd., was endorsed. This leaves the Tretheway in a position to concentrate its energies on its Castle property.

The Coniagas Company have acquired the mine and mill of the Tretheway will proceed to extend its workings over onto the Tretheway territory where a raise will be driven for the purpose of connecting up with the main workings on the Tretheway. The Coniagas would appear to be in a position to benefit considerably in that the overhead expense will not be increased while the volume of the ore available will be materially increased.

Favorable developments at the Beaver Consolidated continue. The new ore shoot encountered recently at the 530-ft. level is gradually being found to extend to quite large proportions, and ore of a medium grade is found to occur over a width sometimes amounting to ten feet. The location of the deposit leads to the belief that it will also be found to extend upwards and may be tapped on some of the upper levels. Coincident with this, the company is developing a large amount of high grade ore on its Kirkland Lake mine where at the 500-ft. level some five feet in width of vein matter is found to be rich in gold tellurides.

The support of mining companies in Cobalt is being solicited by the Thompson Power Company, with head office and plant at Deseronto, Ont., and where it is proposed to manufacture a comparatively new explosive known as Thompsonite. The explosive has been tested at such mines as the Temiskaming, Beaver and Bourke's, and favourable testimony is submitted by the respective managers of the mines above mentioned.

In the Gowganda silver area the number of outfits engaged in exploration work on various promising mining properties is steadily increasing and the camp is experiencing a boom of at least fair proportions. It is learned that the South Bay Power Company will again proceed with the development of Hanging Stone Falls. This enterprise was commenced two or three years ago, but was suspended owing to the concern apparently becoming financially embarrassed. As to this it is now stated that the requisite finances have been arranged for and that about one hundred tons of material is already in course of ransportation to the scene of development. It is understood that the plans are to have the first unit in operation and electricity in Gowganda before the end of the coming summer.

Satisfactory progress is unofficially reported in the negotiations for the Miller Lake-Everett property. It is intimated that the Kilpatrick property may also be included in the deal and that strong financial interests are associated in a scheme to acquire a large acreage in the immediate vicinity of the proven area and with the object in view of carrying out a comprehensive scheme of exploration and development.

It is stated that a number of mining deals are in various stages of consummation, and that they range from more or less small transactions to deals of quite large proportions. In connection with the purchase of the Miller Lake-Everett the name of Sir Henry Pellatt of Toronto is mentioned, while in connection with the Kilpatrick property the name of C. L. Campbell of Montreal is mentioned.

Activity in the vicinity of Leroy Lake continues with promising results. It is learned that a deal is about closed for the purchase of the Dodds property.

Concerning the construction of a railway to Gowganda from Elk Lake, the Journal correspondent has been officially advised that the Canadian Light Railway Construction Company has received encouraging offers from oil operators in the Peace River district, Alberta, as well as the mining district of The Pas, Man. This company which desired to construct a light narrow gauge railway to Gowganda states that it is up to the people of Northern Ontario to decide whether or not they want quick relief in the way of a light narrow-gauge railway or prefer to wait some time for standard-gauge railways. In the meantime, Premier Drury has up to the time of writing failed to reply to queries as to his view of the possibility ofhaving the standard-gauge railway extended from Elk Lake to Gowgada this year.

In the once active South Lorrain silver area, not a wheel is turning, but there appears to be some prospect of a limited amount of work being resumed in the early spring.

The Boards of Trade in Northern Ontario, at least those active in the district of Temiskaming, have again taken up the question of urging the Ontario Government to throw open Gillies Limit for prospecting. It is pointed out that a considerable part of the Limit contains geological conditions which are favorable, and that an aggressive prospecting campaign might reasonably enlarge the proven silver-producing areas of Cobalt.

During the week ended January 30th, four Cobalt companies shiped an aggregate of approximately 359,270 pounds of ore. The Coniagas was the heaviest shipper as shown in the following summary:

Shipper	Cars	Pounds
Coniagas	2	175,630
O'Brien	1	64,030
Hudson Bay	1	61,610
Dominion Reduction	1	58,000
Totals	5	359,270

Bullion Statement

During the week none of the mines shipped bullion, the only consignment of refined silver being sent out by the Dominion Reduction Company as a result of treating customs ore.

The Gold Mines.

The gold mines of Northern Ontario appear likely to be confronted with a request from the workmen for another increase in pay in the early Spring. It is intimated that the men have the issuing of such a request now under consideration. The attitude of the companies is not known for the reason that the workmen have not yet directly intimated their intentions. It is learned, however, that he workers will base their request on the present wage scale at Cobalt which amounts to about $1 a day higher than in the gold camps. At the same time, acording to information obtainable, it is understood they are calculating this comparison on a basis of silver at or above $1.30 an ounce.

It is unofficially estimated that the 1919 output from the mines of Porcupine was well over $9,000,000 which record would bear out previous estimates made in these columns that the 1919 production for the province amounted to around $10,500,000. Further it is now assured that provided sufficient men can be procured and allowing for a reasonable temper in the workers, the 1920 production will greatly exceed any previous year on record in the province.

At the time of writing, the Hollinger Company is expected to declare a dividend of one per cent. payable February 15th, amounting to $246,000. It is also believed that the annual statement will be issued within the next thirty days.

Local criticism is being directed at the continued reticent policy of the directorate of the Dome Mines. The crop of unofficials rumors pertaining to tonnage treated, gold produced, and costs of operation have not served to appease the hunger of the shareholders for definite information. It was expected that the interim dividend cheque of January 15th would be accompanied with at least a brief statement as to the present financial condition of the company. Failure to do this has aroused some uneasiness. The company will end its fiscal year March 31st. Also its option on the Dome Extension property will either have to be exercised, extended or rejected in March.

Unofficial reports concerning the McIntyre would appear to offer reason for speculation as to the manner in which the McIntyre-Porcupine will dispose of the option which it holds on the Plenaurum property. Here, also, opinion is divided, and all shareholders await the verdict.

The Hudson-Porcupine Gold Mines Company has been incorporated for the purpose of exploring and developing the property formerly known as the Whelpdale. The property is situated on the north side of Timmins.

Concerning the Porcupine Crown and its negotiations in connection with the Moneta, nothing of a definite nature can be learned, and apart from the fact that an examination of the Moneta was made by officials of the Porcupine Crown, no official statement has been issued.

In the Kirkland Lake district there is much to arouse the enthusiasm of those involved. This is not only true of the producing mines but also applies to various properties in the development stage as well as to mining claims in general.

The Lake Shore mine having been dewatered to its deepest level, the 400-ft. it is now finding it possible to produce at full capacity and the figures soon to be issued for the month of January promise to show a very substantial increase over the December record.

Work at the 500-ft. level of the Kirkland Lake Gold Mines is serving to develop a large tonnage of rich ore. Gold tellurides have been found to occur in rather spectacular quantities over a width of about five feet. The work of developing this ore body at the 400-ft. level, as well as at the 600 and 700-ft. levels is to be carried out at once.

At the Miller Independence property at Boston Creek, the central shaft has reached a depth of 500 feet and arrangements are being made to carry out extensive lateral operations. The annual meeting of the company will be held in Dayton, Ohio, this week.

At the Peerless property, formerly the Mondeau, the installation of a mining plant has been completed and will probably be set in operation by the beginning of next week. The capacity of the plant will make it possible to carry operations to a depth of at least 500 feet.

Shaft sinking at the Kennedy-Boston has been carried to a depth of 76 feet at the time of writing and will be soon completed to the 100-ft. level. It is understood further arrangements will be made to carry out lateral work at the first level.

Among the new mining companies recently incorporated is the Wood-Kirkland Gold Mines, Limited, with a capitalization of $2,000,000 made up of 2,000,000 shares of the par value of $1 each.

The Wood-Kirkland owns close to three hundred acres of mining lands situated in the township of Lebel, in the Kirkland Lake district. The property is located South of Mud Lake and is just one claim removed from the Bidgwood. The explortion and development of the property is to commence within the next month or so, toward which end Jack Murphy, a former mine captain at the Tough-Oakes Gold Mines has been engaged to superintend the work.

The directorate of the new company is made up of strong financial men, as shown below:—

Geo. W. Morris, Buffalo; N. R. Kirkpatrick, Dayton, Ohio; J. E. Day, Toronto; Fred C. Bonnet, Hamburg; A. L. Pfau, Haute, Ind.; E. L. Wettlaufer, and Henry J. Wood of Buffalo.

Reports from the Boston Creek district are to the effect that the exploration work being done on the Rice Mine, or commonly known as the Charette property, has been exceedingly satisfactory. It is reported unofficially that some very rich ore has been encountered in a diamond drill hole, commercial ore extending over more than twenty feet in width.

Lack of offical confirmation has caused the report to be received with all due caution, but fairly general interest has been aroused among those holding claims in the township of Boston in the vicinity of the reported find.

HARMONY AT COBALT.

Employees' Sick Benefit Fund Proposed.

Among the first benefits to be derived from the scheme of "Employe Representation" at the mines of Cobalt is presented herewith. It has to do with the insurance of men during illness. The present practice at the mines of Cobalt is for the men to form into committees representative of the workmen at individual mines. These committees deal with questions arising in connection with the mine at which they are employed. No unions are recognized, but all employees whether members of unions or not are given full representation the scheme thus providing representation for one hundred per cent of the men employed.

Following is the full text of the rules governing the proposed "Employes Sick Benefit Fund" as applying to the employees of the Dominion Reduction Company. It is understood that the company has approved of this scheme and has offered a loan in order to place it on a satisfactory working basis. The rules follow:—

(1) That this Fund be called "The Dominion Reduction Employes' Sick Benefit Fund."

(2) That employees agree to pay into the fund one-half of one per cent. of his monthly wage based on a thirty day month at the daily rate, i.e. A man earning say $3.50 per day receives $105.00 for thirty day's work. His contribution to the fund will be 53 cents monthly no matter whether or not he works the full thirty days.

(3) The Dominion Reduction Company pays a like sum, 53 cents, making a total of $1.06 per man to the fund.

(4) That employees who are sick for more than three days be entitled to receive from the fund an amount equal to 55 per cent. of his daily wage for each day's sickness up to 60 days. After 60 day's illness he shall be entitled to receive one-half of 55 per cent. of his daily wage for another period of 60 days' after which he shall cease to have any further claim on the fund. In cases of dire distress, however, if funds sufficient are on hand and the committee recommends it, a vote shall be taken on the question of additional relief among all the employees when a majority vote shall decide, also as to what additional relief (if any) shall be given.

(5) A medical certificate must accompany all claims for sick benefits, and men falling sick must see a doctor within 24 hours of his calling on the fund and must obtain a certificate from such doctor certifying that he is unable to work. The claim will commence from the date of such certificate. He must also obtain a certificate calling him off the fund. No claim will be paid without the apporval of a majority of the committee.

(6) That in cases where a man is placed in quarantine because of contagious deseases in his home or place of abode the benefits be the same as for sick pay provided he supplies a medical certificate to that effect.

(7) That no employe shall be entitled to receive sick pay where he has not been in the company's employe for at least 30 days immediately prior to his illness except in cases where he has been paying into a similar fund of another company which has previously made such arrangements as to permit each other's men the privilege of immediate full benefit.

(8) That the amount of payment to be made at death be governed by the amount on hand at that time, but at no time shall it exceed $250. This amount will be paid if there $500 in the fund. If not one-half of the amount of the fund will be paid.

(9) That all funds be deposited in the bank in the name of the fund and all cheques to be signed jointly by the manager and the Chairmaan of the committee.

(10) That in cases of accidents where employes are already protected these rules do not apply. There shall be no claim on the fund.

(11) That a balance sheet be issued at the end of each financial year and posted in a prominent place for perusal.

(12) That these rules, rates of pay etc., be subject to change at any time and that special assessments may be levied to meet the claims of sick members should conditions warrant it. In the event of the ceasing of operations, the fund on hand to be divided between the company and the men fifty-fifty."

TORONTO NOTES.

President F. L. Culver of the Beaver Consolidated Mines, Limited, has returned from the North, bringing further important news of finds on the Kirkland Lake and Beaver properties. At the Kirkland Lake mine the volume of rich ore in which exploration has recently been taking place has been found to be considerably larger than was previously known. This was ascertained through further drifting on the fourth and fifth levels. This work will be continued on the sixth level next week. The ore body is about five feet wide and as rich as anything previously enconntered at the mine, showing free gold and tellurides all through the quartz at this point. These workings are the deepest at the Kirkland Lake camp and the further discovery of good ore at this depth is considered important.

Encouraging results have been found at the Beaver, the parent mine of the Kirkland Lake, in virgin ground at the 530-foot level, where some springers were followed, which have developed into a body of mill ore from 6 to 10 feet wide. Where the explorers have driven in on this the wall rock has been found impregnated with leaf silver. Also on the 400-foot level it has been found that the same conditions exist.

British Columbia Letter

METAL MINES.

Nelson, B. C.

Word from Salmo B. C. indicates that the Concentrator, which has been under construction at the Emerald Mine, Iron Mountain, near Sheep Creek, during the past four months, of San Francisco Cal., and erected under his supervision. It has a capacity of 30 tons a day on a double shift basis and stands at the mine site. The new plant is described as being more or less experimental as it is the intention of the Iron Mountain Ltd., if the ore developments warrant it, to erect a large plant on Sheep Creek, possibly of the hydro-electric type. This, however, is a matter for the future and meanwhile the new concentrator is expected to give entire satisfaction. The history of the Emerald Mine started in 1906. It was the first in the silver-lead belt of the Sheep Creek Camp and has shipped between 40,000 and 50,000 tons of ore to the Trail smelter.

One of the private bills to be brought before the Legislature of British Columbia for consideration at its forthcoming session provides for the granting to engineers, practicing in this Province, the right to organize and to insist on men of the same profession taking a Provincial Examination before being admitted to practice in British Columbia. This, in broad general terms, is the object of the measure to be placed before the legislatures for their approval or otherwise. It is argued that it is no more sweeping in its terms than the legislation affecting medical and dental doctors seeking to practice in this Province. Whatever arguments there may be pro and con there is no doubt that the bill will meet with strong opposition in-so-far as it affects mining engineers. The newly organized Prospectors' Association, with headquarters at Nelson B. C., already has taken a strong stand against a closed corporation of engineers. The most objectionable phase of the proposal to the prospectors is that American mining operations bringing capital into this province will be required to employ local engineers, if they wish to do more than look at properties. For a province so interested as British Columbia in attracting foreign capital for the purpose of development, this proposed restriction on the movement and employment of American experts, when their employers are American corporations, is regarded by the prospectors with disfavor. The "Daily Sun", of Vancouver B. C., considers the objection taken by the prospectors as sound. It observes that, while it has been apparent for many years that the profession of mining engineering required better definition and some recognized local status in the interests of both the public and the engineers themselves, "care should be taken that the bill should not have the effect of discouraging outside capital from coming to the province to develop our mining resources. To close our doors to American or other engineers would certainly have that effect'.' The paper goes on to say that "capital knows no international boundary in brains"; that "hitherto Canadian and American egineers have freely crossed the boundary line in pursuit of their calling"; and that "these men have influenced much of the development of British Columbia mines". However it is thought that "if the engineers of British Columbia will set a high standard of qualification as a condition of membership, so that affiliation with their organization becomes a hall mark of efficiency, they will do a great deal towards establishing themselves in the confidence of both the public and the employing corporations."

Trail B. C.

During the first week of January, 1920, there were fifteen shippers to the Trail Smelter of the Consolidated Mining & Smelting Co. of Canada. The receipts amounted to 5,604 tons, of which 451 tons were concentrates and the belance ore. The Rossland Mines of the Company, the Centre Star, Le Roi, White Bear and Black Bear, lose their identify in the list now issued under the grouping "Rossland Properties, Rossland." Two properties have made contributions which were not in last year's list, the Kaaba, Washington, which sent concentrates and the Ptarmigan, of Athlamer.

Hazelton B. C.

The Sunset Claims, Nine Mile Mountain, in the Hazelton Section of the Omineca District, Northern British Columbia, are to be developed, it is reported, under the supervision of a representative of the American Mining and Smelting Co. A party has already gone into the properties with supplies etc. and work will be started as soon as conditions permit. Referring to this and other Nine Mile Mountain prospects in his 1918 report J. D. Galloway, resident engineer, says: "There are a number of veins on these claims, varying from a few inches up to several feet in width and mineralized with galena, zinc-blende, grey-copper, stibnite, and jamesonite. The galena is, as a rule, high in silver content, while the stibnite and zinc-blende also carry some silver. The grey-copper occurs sparingly, but carries a high silver content."

Cowichan B. C.

The Ladysmith Smelting Corporation is reported to have acquired fourteen copper claims on Mount Sicker, Vancouver Island, from the Mount Sicker and B. C. Development Co. This is in line with recent activity in this long-deserted mineralized zone, development work having started some months ago at the Lenora Mine and being still under way. The object is to re-locate the Tyee vein. If this is successful, and the result is likely to be known in the course of the next two months, and ore of commercial quality and quantity is found on the claims which have just changed hands there is no doubt that the Ladysmith Smelter, which recently has been operated but intermittently, and at present is inactive, will be again heated and maintenance as a productive industry assured.

Vancouver B. C.

Arguing that the extension of the Pacific Great Eastern Railway from Prince George to Swan Lake at the eastern boundary of British Columbia will mean the opening up of a vast territory, rich in coal, oil, as well as other natural resources, members of the Vancouver Board of Trade at a recent conference impressed on Premier John Oliver and other representatives of the Provincial Government the desirability of forwarding this work with as little loss of time as possible. This railway now is under construction from Wiliams Lake to Prince George a distance of 100 miles. The distance from the latter town to Swan Lake is 300 miles. The first mentioned section will

be completed by January 1921 and Premier Oliver assured the delegation that the road would be carried to the boundary without delay, although he pointed out that it was a heavy financial burden for the Province to undertake the estimated cost being about $60-000 a mile. It was the Premier's hope that the Dominion Government to take the railway of the hands off the Province but, failing that, construction would be continued, it being appreciated that the country's natural wealth in minerals and agriculture warranted the expenditure.

At the annual meeting of the Vancouver Chamber of Mines officers were elected for the year 1920 as follows: Honorary President, Hon. William Sloan; vice-presidents, J. M. Lay and W. H. Hargrave; treasurer, William Godfrey; executive committee, C. E. Cartwright, S. J. Crocker, F. J. Grossland, G. S. Dawson, Major Fleck, B. G. S. Hawkins, Dalby Morkill jr., H. P. McCraney, N. Thompson, Prof. J. M. Turnbull, G. S. Pettapiece, Noble W. Pirrie, Dr. E. T. Hodge was selected as president vice A. M. Whiteside, who retired after serving for several consecutive years.

Salmo B. C.

John Waldbeser, President of the Iron Mountain Ltd., states that the new Mill has not yet been started and that water conditions may make a test run impracticable until next June. However this trial will take place as soon as weather conditions permit.

Slocan B. C.

High grade silver-lead ore is being raw-hided from the Republic Mine, Lemon Creek, to Slocan City, advantage being taken of a recent heavy snowfall for this purpose. Twenty-three tons of ore were shipped from this property in the early part of last year to the Trail Smelter from which good returns were obtained. The Republic is being operated by a syndicate whose headquarters are at Calgary, Alberta.

The Ottawa is another property from which ore is being taken for shipment over the snow to railroad. It, too, is situated in the vicinity of Slocan City.

The Meteor and the Neale Claims, both located on Springer Creek in the same section, are among other properties which are active this winter.

Campbell River, V.I., B.C.

An immense outcropping of low grade ore, carrying copper, gold, silver and lead, is reported to have been located on Buttles Lake, Stratheona Park, or, to speak more generally, almost in the exact geographical centre of Vancouver Island. Representatives of the Temiskaming Mines Co., Toronto Ont., have visited these claims, if which there are a number, the ore body being said to have been traced for miles. That the Temiskaming Company has taken a bond on this property from the Vancouver holders and that it is proposed to initiate extensive exploratory work without loss of time are other statements made by those interested The suggestion is that diamond drilling will be undertaken and that, if the surface indications are borne out by the disclosures of further development, Vancouver Island will have one of the biggest mines of the Province.

Until about a year ago Strathcona Park was under reserve by the Provincial Government for park purposes. No mining was permitted within its limits. The present Provincial Administration, however, removed ths restriction and since there has been much prospecting within the park area.

Victoria B. C.

The Steel Smelter Co., of Seattle Wn., has conclusively demonstrated that it is practical to produce pig iron economically from the magnetite iron ores of British Columbia, by means of the electro-thermic process. This is the positive statement of F. A. Pauline, a member of the Provincial Legislature who has interested himself specially in the development of the iron ore resources of the Provinece and who recently made a special trip to Seattle to inspect the plant of the company named. Mr. Pauline found one furnace, capable of producing five tons a day, in operation. He learned that a unit of four furnaces is being installed and that the management is looking forward to reaching the maximum output of this plant very soon. The ore is being brought from a property situated on the coast of British Columbia at a cost of from $3 to $4 a ton. The product is described by Mr. Pauline as being the finest grade of pig, fully equal to the product of Sweden. There seems to be no question as to market, local demands being sufficient to absorb all that the Company can provide.

R. A. Grimes, manager of the Slocan Silver Mines Ltd., stated to Hon. Wm. Sloan, Minister of Mines, that development work on the Company's property, situated on the north fork of Carpenter Creek, near Sandon B. C., had given extremely satisfactory results. A considerable amount of good milling ore, carrying substantial silver values, had been blocked out and a small lead of very rich ore had been struck. The prospects were such that plans were under consideration for the installation of a concentrating mill and other equipment.

It was to express his gratification with reference to the working of the Mineral Survey & Development Act that was chiefly responsible for Mr. Grimes' visit to the Minister of Mines. He declared that there was no doubt whatever that the Mining Engineers appointed under that Act were doing much for the mining industry of the Province. In his own case prior to the taking over of the Carpenter Creek Property a copy of a report written in 1917 by A. G. Langley, Resident Engineer, was procured. This was favorable and its terms were confirmed by a personal interview with Mr. Langley, who rendered all assistance possible, particularly in regard to advice and suggestions as to necessary development. Thereupon Mr. Grimes and his associates proceeded to acquire the prospect which then was controlled by the McAllister Mining & Milling Co.

COLLIERIES.

Once more the title of the Granby Consolidated Mining and Smelting Company to the Vancouver Island coal area which they are developing is being contested in the courts of British Columbia. The action has been brought by the Esquimalt and Nanaimo Ry. Co., against Charles Wilson and Angus C. McKenzie, who are executors under the will of the late Joseph Ganner, and the Mining and Smelting company.

To the Ganner estate belong much of the coal lands to which the Granby Company acquired title from the Province of British Columbia under the terms of the Vancouver Islands Settlers' Rights Act, 1904, Amendment Act, 1917. Since the acquisition of this property the Company has installed collieries at a point colloqually known as Cassidy's equipped with modern plant, and has built up a community which, in respect of the accommodation provided for officials and workmen, is considered to be a model, at an expenditure aggregating approximately $2,000,000. In the short space of little more than a year it has put the mines of Cassidys on a producing basis of about 700 tons a day. Depending on the coal from this colliery it has installed at its smelting centre, Anyox, B. C., where it is engaged in the mining and the smelting of copper ore, by-product coking ovens at a cost of in the neighborhood of $2,500,000. For these reasons the law suit referred to is of first importance to the Company and of much interest to the entire Western Canadian mining industry.

The Esquimalt and Nanaimo Ry. Co. ask the courts to declare that the Crown Grant issue by the Provincial Government to the defendants is null and void inso-far as it purports to grant coal, coal-oil, stone, clay, marble, slate, mineral and substances in and under the said lands and that part of the surface of such lands to which, or upon which, the plaintiff is entitled to exercise acts of ownership, purchase or rights to easement. An injunction also is sought restraining the defendants "their servants, agents or workmen or assigns from entering and working or mining for coal and other materials and substances and from registering or applying to register any title to the surface of the lands." The plaintiff also seeks a declaration that the plaintiff always has been the owner of the lands and damages against the defendants.

With reference to this case it is well to note that the Settlers' Rights Act of 1917, which was passed by the Provincial Government and under the terms of which the Crown Grants now assailed were issued, was disallowed by the Dominion Government in May 1918. The Grants in question were given after the passage of the Act and before the Federal Government disallowed it. The point, therefore, arises as to whether the Settlers' Rights Act of 1917 was legally operative during the period that lapsed between the affixing of the signature of the Lieut. Governor and the receipt of the formal declaration of its disallowance at Ottawa.

The One Big Union does not appear to be dead among the coal miners of Eastern British Columbia and the Province of Alberta. Recently the O. B. W. forces of Alberta met at Calgary and forwarded a resolution to the Minister of Labour, Ottawa, stating they were willing to accept the 14 per cent increase in wages awarded them, pending further negotiations on which they are insistent, and absolutely opposing the order of the Fuel Commissioner that the United Mine Workers of America shall be the workers' organization to receive recognition. On January 14th the miners at Coal Creek, Crow's Nest Pass Coal Company, refused to enter the mines because the President of the Fernie Local of the One Big Union was ordered off the miners' train for refusing to pay his fare. They were idle for a day and no further information is available as to further developments. As to the situation in the Province of Alberta a letter written by one of the O. B. U. officials on January 8th is interesting. He states that at the Western Gem, Monarch, and Brule Mines the operators have withdrawn the check-off, (the check-off was the system proposed whereby the management would with-hold from the men's pay their union dues forwarding the same direct to U. M. W. of A. headquarters). He also asserts that everywhere the O. B. U. is making headway against the forces of the U. M. W. of A. How much of the latter may be accepted cannot be said but there can be no doubt that the miners are divided in their union affiliations, that counter propagandists are emergetically at work, and that, meanwhile, the mines are on a productive basis with the assurance that there will be plenty of coal available for the imperative needs of the winter.

OFFICIAL ESTIMATE OF 1919 COAL PRODUCTION.

The official estimate of the coal production for British Columbia during 1919 places it at 2,504,423 long tons, of which 147,205 tons was made into coke, leaving the net production at 2,357,218 tons. These figures show a decrease as compared with 1918 of 74,301 tons gross and an increase of 54,973 tons net. The quantity of coke made was about 98,598 tons, which is a decrease of about 90,369 tons as compared with the previous year. The decline in coke production is explained by the very small output of the ovens of the Crow's Nest Pass Coal Co. It was affected in the first place by the long drawn out strike of the coal miners in the early part of the year and later by the closing down of the smelters of the boundary district.

The Provincial production of coal is summarized as follows:

	Tons of 2240 lb.
From Vancouver Islands Collieries	1,690,724
From Nicola and Similkameen Collieries	152,731
From Crow's Nest Pass Collieries	659,408
From Twelkwa Collieries	1,560
Total quantity coal mined	2,504,523
Less made into coke	147,205
Net quantity of coal produced	2,357,218

In addition to the above net production of coal there was made into coke the production shown as follows:

From Vancouver Island Collieries	43,517
From Nicola and Similkameen Collieries	nil.
From Crownsnest District Collieries	55,081
	98,598

It is observed that the coal mines of the Province have had a fairly good year but that there were some interruptions. Among the latter mentioned are the strike at Fernie, which closed the mines during June, July and August, work being resumed at the beginning of September, and the fact that the Vancouver Island mines, during the months of May, June and July, worked on slack time, losing a production of probably 160,000 tons.

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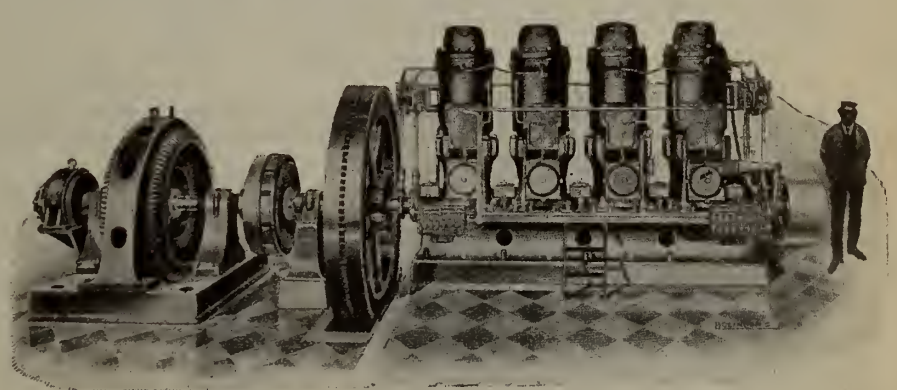

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THE LIMESTONE AND PHOSPHATE RESOURCES OF NEW ZEALAND.*

This admirable Bulletin was undertaken by the New Zealand Geological Survey at the request of the Department of Agriculture, which for the sake of the agricultural industry required a comprehensive report on the limestone deposits of the Dominion. Part 1 of the Bulletin, now to hand, summarises all the known information regarding the limestone deposits of New Zealand. It contains 316 pages of letterpress, with fourteen plates, six text-figures and two maps. Part II, which is to follow will not be so long, and will contain a general account of the plant and machinery used in the calcination and pulverization of limestone, followed by a description of the phosphate deposits of the country.

The scope of the monograh is ambitious, as will be seen from the following headings selected from the first chapter, which deals with general information regarding limestone and its uses, viz., the functions of lime in agriculture, the non-agricultural uses of lime, and the military importance of limestone and lime. The chemistry, geology, and economic utilization and treatment of limestone deposits are dealt with in great detail. Specific information as to limestone is given with regard to every known occurrence in New Zealand, and a notable feature of the monograph is the fine photographic plates of limestone occurrences, which not only are a fine collection of illustrations of the characteristic and often fantastic physical features of a limestone formation, but reveal incidentally that New Zealand is a country of much natural beauty. It is evident that the geologists who selected these photographs had not only an eye to topography, but a nice appreciation of the artistic values in a New Zealand landscape. The affection of New Zealanders for their country is not difficult to understand.

The monograph explains the property of lime to liberate plant foods from soil compounds, and the advantages to be gained from the use of ground carbonate of lime as compared with quicklime and slaked lime. The liberation of nitrogen by carbonate of lime proceeds more slowly, nor does the carbonate destroy the humus as quicklime does.

There are a number of concerns in Canada who are prepared to supply ground carbonite of lime for soil dressing. One firm that has done a good deal to educate the public as to the usefulness of ground limestone uses the limestone near Windsor, Nova Scotia, and it would appear that in many parts of Canada, where acidity of the soil is a great drawback, the use of ground limestone to correct the sourness might find a large field. Heavy clay lands are much improved in texture for agricultural purposes by the addition of quicklime.

*Note:—The Limestone and Phosphate Resources of New Zealand. (Considered pricipally in relation to Agriculture). Part 1. By P. G. Morgan. Issued by the New Zealand Department of Mines. Bulletin No. 22 (New Series).

OBITUARY.

E. Fred Wood.

E. Fred Wood, formerly Vice-President of the International Nickel Company, died suddenly at New York City on January 5th, in the sixty-second year of his age. Mr. Wood was born in Milwaukee on August 28, 1858.. He was educated in the public schools of his native city and later entered the University of Michigan where he was a brilliant student and graduated with distinction.

After leaving college Mr. Wood devoted himself assiduously to the study of metallurgy and in connection with his studies made extensive trips through the various mining camps of the West and lived for a year at Leadville and in other mining towns where he pursued his studies and obtained his practical experience. He later entered the employ of the Carnegie Steel Company and rapidly rose to the position of Assistant General Superintendent of the Homestead Plant, which position he filled for a number of years, and during the period of the big strike at the plant, when Mr. Frick was shot, Mr. Wood was in entire charge of he plant. He was looked upon by Mr. Carnegie and his associates as one of the valuable men of the organization and was one of the so-called "Carnegie Veteran Associates."

Because of the great reputation he had achieved he was invited to join the International Nickel Company, upon its organization, becoming First Vice-President of the Company and a member of the Board of Directors of its Executive Committee, and he was an important factor in developing the mining, smelting and refining business of the Company, so that from a small and unimportant undertaking it developed into the largest business of its kind in the world.

When the United States entered the World War, Mr. Wood resigned his official connection with the International Nickel Company to devote himself to public work, and became a member of the Committee on Production of the War Industries Board, of which Committee Mr. Samuel Vauclain, President of the Baltimore Locomotive Works, was chairman. Mr. Wood served continuously on this Board during the entire period of the war, without compensation

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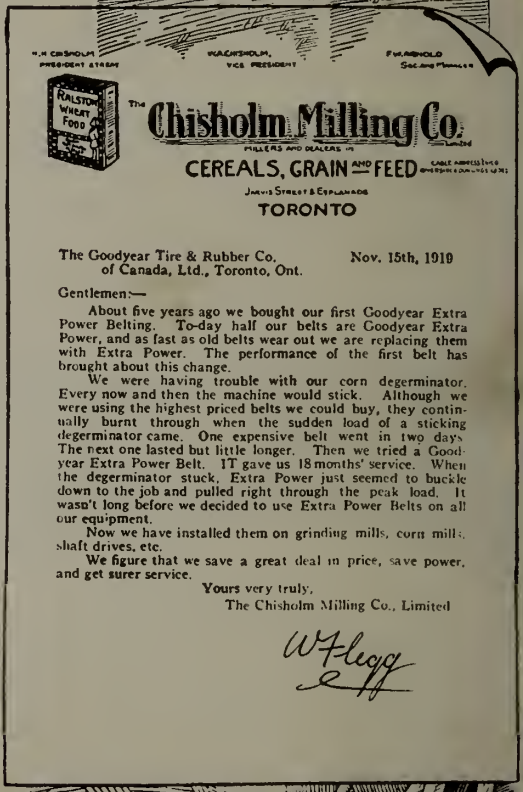

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We figure that we save a great deal in price, save power, and get surer service.

Yours very truly,
The Chisholm Milling Co., Limited

W. Flagg

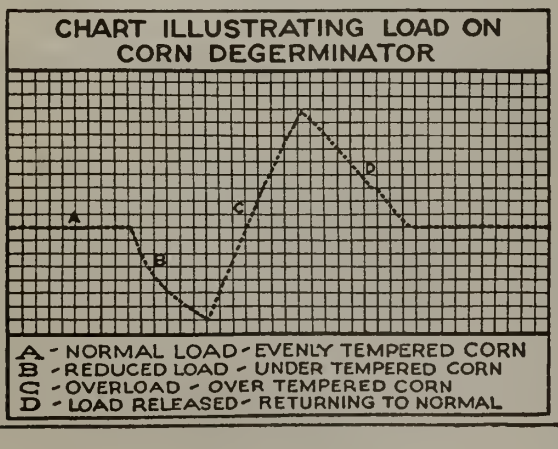
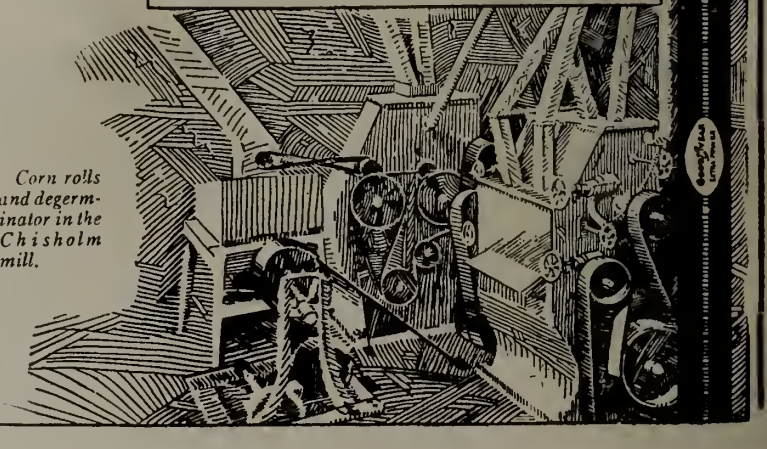


CHART ILLUSTRATING LOAD ON CORN DEGERMINATOR
A
B
C
D
A - NORMAL LOAD - EVENLY TEMPERED CORN
B - REDUCED LOAD - UNDER TEMPERED CORN
C - OVERLOAD - OVER TEMPERED CORN
D - LOAD RELEASED - RETURNING TO NORMAL



Corn rolls and degerminator in the Chisholm mill.

:-: EDITORIAL :-:

The Price of Silver

The decision of the Indian Government to fix rupee exchange at ten to the sovereign in place of the "gold exchange" rate of fifteen to the sovereign established in 1898 is interpreted by Mr. Moreton Frewen to mean that silver cannot fall below $1.29 per oz. because of the preponderating influence of the Indian price of silver upon the world price of the metal.

This action of the Indian Government adds another reason to the many that are causing the present unprecedented persistence of high quotations for silver, and it will prove to be one of the most important factors from the viewpoint of Canadian silver producers because it promises a virtual stabilization of silver at a value of approximately $1.30 Canadian money. The additional revenue which Cobalt shippers of silver are obtaining from payment in New York funds is, it is to be hoped for our general national good, a passing phase, but there is every reason to expect that a substantial premium on New York funds—which means of course a serious discount on Canadian funds —will persist throughout 1920 at least, and this will ensure good revenues to producing gold and silver mines for some time to come.

From the national standpoint there is today in favour of gold and silver production not only the promise of satisfactory financial reward, but there is the compulsion of necessity. During the war period, it was a moot question whether precious metal mining should be prosecuted with full vigor or not, and in the critical days of the war, our leaders may be forgiven if they had not the time to devote to thinking out the infinite complexities of currencies, and saw more clearly the necessity for men and guns. Today, however, the demand for bullion is insistent. Unfortunately, the effect of the war was to reduce the capacity for mines for output, and this is true of gold and silver mines, as it is also true of iron-ore and coal mines.

If the new production of precious metals will help our national credit, and the credit of Britain, as the most competent economists tell us it will, then every possible encouragement should be given by provincial and federal governments to assist production. Labour shortage is one long existing reason for restricted gold output in the Northern Ontario camps. If the Federal Government were to detail a competent person to study the labour situation it might be possible to find some means of supplying the existing deficiency of workmen.

It seems to us that Canada is singularly fortunate in having within her borders at this time natural resources of gold and silver, and it would also seem the obvious part of wisdom to augment production by every possible expedient. The quickest and most tangible results can be obtained by operating the larger and most dependable mines to the limit of their capacity, which means, in short, supplying them with enough workmen.

The Politics of the Technical Man

The Secretary of the Association of Technical Engineers in Great Britain in stating that the technical men are unlikely to make common political cause with the so-called "labour" party, expresses probably a fairly general attitude of technical men. Under this head are included a wide variety of workers, and the term is wide enough to cover all persons who by study and application of brain and hand have equipped themselves with a special knowledge of one branch of human endeavour. Most of these men have at some time felt themselves in revulsion against that form of "labour" propaganda which arrogates all the so-called dignity of labour to the man who works with his muscles. If the British labour leaders have felt it necessary to suggest an alliance with the technical men it reveals a tardy, if not a grudging recognition of the usefulness of the part played by the white-collared and black-coated person to whom in the past there has so often been allotted the thankless triple role of long hours of hard work, meagre remuneration, and denial of the "dignity" of labour.

If those who govern and direct the stabilizing influences of modern civilization, which are variously known as governments, capital and industry, have retained the backing of the technical men, it is solely because of the inherent common sense and the decent loyalty of these men, for they are the men who, in person and vicariously suffered the brunt of the hurt

occasioned by the war, and they are today shouldering the burden of reconstruction.

The technical men are unlikely to organize, except in associations for the study of their respective arts, and they are likely to remain inarticulate in political life, for they are primarily thinking men, and will wish to choose their political affliations by the free use of their brains and consciences.

There is however the danger that technical men, in both their lower and higher grades, will be impelled to organize for self-protection unless fitting recognition of their difficulties and aspirations are made. Indications of this tendency are not lacking in Canada, and while one young association is making "service" the keynote of its policies, it is useless to hide the fact that the genesis of this association, and others in other countries, lay in the necessity for technical men either to organize for self-protection, or suffer piecemeal disintegration of all their hopes and ambitions in life.

The trained technical man, with his analytic mind, and his desire to connect cause and effect in all that concerns mankind, is one of the first to detect the fallacies of such forms of group government as have recently become fashionable, and he is the last man in the world to support political organizations which have frankly announced economic aims for any one industrial group. He represents the commonsense of mankind, the saving sanity of decent men, and his vote, in the long run, will decide national policies. There are moreover, in the ranks of "labour" itself many men of this type, numbering amongst themselves the fathers or the putable fathers of men of the technical grade of workers.

"They do not preach that their only duties are spreading dissension and going on strike.
They do not teach that its square and decent to scamp their work as they damn well like.
They aim to uphold a mind of fairness, not class suspicion and social strife.
They too must think of making a living—but they sometimes think of making a life."

But—if the living is denied to men, then the herd instinct will surely show itself.

INDEX TO VOLUME 40.

Bound in with this issue will be found the Index to the issues of the "Journal" during 1919, being Volume No. 40.

The United States Senate has amended the Zinc Ores Bill to provide for an increase in the rate of cobalt from ten cents to twenty-five cents per pound.

THE FINANCING OF MINING ENTERPRISES.

By R. E. HORE.

Mr. Thomas Mulvey K. C., Under Secretary of State for Canada in a recent discussion on "blue sky" legislation made some statements that should prove interesting to those who wish to see the public take part in mining ventures. Mr. Mulvey has found that in many cases blue sky legislation has failed to prevent the licensing of certain companies which operated to defraud the public. He considers that the British law, the underlying principle of which is publicity is preferable.

There was last year prepared for the Ontario Legislature a bill of the "blue sky" class. Drafts of this bill were given some publicity and there was much criticism of it because it appeared that legitimate business was to be made more difficult. There was general approval of the endeavor of the framers of the bill to provide protection for the investor against fraud, but disapproval of the effect the bill would have on honest enterprise. Mr. Mulvey's opinion that blue sky legislation is not even successful in preventing fraud is worth noting in this connection. The bill was withdrawn at the last session not because it was not expected to ensure protection for the investor, but because its provision would have done more harm to industries than the framers intended. In aiming to make business safe, legislation was proposed that would make some desirable business impossible. Mr. Mulvey is evidently of the opinion that it would not even provide the safety that its proposers claimed for it.

For the successful development of a mine much work and money is necessary. The first essential is an ore deposit. There are many known undeveloped ore deposits and there are doubtless very many unknown. To find the unknown ones and to develop the known ones much money must be expended. When preliminary development gives satisfactory results, and profitable operation appears to be possible, very large sums of money are required for the necessary mining equipment and further development work.

If our material deposits are to be developed, we must first find where they are. This is the work of the prospector, and on his efforts the expansion of the mining industry very largely depends. The prospector has an arduous task and usually very little money. He knows that good ore deposits are not common and that he may search months and years without making an important discovery. Whether he will succeed or fail depends partly on his enterprise and largely on fortune. He lives in hope, facing hardships without certainty of reward. If, finally, he does find an ore deposit that looks promising, he cannot himself mine the ore and put the metal into merchantable form, for that requires money far beyond his means.

The ordinary prospector has little money and yet must be prepared to spend his time at work for which no one pays him wages. In most cases therefore he must be financed by some other person. Often he accepts a "grubstake", undertaking to share his interest in any discoveries made during a certain period with the person supplying his living and transportation expenses. Commonly the money, a comparatively small amount, comes from a personal friend of the prospector who has himself a modest but more certain income.

When a prospector makes what seems to him to be an important discovery, he and his partner find many difficulties confronting them. To obtain any reward from the success of the search they must find money to develop the deposit or sell it to some other person. In either case they must first give the discovery some publicity and induce others to examine it. Then follow negotiations and the claim or an interest in it is disposed of. The prospector's reward depends of course not only on the merits of the property but on his ability as a salesman. In a few cases the discoveries are so valuable that the prospector's fortune is made; but the ordiuary ore deposits are, when first discovered, of such doubtful value that very large sums are not often obtainable for them. In most eases the sum realized for discoveries is a modest one which permits the prospector to take a holiday and then to return to his work in the wilds, without the need this time of financial assstance. If fortune smiles on him he makes another find before he has spent his "stake".

The purchaser of the prospector's claim may be one who shares the hardships of pioneer life and who intends himself to dovelop work on the property or to personally supervise the work. Some supply merely the necessary money and delegate the work to others. In either case the success of the venture is very uncertain. Frequently the development work proves unsatisfactory and the time and money spent on the property yield no return. In some cases however results are considered satisfactory and then heavier expenditures are undertaken.

It is often at this stage in the history of a mining property that an appeal is made to the public to invest money to provide mining equipment and do development work. In view of the fact that a large amount of money is needed to bring the ordinary property to the producing stage, public stock offerings are not only necessary but desirable otherwise we would be dependent on a few wealthy men or companies for the expansion of the industry and the average man would be unable to take part in the venture. The uncertainty attaching to mining ventures is of itself a good reason why the risks should be shared by many.

In the interests of the mining industry, which must have more money from the public for its development, the transaction between mining companies and the public or between mining brokers and the public must be above reproach. The promoters of a mining company are unable to state with any degree of accuracy what the capitalization should be. The fixing of some figure is however, required, and some large round number like $1,000,000 is commonly chosen. The capitalization therefore bears no necessarily fixed relation to the value of the property. It would prevent some misunderstanding of the par value of shares was not fixed, but the common practise is to require this. The proper capitalization on an earning power basis obviously cannot be determined for a company whose mining property is in the prospect stage.

In some cases the treasury stock is sold in large blocks to brokers who in turn sell to the public. Some companies sell their own to the public in small lots directly or through agents working on a commission basis. Much might be said in favor of either method. The latter method involves much greater head office expenditures and a selling staff, but allows the company to sell stock at a higher price than might be obtainable for large blocks. The operator might have had little experience in selling shares, however, and then he naturally turns to brokers, who make it a business.

The development of mineral resources in Canada, as in other countries, requires large sums of money. Those who supply the money must have confidence that their money will be wisely spent, for there are risks enough in the venture in any case. To gain the confidence of the public every endeavor should be made to inform the shareholders of the progress of the work. Publicity is desirable and should be insisted upon by shareholders.

THE ENGINEER AND THE PUBLIC.

In an address to the Engineers' Club of Philadelphia, on January 20th, George Otis Smith, Director of the U. S. Geological Survey dealt with engineering as prosperity insurance. He pointed out that the engineer is an insurance agent of the first magnitude even if he does not talk like one. "Conservation, whether of material or of energy, is engineering, and the policy which a few years ago began to attract public attention is really as old as engineering. The truth is that we needed thrift on a national scale before we began to realize it, and conservation or national thrift therefore became a popular issue. The task is growing larger and more critical, however, as the years pass, and it places a large civic duty upon the engineer. In his role of insurance agent the engineer has not only to plan but to execute, yet in putting his plans into effect he must depend upon popular support. The public must be educated in its use of resources, and the engineer must therefore also function as a teacher."... "No type of citizen, is better fitted to tackle the civic problems of today than the engineer. The large questions before the people are economic questions, and engineering is mainly applied to life in an economic way."

In urging American engineers to take a prominent part in public affairs, Mr. Smith appeals to their interest in the general welfare of their country. He believes that it is in the power of engineers to be of greater service to the community by assuming more of leadership in public opinion so that raw materials and energy will be used to greater advantage. It is not enough to know what should be done. The general welfare is not promoted by secretiveness and exclusiveness. The engineer has duties in addition to those which he owes to his employers.

There has been during the past few years much discussion among Canadian engineers along the lines of Mr. Smith's address. The engineer's potential power for public service is well recognized. Possibly he might learn something from other insurance agents. Mr. Smith says he does not talk like one

R.E.H.

The anunal meeting of the Mining Society of Nova Scotia is expected to be held in Glace Bay on May 4th and 5th.

Nickel Ore Mining In Sudbury District

ONTARIO, CANADA

By W. L. WOTHERSPOON.

The Geological Survey reported finding Nickel in the Sudbury District as early as 1853, up to which this section of the country was little seen by the white man, with the exception of the officers of the Hudson Bay Company and the Geological Survey, whose travels were confined more to the immediate vicinity of the lakes and rivers, and little was known of the minerals of the district.

The country, although broken by rocky ridges, was well wooded but extensive forest fires raged throughout the district in the thirties and forties, destroying heavy timbers and leaving vast tracks of dead pine standing like grim sentinels, with little or no undergrowth.

Following these fires, second growth timber sprang up, but similar fires raged from time to time resulting in the rocks being exposed to the action of the weather, which soon attacked the ore where exposed and converted it into gossan.

The presence of mineral was first shown during the construction of the Canadian Pacific Railway in a cutting on the main line about four miles from Sudbury, (now Murray Mine), and later in a cutting on the Soo branch of the C. P. R. about twenty-five miles south-west from Sudbury, now Worthington Mine.

In the summer of 1885, New York interests had a shaft sunk in one of these ore exposures, and a small quantity of copper-ore was obtained, but in quantities not considered for a paying mine and the property was abandoned.

The prospecting in the district dates from 1884, among the pioneers being Thomas Frood, R. McConnell, Henry Ranger and James Stobie. Mr. Frood discovered some promising looking properties in the spring of 1885, and with other associates began development work on a field in the Township of Snider, known as the McAllister Mine. The prospected were reported encouraging for a paying copper mine, and in 1886 this property was visited by Lady MacDonald, in company with a party of Montreal capitalists, among whom were W. C. Van Horne, Sir George Stevens, and Sir Chas. Tupper. In honour of the visit the name of the mine was changed to the Lady MacDonald Mine, afterwards McArthur No. 5. Prospecting was also done at other points, the most notable being by Thomas Frood and associates at McKim, and by R. McConnell in the Township of Snider.

Until the end of 1885 only prospecting had been done, and copper was the only metal of commercial value known to exist in the district. During 1885 Mr. S. J. Ritchie of Akron, Ohio, visited the district and took over several properties, and during the winter of 1885-86 the Canadian Copper Company was formed to operate these properties, among them being the McAllister, now Lady McDonald Mine, the McConnell Mine later known as the Copper Cliff Mine and part of the Frood or No. 3 Mine.

The Evans Mine was then discovered and was purchased by the Canadian Copper Company in September 1886. The Stobie Mine was also discovered, the Canadian Copper Company acquiring same in July 1886, when a railway was built from Sudbury to the Mine, a distance of four miles.

The Canadian Copper Company began prospecting and developing several properties about this time, work being begun on the McConnell or Copper Cliff mine. An open cut was made which exposed ore which consisted of pyrrhotite and chalcopyrite, but the pyrrhotite was considered valueless the presence of nickel not being suspected.

Several hundred tons of picked copper ore were shipped during 1886 to New York, upon the treatment of which the presence of nickel in the ore was discovered.

Prospecting was continued at the McAllister and at the McConnell mines, and a vertical shaft was sunk on the Evans Mine.

R. McConnell then discovered mineral in Denison Township, and sunk several test pits and stripped the surface, exposing ore; this property later being known as the Victoria mines, now owned by the Mond Nickel Company.

In October 1886 the southern half of lot 7, Con. 6, McKim, (part of Frood or No. 3 Mine), was purchased by the Canadian Copper Company from Thomas Frood, P. C. Campbell and Robert Tough for the highest price reported to have been paid up to this time for any mining property in the district.

The year 1887 did not show any marked increase in mining activity, beyond a few further discoveries, the principal difficulty being that a practical method for the treating of nickel ores had not yet been discovered.

The Canadian Copper Company secured the services of Dr. E. D. Peters, who went to Copper Cliff in July 1888, and planned and erected the first smelting plant in the district, which consisted of a roast yard, one 100-ton Hereshoff smelting furnace with blowing engine pumps, etc., which furnace was blown in on December 22nd, 1888; a nickel and copper matte being produced containing from 15 to 20% nickel and 20 to 25 per cent copper. A second furnace was added early in the summer of 1889.

Spurs were completed from the Canadian Pacific Railway tothe Copper Cliff and Evans Mines in September 1888, and ore was brought from Copper Cliff, Evans and Stobie mines to the roast yards, near the smelting plant at Copper Cliff. The ore from the three mines differed somewhat in character, that of Copper Cliff carrying a relatively high percentage of copper, but all the ores consisting of intimate mixtures of pyrrhotite, chalcopyrite and pentlandite.

The ore from the Stobie mine is fairly free from rock and carries a much smaller percentage of chalcopyrite than Copper Cliff ore. It was found that the Stobie ore, although lower in nickel and copper, carried more iron, and aided the smelting operations, the excess of iron assisting the fluxing quality of the other ores.

In 1889 other mining and smelting companies entered the field. The Dominion Mineral Company

Cupola Building in the Port Colborne Refinery of the International Nickel Co.

opened and developed the Blezard and Worthington mines and built a smelter in 1890 a short distance from the Stobie mine. The Blezard mine was closed down in 1893, the Worthington mine in 1894 and the smelter in 1895. The property was purchased in 1913 by the Mond Nickel Company who are again operating the Worthington mine.

In 1889 the Murray mine was secured by the H. H. Vivian Company, of Swansea, Wales, and a mining and smelting plant was erected in 1890. This property was worked about five years and then closed down. The property was sold in 1912 to the Dominion Nickel Copper Company, now the British-American Nickel Company, who have built a large mining and smelting plant.

In 1891 the Drury Nickle Company acquired the Chicago mine in Drury Township and built a smelter there. It was closed down in 1892, but was worked again for a time in 1896-7 by the Trail Mining Company.

The Nickel Copper Company of Ontario, (promoted by the Late John Paterson), built a small plant near Worthington and a refinery in Hamilton in 1900. The Hoepfner and Frosch refining processes were tried in turn, presumably without success, as the plant was closed down in 1901 and some time later the holdings were sold to the Dominion Nickel Copper Company, (now the British-American Nickel Company).

In 1900 the Great Lakes Copper Company built a plant at Mount Nickel near Blezard mine, to try out the refining process of Aubon Graf of Vienna. This failed and the Company closed down in 1901.

The Lake Superior Corporation, operating the Gertrude and Elsie mines, built a smelter at Gertrude in 1902 which closed down in 1903. This property was also sold in 1912 to the Dominion Nickel Copper Company. Other nickel mines operated without any smelting plant being erected, were as follows:— Algoma Nickel Company, Township Lorne, 1891, Sheppard Mine, Township Blezard, 1891, Gersdorffite Mine, Townshrip Denison, 1891, Trillabelle Mine, Township Trill, 1894, Sultana Mine, Townships Trill and Drury, 1900.

This review covers the situation generally up to the year 1900.

The Mond Nickel Company was incorporated in 1900, and The International Nickel Company in 1902, the latter embracing as subsidiaries The Canadian Copper Company, The Vermillion Mining Company, The Anglo-American Iron Company, etc., and the Oxford Copper Company with its refinery at Bayonne, N. J.

Since 1900 the history of the nickel production is confined to the story of these two companies, by far the largest part of the production, however, going to the credit of the latter company.

The British-American Nickel Company has a mining and smelting plant at Nickelton near Sudbury, (on the old H. H. Vivian property), and a refinery at Deschenes near Ottawa, both nearly completed.

The International Nickel Company of Canada, Limited, was incorporated in 1916. This Company, with head office in Toronto, has a $5,000,000.00 refining plant at Port Colborne, Ontario, completed about two years ago, and is amalgamated with the former

Canadian Copper Company, which has large mining and smelting plants in Copper Cliff, Ontario, and vicinity, and is now known as the Mining and Smelting Division of The International Nickel Company of Canada, Limited.

A large capital investment has been distributed over the many branches necessary for the success of the industry, including mining, smelting, refining, exploitation and sales, each department of which has a history of its own which would make a long story.

A general description follows of the work done by The International Nickel Company, Limited, in connection with the development of the largest nickel mine in the world, namely, Creighton mine, located about eight miles from Sudbury, in Northern Ontario, from which the major portion of the ore is obtained for its current operations.

The ore is located on the Company's holdings on the South Range of the Sudbury nickel belt. The ore consists of pyrrhotite, with chalcopyrite and pentlandite, together with some gangue material which is generally basic.

The ore deposit is a massive body and for some years mining was done by the open pit or quarrying methods, but during the last ten years has taken place at depths which have now reached about 1,200 feet, and the earlier methods of mining have been replaced by a system of main levels from which the ore is mined in underground chambers, or stopes, and hoisted to the surface through a large incline shaft.

The capital investment in Creighton Mine, (aside from the ore deposit), including machinery, equipment and housing for employees, amounts to many millions of dollars. The expenditure covers such items as many miles of diamond drilling to a maximum depth of 2,000 feet for exploration work necessary to prove the existence and amount of ore in the mine, and, in addition, to give information to the Company's mining engineers for the design and layout of the main shafts and system of mining to be adopted.

A general idea of the efficient methods of mining of mining and the large expenditure involved will be appreciated from the following:

The main shaft is an incline of 55 degrees, has five compartments, two being used for hoisting ore in skips, two for transportation of men and material in specially designed cages, while the fifth compartment is used for pipes, such as compressed air and water mains, electric cables for power and lighting, and a ladderway for emergency use by employees. The shaft has at present a total depth of 1400 feet the section dimensions being about 45 feet by 8 feet.

The hoisting of ore is now from a station having a vertical depth of about 1000 feet, the capacity being about 5000 tons per day, working 16 hours. The shaft connects with several main stations in the mine from which levels consisting of drifts and crosscuts are made through the ore body in order to carry out the development of the mine and give haulage facilities between the stopes and main shafts.

Three main levels have tracks of 45 lb. steel rails, the ore being hauled in trains of automatic side-dumping type steel cars of four tons capacity hauled by electric locomotives. These cars dump the ore into a large underground storage chamber of 100-tons capacity which in turn connects with a crusher

Nickel Finishing Building, Port Colborne Refinery, International Nickel Co.

station for the purpose of reducing the ore from the large pieces as mined to about six inches in size before being loaded in the 7½ ton skips from measuring pockets for hoisting to the surface.

On account of the massive nature of the ore which is extremely tough and heavy, extra heavy crushers have been designed with 42 inches by 30 inches jaw opening, and each operated by two 100/H.P. electric motors. These crushers were made in sections, to permit taking down the shaft, the total weight of each machine being about 25 tons.

The underground workings have electric light and fresh water supply for drinking purposes, and in addition special attention has been given to ventilation There are at times as many as 200 rock drills in use, all operated by compresed air, generated in a compressed air power station at the surface, the air piping system being distributed to all the working places in the mine by the use of approximately ten miles of steel pipe of varying sizes from two inches to sixteen inches in diameter.

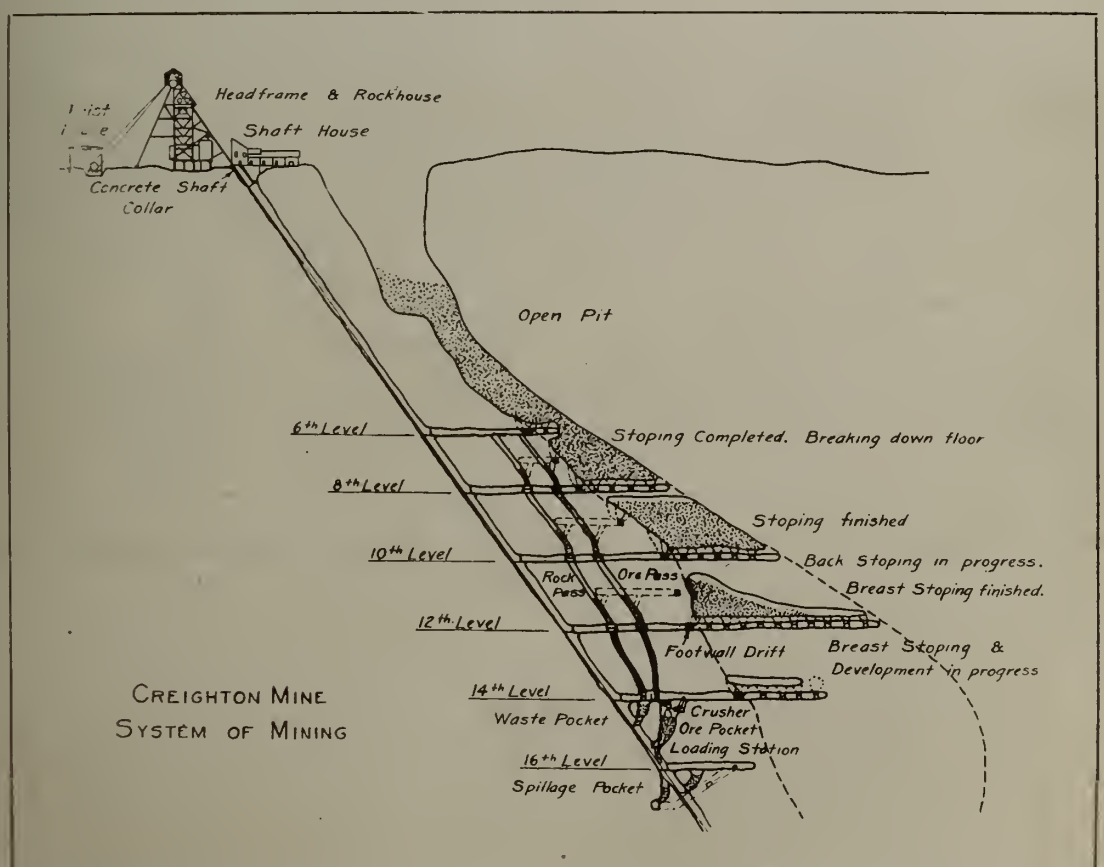
The underground equipment also includes pumps, operated both electrically and by compressed air, for the handling of mine water, and there are many other important items, but the reader will be particularly interested in the surface equipment and machinery which has been designed, erected, and placed in operation successfully during the last five years.

There are many important mining districts in America and in Canada, but there will not be found anywhere a more complete equipment than at Creighton mine. All machinery is operated by electric power, generated in the Company's own hydro-electric station at High Falls, 26 miles away, being transmitted at 34,000 volts. This power is used at the mine for hoisting engines, air compressors, locomotives, pumps, lighting workshops and sundry service, and even to the heating of the buildings during the winter months when temperatures as low as 20 degrees below zero occur.

The main hoisting engine has a 1500 H/P motor and is capable of hoisting nine tons of ore at a speed of 2500 feet per minute, and on account of the motor load being as high as 3000H/P for a few seconds at the start of each hoisting trip, the engineers have installed the most modern systems of electric drive known as the Ilgner'' system, in order to take care of this extremely large variation in the use of power. The ''Ilgner'' system utilizes for the equalizing of the power a large fly wheel weighing fifty tons and is connected to a converter set driving the hoist motor. In operation this wheel absorbs and gives out power in such a way that the motor driving the hoist has a steady load.

There are special high tensile steel cables used for hoisting the ore, men and material from the mine. At present it is not necessary to operate the hoist at more than 1500 feet per minute, but in years to come when the mine has reached greater depths the speed will be greater in order that the increasing quantities of ore can be hoisted in a minimum time.

There are other hoisting engines used solely for handling men and material. The men who work underground are transported in special man-cages so that thirty men can be handled per trip. There are in addition four large electrically driven air compressors, three of which have motors of 1000 H/P each.



Diagramatic View of Mining System of the Creighton Mine of the International Nickel Co.

The shaft house or rock house is an immense steel structure 145 feet high, containing about 1600 tons of constructional steel. This huge structure, believed to be one of the three largest shaft houses in the world, is enclosed with hollow tile on account of the climatic conditions in this district. It is in this structure that the ore delivered from the skips, after being hoisted by the massive engine, gravitates through rock crushers and screens on three floors and is classified to various sizes on rubber sorting belts from which the waste rock is removed by the pickers. An electric elevator is installed for handling men and material, and ore storage facilities are for 4000 tons, steel bins being arranged so that ore and waste rock is discharged directly into 50-ton hopper bottom railroad cars.

The mine equipment includes blacksmith shops where a large number of steel sharpening machines are in use, together with steel hammers, forges, steel plate rolling machines, etc., etc., so that all repairs to mine cars, skips, cages, ets., are made at the mine. Machine shops containing lathes, shaping, drilling and milling machines, drill presses, etc., and an up-to-date carpenter shop are provided, and owing to an immense amount of stores and supplies being necessary, special facilities for storing have been made, the arrangement for the storage and handling of explosives having received particular attention.

The comfort of employees is provided for in a well laid-out town, with modern houses owned by the Company and rented on a favourable basis. Water supply and sanitation is under direct supervision of a resident medical officer, who is also responsible for the health and physical examination of employees.

Connected to the main shaft by a covered passageway is a large change house for 1700 men, containing individual steel lockers, shower baths and other conveniences, with hot and cold water service, so that every employee has the opportunity of leaving work refreshed from the day's labor.

A modern club house, well equipped for recreation and amusement, together with facilities for sport, and a school house with qualified teachers have also been provided by the Company.

Map of the Sudbury Nickel Area showing location of mining properties referred to in foregoing article..

How to Recover Added Millions from the Mines of Cobalt

(By J. A. McRAE, COBALT.)

As further evidence in support of the fairly general belief among the mining operators of Cobalt that a merging or consolidation of various of the mines is to become fairly general is last week's announcement in The Canadian Mining Journal that the Trethewey mine has been sold to the Coniagas Mines, Limited. All signs point to the likelihood of the Conagas being one of the companies which may become active in this respect.

..As regards the financial status of the company it is an excellent position to carry out a policy of absorption of other properties. This is also true as regards mining and milling equipment. The annual statement from year to year which shows the cost of producing silver at the Coniagas to compare favorably with the best records in the Camp is conclusive proof of the efficiency of the management, and serves to show that the system of ore handling and treatment must necessarily be of the highest order.

View No. 1 being a general view of the Coniagas, forms only a limited idea of the size of the mining and milling plants. In the foreground is the main shafthouse and mill, but the mining plant as well as the oil flotation plant is concealed in the background owing to the situation of the buildings making it difficult to secure a photograph of the whole.

to the shareholders of the companies involved. It is a practice that should be beneficial to the purchaser and the vendor alike, in that it offers an opportunity for the company owning a mine which may be pretty well worked out in itself and therefore a source of much worry and but little revenue, to sell its property at a substantial cash price, and at the same time it offers an opportunity for the purchasing company to add to its acreage and volume of low grade ore, which, combined with its own brings the whole to a point sufficiently large to maintain a high degree of efficiency and the attendant higher margin of profit. In a word, worked singly and with a multiplicity of managerial staffs the mines of any camp in the days when mill heads become low will be compelled to close at a much earlier period in their life than is the case where they become merged into one large operation and under the expense of but one management.

In view No. 2 is shown the mill situated on the Trethewey mine, and which now also becomes a part of the Coniagas.

As to what companies will play a leading part in the process of absorbing other properties would be difficult to estimate at this time. The Nipissing, with some 840 acres situated in the heart of the Cobalt Camp appears destined to be a fixture even without

No. 1—General View of Coniagas Mine.

No. 2.—Trethewey Mill.

In the purchase of the Trethewey mine, the Coniagas acquires an additional 43 acres of mining lands situated adjacent to its own property which comprises some 40 acres, and thus increases the whole to 83 acres.

On the Coniagas, work has been carried to deeper levels than on the Trethewey, but it is now proposed to extend the Coniagas workings onto the Trethewey and drive a raise into the main workings of the latter property. Once this work is completed it will be possible to considerably increase the volume of ore available for treatment in the plant of the Coniagas, and with the elimination of dual management and with very little extra overhead expenses, the added margin of profit should be considerable. That this tendency toward the absorption of the smaller properties by the larger and well equipped mines will result in a greatly reduced cost of operation seems certain, and promises to add to that extent to the benefits accruing

becoming involved in any consolidations. The Mining Corporation of Canada already owning the Townsite, City of Cobalt, Cobalt Lake, and having recently purchased control of the Buffalo as well as a lease on the Foster appears determined to stick with the camp to the end. The Northern Customs Concentrator in the purchase of a part of the Chambers-Ferland, as well as consolidating with the Bailey-Cobalt and the acquiring of a lease on the Silver Cliff appears also to have big ambitions in this direction.

It is in the case of the activities of the Coniagas and the Mining Corporation of Canada, however, that the careful observer is found turning with a great deal of interest and in regard to which, sooner or later, one of the biggest consolidations in Cobalt may reasonably occur. In this I refer to that entire ridge extending from the McKinley-Darragh mine on the South, to the Hudson Bay Mine on the North. This ridge includes the McKinley-Darragh, the properties of the Mining

Corporation inclusive of the Buffalo, the Coniagas as well as the Trethewey and the Hudson Bay. It also includes that part of the Nipissing lying to the West of the railway as well as the Chambers-Ferland, Right of Way, and the original property of the La Rose.

In dealing with this chain of properties, all of which have produced a large volume of high grade ore in which are maintaining their output by treating medium grade ore, I have in mind the belief that they will some day all be a part of one enormous consolidation. As to this, I have discussed the matter with some of the best informed mine managers in the Camp and they have readily concurred that the idea of a large mill, possibly with a capacity of two thousand tons daily located somewhere along this great ridge and operated at a minimum of expense under one management would add many millions of ounces to the final production record of the Cobalt camp and would result in added millions of profit to the operators.

The fact is that in various parts of this enormously rich strip of territory, there are sections that could actually be quarried out and treated provided equipment sufficiently large to treat such a volume of ore were available. To treat this enormous tonnage of low grade ore in small parcels in small mills could not be carried out on a commercial basis, but to include the whole in one giant operation would make it possible to reduce the cost per ton treated to a point where the margin of profit would be very satisfactory. A merger of this description would include every producing mine situated along the west side of the railway. In years to come it might not be unreasonable to suppose that even the Nipissing might also figure in the scheme which is already presenting itself as desirable to mines where the resources of high grade ore are gradually becoming exhaustd.

Below is a somewhat long-range view showing a part of the North end of this ridge. The high shaft house is that of the Coniagas while at the opposite end of the picture are the buildings of the Trethewey. North of the Trethewey lies the Hudson Bay, while South of the Coniagas lie the long chain of properties, which belong to the Mining Corporation of Canada. On the East lies a part of the Nipissing and farther over the Chambers-Ferland, Right of Way and La Rose.

No. 3.—"The Ridge," showing the Coniagas and Trethewey Mines.

Our Northern Ontario Letter

THE SILVER MINES.

During the past week the silver producing mines of Cobalt have received as high as $1.60 an ounce for their silver. The reason for this rapid jump in price is not due to an upward movement in New York quotations but is brought about by the rate of exchange between Canada and the United States.

With silver quoted in New York at $1.34½ an ounce, and with United States funds at a premium of 18 p.c. at the time of writing, the Canadian producer is actually receiving $1.59 an ounce for silver. Old Canadian silver coins, minted on a basis of silver at $1.29 are rapidly disappearing from circulation. These coins, figured in 1000 parts are made up of 925 parts silver and 75 parts alloy.

It will be recalled that the Canadian Government at the beginning of this year decided to reduce the silver content of new coins to 800 parts silver and 200 parts alloy. With the rate of exchange operating unfavorably in addition to possible further increases in New York quotations for silver the question may arise as to whether or not the proportion of alloy in the new coins will constitute an adequate safeguard against these sufficiently unscrupulous to resort to the melting pot in the work of mutilating the Canadian piece for its silver content, which in turn may be marketed in New York at the high price plus the premium on U.S. money.

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The Crown Reserve Mining Company during 1919 produced $223,034 a gain of $25,000 as compared with 1918. The net profits for the year amounted to $77,.330 as compared with $6,756 during the preceding year. Optimistic reference in the report is made to other properties in which the company is interested. These include the Porcupine Crown mine at Porcupine which the Crown Reserve controls, as well as the Canadian-Kirkland property at Kirkland Lake on which the Crown Reserve holds a working option and on which work is now being prosecuted.

The Mining Corporation of Canada proposes to carry out a limited amount of exploration work on claims acquired last fall in the township of Butt, district of Nipissing. The work will probably consist chiefly of surface prospecting in an effort to explore the possibilities of commercial deposits of radium-bearing ore. It will be recalled that considerable attention was attracted to that district late last summer on the strength of a report that radium-bearing ore had been found, which was later confirmed by Cyril Knight, geologist for the Ontario Bureau of Mines.

The Kerr Lake continues to produce upwards of 100,000 ounces of silver monthly, thus indicating an output at the rate of about 1,250,000 ounces a year. The January output amounted to 108,000 ozs. With costs for 1919 having averaged under 41 cents an ounce, and since having perhaps risen to around 45 cents an ounce (owing to the high price of silver entitling the workmen to a bonus), it is evident that at present the company is realizing over $1 an ounce on its silver output. Should this continue throughout the year the net profit would amount to about $2 a share on each of the company's 600,000 issued shares.

The Directors of the Coniagas Mines have under consideration an option on the Gamble-Thompson group of properties in the Gowanda silver area. Provided the deal goes through, arrangements will be made to commence exploration work this month. The claims in question are situated in the Miller Lake area.

On February 2nd the Trethewey-Cobalt Company received $100,000, this being payment in full from the Coniagas Mines Company for the Cobalt mine of the Trethewey Company. Further reference as to this is made on another page of this issue of the "Journal".

It is learned that the management of the Temiskaming mine plans to submit the annual report about the last week in February. From the available information it would appear reasonable to expect that an increase in ore reserves will be shown. Also, that net earnings for 1919 were adequate to take care of the 4 p.c. dividend paid last month, without drawing from the surplus of $900,000 with which the year 1919 was commenced.

The deal for the Dodds property, situated at the Leroy section of the Gowganda district has been closed. Exploration work will be commenced by the new holders within the next month or so.

Your correspondent has received the following statement from Premier E. C. Drury, in reply to a request for an expression of opinion in regard to the possibilities in regard to the Gowganda district being provided with railway accommodation this year:

"The matter to which you refer is under consideration, but at the present time, I am unable to express an opinion on the question. It is a matter of such importance that I should not express an opinion until I have fully gone into the facts of the case and had an opportunity to view it from all angles."

The above statement appears to be an admission that the government is as yet undecided in regard to authorizing the Canadian Light Railway Construction Company to proceed this spring with the building of a light narrow-gauge line, in that if the government had decided to let private interests proceed it would scarcely be itself considering the extension of the Elk Lake branch of the T. & N. O. as urged by mine operators. The situation has given rise to the fear that the Ontario Government by lack of decision may discourage the private enterprise, and itself finally fail to take definite steps to provide the desired accomodation. In the meantime it is learned that an application will be made to the Legislative Assembly of the Province of Ontario at the next session thereof for an act to incorporate the Northern Light Railways Company with the following powers:—

"to construct and operate light narrow gauge railways with steam, electricity or other motive power, from a point at or near the Elk Lake Branch of the Temiskaming and Northern Ontario Railway adjoining the Town plot of Smythe, in theDistrict of Temiskaming, thence in a south westerly direction through the Township of Roadhouse and Lawson, thence in a south westerly direction through the Township of Nicol, to a point in, at or near the Town plot of Gowganda, and with Branch lines proposed as follows:—(1) Commencing at a point on the Elk Lake Gowganda line in the township of Nicol. Thence in a northerly direcrow connecting with the established gold mines in the township of Powell known as the Fort Matachewan Gold Mining Area.

(2) Commencing at a point on the Elk Lake-Gowganda line in the township of Nicol, running in a westerly direction through the townships of Nicol, Milner and Tynell, in the District of Temiskaming, and McMurchy in the Distict of Sudbury, and connecting with the mines in the township of Churchill known as West Shining Tree Gold Mining area. And a loop line commencing at a point on theT.&N.O. Railway at or near Swastika station in the township of Teck, running in a north earserly direction through the township of Teck and the Kirkland Lake Gold Mining area, thence in an easterly direction through the townships of Lebel and Gauthier, thence in a southeasterly directrion to Larder Laks in the township of Hearst; thence in a southerly direction through the township of Hearst near Lake St. Anthony in the township of Skead; thence in a westerly direction through the township of Skead and in a north westerly direction through the townships of Catherine and Boston at a point or at near Boston Creek Station on the T. & N.O. Ry. and other railways that may be built; with bonding powers and with such other powers as are usually given to Railway Companies."

In connection with the development of the Gowganda district it is interesting to note that nine out of ten of the concerns operating in that field are doing so on behalf of previously financed mining companies or with private capital and that stock promotions are playing but a very small part in the financial requirements of the camp. The situation is regarded as highly favorable and one that lends strength to the camp. One reason for this is that funds of the above description are usually handled

with greater care than where they are a part of a campaign of stock selling. Also, that money of this kind is only spent upon property of outstanding merit, whereas that in less stable concerns may be spent any place where a spectacular showing may be made as a temporary advertising medium.

As an instance of one unfavorable influence of the decline in British sterling exchange those companies with head offices in the Old Country, endeavoring to spend money in the development of mining properties in this country.

On the Dickson Creek property, located about half way between Haileybury and New Liskeard, the main shaft has reached a depth of 200 feet. This will be continued to a depth of 300 feet. The head office of the company is in England.

Ore and Bullion Shipments.

During the week ended Feb. 6th, two Cobalt companies shipped an aggregate of three cars containing approximately 233,612 pounds of ore.

A summary follows:—

Shipper	Cars	Pds.
McKinley-Darragh	2	170,412
La Rose	1	63,200
Totals	3	233,612

On Saturday the Nipissing sent out 75 bars containing 100,365.97 fine ounces of silver bullion. At the present high price of silver, plus the high premium on United States money for which the silver is sold, it is probable that the shipment had a value of around $155,000.

THE GOLD MINES.

The gold mines in this country find themselves in the favorable position of receiving the equivalent of a very substantial premium on their gold. In the past week when United States money rose to a premium of 18 per cent. the mining companies of Porcupine found themselves free to dispose of their gold in New York and instead of the standard value of $20.67 an ounce they received 18 per cent. additional, this premium amounting to approximately $3.70 an ounce.

While the premium is merely the result of unfavorable trade balances and therefore subject to more or less rapid fluctuation, and while there is no doubt the exchange rate will lessen within a reasonably short time and finally be brought back to normal, yet for the next few months it may prove to be an important factor operating in favor of the producers of gold.

The monetary problems of the greatest nations of the world appear to have reached a state bordering upon demoralization. That as in other things the British Empire as well as France will in due course recover their financial status is certain. At the same time, the period of readjustment promises to be slow and the premium on United States money mal reasonably rule high for considerable time to come. For this reason, mine operators of Northern Ontario look forward to the receipt of a substantial premium for their product for at least some months.

Mining men who had given the matter careful thought appear to be convinced that the crest of high prices had been reached. "I believe that the twelve months immediately before us will be marked by a collapse in the price of material and a big decline in wages", said a conservative mining man to the writer. "Should this reach proportions of money-panic", he said, "it will be a pity, for many will suffer; but, as for the gold mines, it is a thoroughly recognized fact that a money-panic and a gold producing mine is one of the finest combinations known."

The Hollinger Consolidated is treating around 2700 tons of ore daily. It is now understood that the present equipment is adequate to treat 3000 tons when at full capacity instead of 3500 tons daily as indicated in previous unofficial estimates. With mill heads averaging around $9 a ton, and treating 300 tons daily, the rate per annum would be 1,095,000 tons treated and $9,855,000 produced or approximately 492,750 ounces of gold. Receiving payment in American funds which are at a premium of 18 per cent. and therefore equal to a bonus of $3.70 an ounce, the added revenue on one year's output would approximate $1,822,175. Of course, this 18 per cent. basis of calculation is not permanent, but the importance of the exchange situation is in this way emphasized. The fact is that even if exchange drops to half that of the present the income of the Hollinger will still be enhanced by several hundred thousand dollars for the year 1920. As regards costs of operation it is understood that during 1919 they were reduced to $4.31 as compared with $4.93 in 1918.

At the Dome where production is running between $2,000,000 and $3,000,000 annually, and at the McIntyre-Porcupine where an output of not far under $2,000,000 is being recorded, it can readily be seen that these mines will also derive large benefits from the exchange situation.

It is learned on good authority that the McIntyre will not drop its option on the Plenaurum property, but, rather, will seek another extension of time. Water troubles as well as a shortage of labor were unfavorable factors during the past year, and the general impression appears tobe that the Plenaurum control will grant the requested extension of time.

The mill of the Dome Lake is once more in operation, the first clean-up since resuming work having been made during the past week. A force of between 40 and 50 men are now employed and the mill is treated between 60 and 70 tons of ore daily.

Sinking operations have commenced at the Porcupine-Keora. For the time being, this work is being done with hand steel and progress is consequently not rapid. However, by the time the steam mining-plant is installed, the work will have been carried to a point where the sinking of the shaft to the 300-ft. level may be rapidly carried out.

At the Clifton-Porcupine mine the main shaft has been completed to a depth of 225 feet and average values are stated to have been uniform to that depth. At the 200 ft. level a warking station was cut and drifting both north and south is under way at that depth on vein No. 7. Crosscutting east to cut the downward continuation of veins 5 and 6 as well as the Boulder vein is under way. It is estimated that these veins will all be cut with about 120 feet of undergroundwork. Owing to vein No. 7 having contained uniform values to a depth of 225 feet it is reasonable to expect that the other veins which con-

tain good ore at surface may also be found to show up well at depth. It is officially announced that the mining plants is to be used at practically full capacity, and that if the work of the next three or four months continues to be favorable, the question of installing a mill during the coming summer will be gone into.

In the Kirkland Lake district the scope of operations continue to broaden. Whereas a year or so ago the active section was confined to a two-mile strip of territory running from the Elliot-Kirkland to the Tough-Oakes and only a claim or so in width, this has no wbroadened out to a mile or so in width and gives promise of extending several miles in length.

In connection with the development of the Ontario-Kirkland property (formerly the Hurd group, it is learned officially that for a distance of 100f eet along the vein recently encountered at a depth of 300 feet the ore body has averaged $20 a ton for the full width of the drift, and with the vein still strong in the West face of the drift. It is also stated that the two other veins have been encountered recently, being known as veins A. and B. Vein A. is only twenty feet north from the rich vein above mentioned and is stated to be highly mineralized and containing visible gold. At the time of writing the average gold content has not been determined by assaying. Drifts have been commenced on veins A. and B.

At the Lake Shore, Kirkland Lake and the Teck-Hughes production continues at normal rate, and development work it being attended with favorable results.

In the Boston Creek district, the usual activity continues. The shaft on the Kennedy-Boston has reached a depth of 85 feet and is completely timbered. It will now be carried to the 100-ft. level where a station will be cut and a contract for drifting will be let.

The Catherine Gold Mines is planning the purchase of a mining plant consisting of a boiler, compressor, hoist and corresponding equipment. This will enable the management to make more rapid progress in developing the very promising veins which occur on the property. Sinking will be resumed as soon as a plant can be secured and installed and it is expected that this equipment wil be taken to the property before the snow is off. A small sawmill is now in operation on the Catherine property, and sufficient lumber for shaft timbers, building material, etc., will be sawed before spring.

On March 1st, J. A. Hough will retire from the service of the Department of Mines after having served for thirteen years as mining recorder in the Larder Lake and Swastika division. A successor for Mr. Hough has not yet been named.

The War Veterans in the district of Temiskaming are urging the Minister of Mines to give preference to the appointment of a returned soldier to fill the vacancy on the staff of mining inspectors caused by the death last fall of A. H. Brown. It is pointed out that not a few returned men can thoroughly qualify, having had previous practical experience as well as having a knowledge of engineering, and that the appointment would be made on merit. The request is regarded with general favor throughout the North.

WAGE ADJUSTMENTS AT THE NOVA SCOTIA COLLIERIES.

The adjustment of wages at the colleries in Nova Scotia has made fair progress since the New Year. A number of Conciliation Boards have been appointed to deal with the questions as they stand at issue between the separate companies and their workmen, and, owing to the fact that the mineworkers are now all members of the United Mine Workers of America, it has been necessary for the individual Boards to arrange their meetings seriatim so as to permit of the U. M. W. Executive Board being in attendance.

The Dominion Coal Company and its workmen have agreed upon a complete revision of the wage schedule, particulars of which are given in this issue, in so far as they relate to day-paid rates. There have been some not unusual difficulties in getting the individual locals to ratify the agreement made by the Executive on their behalf, but these difficulties have existed chiefly in the imagination of the newspapers who have assiduously striven to create the impression that serious trouble was brewing among the employees of the Dominion Coal Company. As a matter of actual fact, the leaders of the U. M.W. have driven the most advantageous bargain for the workmen that was ever driven, nor should it be forgotten that the increased wages earned by the mineworkers does not affect the price of workmen's coal, which stays at $1.50 per ton; or the house rentals, which are probably the lowest in North America today. If the Secretary of the United mine Workers in America never has any harder task than to defend the text of the latest agreement with the Dominion Coal Company he will not complain.

The Conciliation Board appointed to deal with the wages of the Nova Scotia Steel & Coal Company's workmen is in session, and its duties have been enlarged to include the collieries in the Inverness field.

In the Pictou Field, the demands of the mineworkers has called forth from the Manager of the Acadia Coal Company a remarkable statement of the position of that Company, a position, which it may be remarked has general application to the coal mines of Nova Scotia, and an even wider field. The statement is as follows:

"During the past few days we hav· discussed with the representatives of our employees the question of advancing certain datal rates and have tentatively intimated that we would be willing, in case an agreement is arrived at, to make certaln concessions as a compromise.

"The Acadia Coal Company expected to be able to make these concessions without any increase ln the price of coal to the public. We would try to do this by a policy of economy and would expect to have assistance and good will of all our employees who would enjoy the benefits of these concessions.

"We have been asked to discuss the question of an advance in certain contract rates. We can only reply that any advance in these rates, be it ever so small, would make it necessary for us to increase in proportion the price of coal to the public. An agreement between ourselves and our employees to increase the present contract rates is in effect an agreement that would compel the public to pay more for coal otherwise we cannot exist.

"We believe such an agreement to be an unsound method of settling these disputes, and we desire to set out briefly for the information of our employees, the board of conciliation and the general public, the reasons why we believe no such increase should be made.

"First.—The average daily earnings for contractors is now $5.83 while in 1914 it was $2.99, an increase of 95 per cent. In addition to this, our employees are provided with houses at low rents and with coal at $1.20 per long ton, privileges which are equal to not less than 55 cents per day. Both in wages paid and in the percentage of the increase our employees compare favorably indeed with coal miners anywhere in Canada or in the United States, and this, in spite of the undoubted fact that the Pictou coal seams have been among the most difficult to work at any profit. We think also that they compare favorably indeed with the men in any other industry.

"Second.—The price of coal is not increasing. It is decreasing. We are actually selling coal today for 95 cents less than in 1918. And the price of coal today is hardly 80 per cent. greater than in 1914 although wages have increased 100 per cent. We do not know that we can get an increase in the price of coal from many of our customers. We may be driven out of certain markets. Local industries may be unable to operate and we and our employees (if we agree to demand an increase in the selling price) may find ourselves eventualy met by a lack of orders, broken time and other difficulties.

"Third.—No industry can prosper which does not have a decent regard for the community to which it sells its product. To meet together and agree to charge more to the public for coal, without regard to the merits of the question is economically unsound. For these reasons we will not take the responsibility of agreeing to any increase, nor will we make any agreement behind closed doors which will make it necessary for us to forthwith increase the price of coal to the public."

There has been very general belief that coal owners can increase wages and absorb the increased cost of production without increasing the cost of coal to the public. In the United States this misconception almost led to a mandate from the U. S. Government to increase wages without increasing selling prices. Under these circumstances, Mr. Notebaert's complete expose of his Company's dilemna is important. There is no leading branch of industry in Canada today that is so unremunerative as coal-mining to the operators. This statement is made advisedly. The profits of the coal and steel companies in the past few years have been made out of steel manufactnre, and not out of coal-mining. The unremunerative character of coal-mining is a condition that affects all collieries in Canada, east and west, and there is only one way by which mineworkers can be given increased wages, namely, by passing that increase along to the consumer.

The public is indebted to Mr. Notebaert for his frank statement.

Col. Walter Karri-Davis, well-known to the mining fraternity of the Pacific Coast, has been visiting British Columbia, familiarizing himself with present conditions. He expressed much interest in the recent developments in the Portland Canal section of the north.

Joseph Errington, the mining engineer who is interested in the exploration and development work now underway at Aspen Grove, near Kamloops, B. C., denies that the Temiskaming Company, of Toronto, Ont., with which he is associated, has acquired any interest in the large low grade property staked on Buttle's Lake, central Vancouver Island.

Mr. C. J. Coll, formerly General Manager of the Acadia Coal Company, and later General Manager of the Cape Breton Coal Iron & Railway Co., at Broughton,, Cape Breton, has been appointed General Manager of the Minto Coal Co., at Minto, N.B.

CORRESPONDENCE FROM BRITISH COLUMBIA.

Victoria, B. C.

A meeting of Coal Mine Operators was held at Calgary over the week-end. January 24th to 26th, to discuss the wage question and also the matter of the "check-off," which already has been described as being a method set out in an order issued by W. H. Armstrong, Director of Coal Operations, by which the men's union fees were to be deducted from their pay cheques and the aggregate amount forwarded to the U. M. W. or A. headquarters. This was designed as a means of circumventing the One Big Union and was by way of being a *sine qua non* to the receipt by the men of a 14 per cent increase in their wages. Word from the coal fields, however, indicates that many of the men refused to accept this condition. It is said that as many as 5,000 took this stand. Rather than face a walk-out in mid-winter a proportion of the Operators ignored the Armstrong order and the men are being paid at the advanced rate, without the deduction of union fees. At the Coal Operators' meeting referred to no way was discovered out of the dilemma and no action, apparently was taken.

An interesting action to those connected with the coal mining industry in British Columbia was mentioned in the courts a few days ago. It is known as Hodgson vs. French, Elliott, Hamilton and Dunsmuir. On the occasion in question an application was made for the dismissal of the case but it was not allowed. Edward E. Hodgson, it appears, is asking for a portion of the $1,000,000 commission paid to Messrs French, Elliott, Hamilton and Dunsmuir, as a result of the sale years ago of a large block of Vancouver Island coal lands. In 1912 an action was started by Hodgson in which he claimed one-third of the commission. Subsequently he brought another action in which no amount was specified. Counsel for the defendant sought to have the latter phase of the litigation set aside as he could not see the idea of starting a second action before the first was settled.

Counsel for the Pacific Coast Coal Mines, Limited has left for Ottawa to appear before the Supreme Court of Canada in re Wellington Collieries and Canadian Collieries (D), Ltd. vs. the Pacific Coast Coal Mines, Ltd. This is a suit brought by the Wellington and Canadian Collieries for the recovery of $85,009 damages for alleged trespass by the Pacific Coast Coal Co. on their Vancouver Island coal properties. In the Supreme Court of British Columbia the plaintiffs were successful but in the Court of Appeal (Provincial) the decision was reversed. The Willington and Canadian Collieries now have taken the suit to the highest court of Canada where, of course, it is being combatted by the defendant Company.

Coal lands near East Princeton are being developed by the Harvard Coal Company a re-organization of the United Empire Company. James Gray, an experienced miner, is the superintendent He has only some fifteen men employed at present but is said to be meeting with good success. Small coal shipments are expected in the course of a short time.

Alexander Ewart, a pitt boss in the Middlesboro Coal Mines, was murdered on the evening of the 19th of January. Ewart returned to assist in straightening out some trouble the rope-riders were having with the cables. He had just reached his objective when a

masked man stepped in from the darkness and discharged two revolver shots at him from point blank range. Ewart was killed instantly. The murderer, picking up a lamp, which subsequently was discovered in the mine, made his escape. While an arrest of a suspicious character has been reported there is no certain evidence that the man responsible is in the toils. Ewart was a well-know and highly respected citizen. He was a member of the Masonic Lodge and had served for several terms on the aldermanic board of the City of Merritt. He had been engaged in the coal mining business in the Province for some years.

Samuel Matthews Robins, for many years a prominent figure in connection with the coal mining industry of British Columbia, died on the 4th of November last in Devonshire, England, where he took up his residence after the Vancouver Island Coal Company's holdings on Vancouver Island passed in to the hands of the Western Fuel Company. This happened in the year 1901. It was in 1884 that he took charge of the old Company's business in this Province, making his home at Nanaimo, B. C. He is well remembered by all the old timers of that City and the miners who worked under him have nothing but praise for their old boss. Pursuing an energetic programme of development the properties were made highly productive. The workers, too, were contended. The late Mr. Robins always gave them a hearing and, while his word was law, it was not passed before both sides of every story were weighed. He was fair and just in his balancing of the scales as between employer and employed with the result that there was little of the bickering that has been so common in latter years and the then little mining town flourished.

Stewart, B. C.

Native silver is reported to have been discovered on the crosscut being driven on the E. Pluribus Claim, William Noble, superintendent of the development work in progress, being credited with bringing samples of the same from the property to the town of Stewart. The Big Missouri Group, to which this claim belongs, has been considered to be an immense low grade proposition but, if information from the North can be accepted, recent work has disclosed ore carrying high silver values.

According to statements made in Seattle, Wn., Governor Riggs, of Alaska, has left for the Eastern United States with a view to interesting the American authorities in the question of obtaining more adequate transportation facilities for the town of Hyder, which is situated on the seaboard of Alaska and is one of the gateways to the Salmon River mineral zone. He is quoted as expressing confidence in the future of the district to which the Premier Mine has been chiefly responsible for the attraction of general attention and interest. The Alaska Territorial Government, cooperating with the Forestry Service and the Alaska Road Commission, is to have a road completed up Salmon River, across American territory to the British Columbia border by next summer. It is proper to interpolate here that the British Columbia Government has expended a considerable sum in the construction of a road from Stewart to Hyder and in the building of a road from the American boundary to the mines. More expenditure, it is likely, will be authorized this year for the further improvement of the avenues of transportation on the Canadian side. To return to Governor Riggs, he is credited with saying that this American road will permit silver ore being brought to Hyder for transportation to the smelters. He also is quoted as being dissatisfied because the American Steamship Lines do not touch at Hyder while the vessels of the Grand Trunk Pacific Steamship Co. do so at regular intervals.

Grant Mahood, of Stewart, is reported to have takne a very rich specimen of silver ore from the Divide Group, situated in the Salmon River section, about a mile and a half from the Spider Prospect.

Kamloops, B. C.

Application for the extension of the charter of the Kettle Valley Ry. to permit of the construction of a branch line into the Aspen Grove Mining Properties, which now are under development, is being made at Ottawa. The same railway company is applying for authority to build a branch to tap the Coalmont Coal Mines. The latter has been operated on a small scale recently, its output being transported by motor truck to railhead. With railway connection no doubt the production will be increased.

Princeton, B. C.

H. R. Van Wagenen, General Manager of the Canada Copper Corporation, who has been spending the winter at Denver Colo., with his family, is expected to return to Princeton early in February to take personal charge of the Company's preparations for the opening of the mine and mill at Copper Mountain and Allenby respectively.

Nelson, B. C.

The Prospectors' Association of British Columbia is growing in strength rapidly. Branches are springing up in different parts of the Province, organizations have been launched at Prince Rupert, at Cranbrook, as well as at Nelson and others being promised for other centres. The intention is that these various locals shall affiliate and a central executive selected whose headquarters shall be at Nelson. At a recent meeting of the Nelson Association resolutions were adopted as follows:

To petition the Railway Companies and the Railway Commission for special transportation rates on small shipments of prospectors' ore.

To ask Consolidated Mining and Smelting Company for a special smelting rate on such small shipments.

To advocate the establishment of ore testing and sampling plants and free assays.

To advocate the furnishing to prospectors of powder at cost.

To advocate the establishment of a winter school of mines at Nelson under the British Columbia University.

To oppose the section of Engineers' Incorporation Bill which would compel foreign mining corporations to retain local mining engineers.

To advocate the application on assessment work under the Mineral Act of expenditures by prospectors or miners on trail or cabin building.

To advocate that reports of district engineers be made accessible to owners of properties dealt with by said reports.

To advocate a division of the Eastern Mineral Survey District or the appointment of an assistant engineer under A. G. Langley, the present Resident Engineer.

To advocate that where partners of overseas soldiers allowed their half interests in mining properties to lapse, while the government retained the soldiers' interests intact, the delinquent half interest be made over to the returned soldiers.

Officers named in the application of the Association for incorporation are: President, J. W. Mulholland; Vice-President, Cecil E. Crossley; Secretary, Fred. A. Starkey; Treasurer, Dr. F. E. Morrison; Directors, James Miller and M. C. Monaghan.

Development of the Mountain Chief Mine at Renata continues with satisfactory results. After taking 423 tons of ore from the upper workings J. W. Evans, the manager, has started to sink from the bottom of the shaft. There has been a considerable addition to the mine plant during the last few months, notably a two-drill compressor and a power hoist.

Kimberley, B. C.

A shoot of silver-lead ore, samples from which have assayed between $101 and $103 for the total metallic content, has been encountered by Robert B. Durrant while tunnelling on a gold-bearing quartz ledge on Perry Creek. This galena ore body in a quartz ledge is not the chief feature of the property and Mr. Durrant proposes driving to 100 or 120 feet depth to ascertain whether the ore body persists and, if so, to gain stoping ground.

Slocan, B. C.

The Silver Bell is reported to be showing up very satisfactorily on further development. A new find is announced as a result of a raise from the lower tunnel. It consists of 12 inches of mixed ore, through which more or less clean ore is scattered. The indications become better as the work progresses. The Silver Bell has about 1,000 feet of work in its two tunnels and raise, the latter opening into ore about midway between the tunnels. The property has been operated continuously since August 1918 last year shipping 135 tons of ore. New cabins have been constructed with accommodation for twenty men and a crew of fourteen now is engaged in taking out ore, four cars having been shipped since sleighing began. R. F. Green, M.P. and S. H. Green, of Kaslo, are the owners.

Trail, B. C.

Some additions as well as remodelling is underway at the Trail Smelter of the Consolidated Mining and Smelting Company. A supplementary drafting office is being provided for the use of a staff of about twelve draftsmen who will be engaged in connection with the new concentrating plant which, it is expected, will be erected at Rossland. As far as can be learned the site of this Mill has not been definitely decided as yet, there still being a possibility that it will be placed at Trail, owing to the difficulty as to the obtaining of a satisfactory water supply at Rossland.

Sixteen properties shipped ore or concentrates to the Trail Smelter during the week ending January 14th, the total being 6,510 tons. Included in these were three of the Clarence Cunningham properties, the Queen Bess, at Three Forks, and the Wonderful and Richmond-Eureka, at Sandon. For the first two weeks of the year a grand total of 12,214 tons have been shipped to the smelter, which is considered an excellent start.

Golden, B. C.

The Castledale Mine at Castledale, a copper property on which development work has been done to the extent of about 50 feet of tunnel and 60 feet of drift, is reported by C. H. Rowley, the superintendent, to be showing up well. He says that ore carrying between 15 and 20 per cent copper has been struck but the extent of this body will not be known until development is carried further.

Vancouver, B. C.

C. Camsell, in charge of the British Columbia Branch of the Geological Survey of Canada, is quoted as being of the opinion that the airplane should prove of much assistance in the exploration of the vast areas of northern Canada of which little is known. As a means for the transport of travellers and supplies to points almost inaccessible under ordinary conditions he considers the aeroplane of first importance. He states that, as far as the geological survey can learn, there are one million square miles, practically one-third of Canada, which has never been traversed by a white man. The greater part of this territory lies between the Rocky Mountains and the Hudson's Bay to the north of the provinces of Saskatchewan and Alberta. British Columbia, with the exception of a strip in the northeast section, has been examined and authenticated by geologists. Mr. Camsell spoke of the hydroplane as being the most suitable form of an airplane for the work in mind because, as the northern part of Canada is broken up by many lakes and rivers, there would be little difficulty in finding good mooring. In support of the suggestion it was pointed out that under present conditions geologists spent much of their time in travelling to the point marked for exploration. On one of his recent trips he left Edmonton in May and the party was absent for five months, six weeks of which period was devoted to the work in hand. Their destination then was Athabaska Lake, which is only a comparative short flight from Edmonton. With the development of the airplane during the war, and its present reasonable cost, Mr. Camsell thought it might be well that the proposal be given consideration. Mr. Camsell also referred to the loss of a number of the members of the staff of the Canadian Geological Survey, who have taken positions with a private Company, stating that their loss probably would mean the curtailment of this season's work.

Victoria, B. C.

It is definitely announced that the Consolidated Mining and Smelting Company of Canada has taken over the Jordan River properties, Vancouver Islands, known as the Sunloch Group. These have been under development for some time, about 1,000 feet of crosscutting and drifting and 300 feet of diamond drilling having been done. Besides this there has been constructed some 6,000 feet of automobile road. A four drill compressor plant has been installed and new building erected. A track also has been laid from the mine to the waterfront. The Consolidated Company is expected to pursue development energetically and it is possible, although no official announcement has been made, that, with confirmation of the belief that the Sunloch is to become a large producer, a concentrator will be installed. It has been known for some time that the Consolidated Company was interested in this property but not until now has a definite statement been authorized.

TORONTO NOTES.

Preparing for the annual convention of Canadian Mining Institute

(From Our Toronto Correspondent.)

Arrangements for the annual meeting of the Canadian Mining Institute to be held in Toronto on March 8, 9 and 10, were well advanced at the meeting of the Toronto branch last Saturday. Assistant Secretary Rose was present, and during the meeting a provisional program for the convention was drawn up and read. It will, of course, be subject to changes, but as it stands now the program provides for a full and very interesting three days. The first day will be devoted to an address of welcome, the President's address and the presentation of mineral statistics by John McLeish, T. W. Gibson, T. C. Denis and W. Fleet Robertson. Papers are expected from O. C. McKenzie, B. Geikie Cobb, W. H. Collins, F. E. Lucas and others.

At the Tuesday and Wednesday sessions time will be given to a consideration of the coal and oil resources of Canada when among the speakers will be J. T. Stirling, W. J. Dick, F. W. Gray, editor of the Canadian Mining Journal, W. B. Lanigan, freight traffic manager of the C.P.R., O. E. S. Whiteside, A. McLean, Edgar Stansfield, M Y. Williams, T C. Bosworth, Dr. R. C. Wallace, J. G. Ross, Professor Baker. Papers are expected to be read before the Iron & Steel Section of the Institute dealing with the manufacture of alloy steels in Canada, the new plate mill of the Dominion Iron & Steel Co., in Sydney, and the general question of fuel economy in steel plants. It has been arranged that J. A. Campbell, M.P., will speak at the evening dinner on the closing day.

The local committees have charge of the arrangements for entertainment, these to include luncheons, dinners and possibly a dance. It was decided at the meeting to send representatives to the Joint Committee of Technical Organizations. This Committee has been about three years in existence and was originally appointed to give the engineers an opportunity to help the Government in war work. It has been reorganized on a peace basis now. James McEvoy was appointed representative of the Toronto branch of the Canadian Mining Institute on the Committee.

Vickery & Co., a mining brokerage firm doing business at 56 King Street West, Toronto, has made an assignment and a meeting of creditors revealed what appeared to be assets in the neighborhood of $1200 as against $40,000 liabilities. The firm carried on a business mainly on margin, the stocks dealt in being chiefly of Northern Ontario properties.

Sir John Carson, in his address to the shareholders of the Porcupine Crown ines, Limited, in submitting the annual report, pointed out that development had proceeded on the Canadian Kirkland, one of the company's options, despite the fact that they had been hampered by labor troubles, and good progress had been made. According to the annual report, surplus had been reduced $54.166, bring the account to $224,610 and comparing with an addition in 1918 of about $13,-000. Mine operating account, development, etc., during the year, totalled $46,736.

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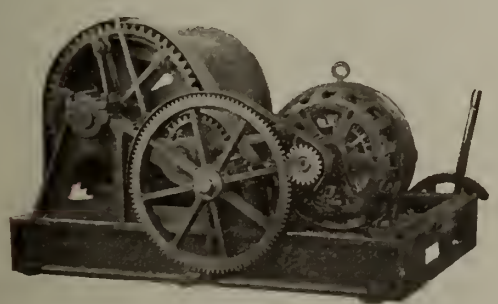

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Schedule of Wage Rates and Classification agreed upon between the Dominion Coal Company and those of its employees who are members of the United Mine Workers of America.

1st Jan. 1920.

AT THE COLLIERIES

Surface.	Per Day
Headman (attending man cage or coal hoisting cage where men are lowered and dumping cage-man	$ 3.75
Tally boys (boys taking tallies out of empty boxes)	2.40
Tipple men, unhookers and grabmen, at head of slopes.	3.50
Bank and screen-men (including men reading off tallies at weigh scale)	3.50
Car shunters and trimmers (including box car trimmers)	3.35
Pit tub oilers,	3.30
Pick men	3.30
Hoisting enginemen (including shafts and main trip haulages)	4.60
Man enginemen, shafts	4.60
Man enginemen, slopes	4.30
Main endless haulage	3.95
Fan enginemen (steam engine) Nos. 2 and 9.	4.00
Fan enginemen, other large engines.	3.80
Fan enginemen, small engines and motor fans.	3.55
Screen and bank mechanic, (No. 2)	4.00
Others	3.80
Box car enginemen	3.75
Brook and reservoir pumpmen	3.80
Compressor men (with oilers)	3.85
Compressor men (doing own oiling)	4.50
Compressor men, oilers	2.85
Head stokers	4.00
Stokers.	3.80
Ash wheelers and coal to fires	3.40
Convey men	3.70
Machinists, 1st grade.	4.00
Machinists, 2nd grade	4.00
Machinists, apprentices (boys)	2.80
Electricians.	4.05
Smiths, 1st grade	4.30
Smiths, 2nd grade	4.00
Smiths' helpers.	3.40
Carpenters, 1st class.	4 05
Tubmen and 2nd class carpenters	3.80
Masons	5.60
Masons' helpers	3.25
Teamsters (double team)	3.50
Teamsters (single team)	3.40
Stablemen, (per month)	110.00
Washhouse and boiler tenders	3.50
Washhouse tender only	325
Lamp room men (monthly) No. 2	120.00
Lamp room men (others)	100.00
Lamp room men (daily)	3.80
Lamp room boys	2.80
Laborers.	3.25
Underground	
Examiners and shot firers (by night.	4.50
Examiners and shot firers (by day).	4.25
Boss drivers	4.00
Drivers, rooms	3.60
Drivers, levels	3.40
Pit stablemen.	3.60
Haulage enginemen (main deeps and main haulage)	3.80
Haulage enginemen, levels	3.55
Haulage enginemen, headways and small donkeys.	3.35
Trip riders, main deep and main and tail rope haulage	3.80
Others	3.55
Air loco drivers	4.00
Air loco brakemen	3.70
Spraggers	3.40
Rollermen.	3.80
Couplers	3.40
Pit tub oilers	3.40
Landing tenders (datal)	3.70
Onsetters (hoisting cages) headmen	4.00
Onsetters' helpers	3.70
Jig and balance onsetters	3.50
Brakeholders	3.30
Cage runners	3.80
Man cage onsetters (Nos. 2 and 9	4.05
Man cage onsetters, others	3.75
Rope examiners and splicers	4.25
Bratticemen	3.60
Trappers, men.	3.35
Trappers, boys	2.29
Roadmakers (main track and turnouts.	4.25
Roadmakers, others	4.00
Timbermen.	3.75
Pumpmen (capable of doing ordinary repairs).	4.00
Shartmen	5.00
Material men	3.40
General laborers	3.35
Assa. examiners	3.35
Asst. shotlighters	3.60
Machine repairs	4.00
Pick men, No. 2	4.25
Pick men, others	3.70
Pick boys	3.00
Miners (taken from the face to do other work)	4.50

Railway and Machine Shops

Classification	Rate per hour
Loco fitters	67.0
Loco. fitters helpers	44.0
Shop sweeper	40.0
Machinists	
Chargehand.	72.0
Machinists	67.0
Machinists' helpers	44.0
Scale repairmen	67 & 63
Tool-room keepers	44.0
Grab fitters	50.0
Wheel pressmen	50.0
Drillers	67.0
Drillers' helpers	44.0
Stokers	50.0
Compressor tenders	28.0
Pattern makers	67.0
Carpenters, wood machinists and wagon repairmen	62.0
Blacksmiths, 1st grade	67.0
Blacksmiths, 2nd grade	60.0
Blacksmiths' helpers	44.0
Boilermakers.	67.0
Boilermakers' helpers	44.0
Iron workers	62.0
Tool dresser.	67.0
Bolt threader.	50.0
Car Repairers	
Chargehand	67.0
Repairmen (steel cars)	62.0
Repairmen (wooden cars)	62.0
Painters	
Passenger cars, freight cars, etc.	62.0
Car oilers	44.0
Tub shop.	
Chargehand	55.0
Tubmen.	50.0
Tinsmiths	62.0
Head fitters, Glace Bay roundhouse.	72.0
Head fitters auxiliary roundhouse	67.0
Fitters, 1st class	67.0
Fitters, 2nd class	60.0
Fitters' helpers	44.0
Cleaners	44.0
Boiler washers	65.0
Sand dryers	50.0
Ash pit men	50.0
Car inspectors	60.0
Laborers	40.0
Moulders, 1st class	67.0
Moulders, 2nd class	60.0
Moulders' helpers	44.0
Brass moulders	67.0
Cupola tenders	62.0
Chippers	44.0

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:-: EDITORIAL :-:

Nationalization of Mines

The King's Speech at the opening of the Houses of Parliament in London recently forecasted legislation for the acquirement by the State of the coal royalties in Britain, designed to settle the questions affecting the coal industry on "an enduring basis." Mr. Wm. Brace, representing the Miners' Federation, moved an amendment to the reply to the speech from the Throne regretting "the absence of any proposal to nationalize the coal mines of the country along the lines recommended by the majority of the members of the Royal Commission on the Coal Industry." Mr. Lloyd George, in the discussion which followed Mr. Brace's motion definitely aligned himself and his associates against nationalization of coal mines as understood by Br. Brace, and with the genius to epitomize a situation which marks this distinguished tribune of the people, said it was impossible to have nationalization without bureaucracy. Herein we believe Mr. Lloyd George has summed up the main objections to nationalization, and to a freedom loving nation that has so long submitted to the whims of "Dora" the mere mention of bureaucracy is nauseating.

The miners' leaders have not as yet given any satisfactory reason for their advocacy of nationalization of the coal industry, and the only thing that stands out with any clearness from their arguments is their determination not to work for private profit. As to this the miners' leaders are very frank, and their point of view is understandable, being, in fact, nothing more than the ancient human failing of envy. There is no academic reason favouring the nationalization of the coal mines that is not equally applicable to every other industry in which private profit constitutes the spur and original incentive, and in what branch of human endeavour is not personal betterment the compelling power?

The British people is not in the mood to allow itself to be mulcted for the preferential treatment of one class of men, whose strength consists in their employment in the production of an essential article, but not in any intrinsic personal merit or deserving claim to be more favored than other men. During the railway strike in Britain last summer, the country discovered that in a good many respects railway transportation was unsuited to British conditions, and that a combination of short distances, good highways and motor-lorries provided a system of transportation that was found upon trial to have superseded railway transport of such commodities as fish, milk and vegetables. As a result of this strike, the railwaymen found the importance of their occupation was diminished, and the country breathed more easily when it found itself emancipated from the demands of men who took an undue advantage of the necessary and specialized character of their employment.

It is probable that if the miners strike in order compel Parliament to enact a nationalization law for coal mines that similar disillusionment awaits them and their leaders, by reason of the essential unfairness of their policy, which, baldly expressed, is that because the miners are strongly organized and produce a commodity that is the life-blood of Britain's internal industry and her export and shipping trades, then the miners must be given preferential treatment. No matter how disguised the proposals of the miners' leaders may be by their presentation, they will be found when stripped of their verbiage to be based upon envy and greed.

EN PASSANT.

There is scarcely a week that the newspapers do not contain the announcement of the destruction by fire of some factory, some historic building, church or school, and altogether too often it is stated "the loss is only partly covered by insurance." This matter has been previously mentioned in the "Journal," but since that date, construction costs have gone further upwards. A revision of insurance schedules by the average mining company will reveal a serious divergence between the amount of insurance cover and the actual cost of replacement today. The next thing that we shall hear about will not only be still higher building costs, but increased insurance premiums, and there is no time better than the present to put insurance schedules in order.

The past few months have been marked by an unusual number of earth tremors, one series, of unusual duration, being felt with alarming severity near Nanaimo, Vancouver Island. So far as can be gathered, however, no effect of this tremor was experienced underground in the coal mines of that district. According to Mr. Napier Denison, of the meteorological observatory at Victoria, V.I., the shock was the worst tremor recorded in that vicinity.

Previous records of earthquakes have tended to show

that the seismic wave is a surface one, not reaching far down into the earth's crust, and instances where deep underground workings in mines have been affected are rare, if not non-existent. It might prove of interest to the readers of the "Journal," if residents of the coal-mining districts which felt this western earthquake would communicate their experiences to our columns.

THE MINING SOCIETY OF NOVA SCOTIA.

The Annual General Meeting of the Mining Society of Nova Scotia is planned for May 4th and 5th, and will be held in Glace Bay.

The new officers for 1920 have been nominated as follows:—

President—A. J. Tonge, General Superintendent of Dominion Dominion Coal Company.

First Vice-President—Geo. D. Macdougall, Chief Engineer of the Nova Scotia Steel & Coal Co.

2nd Vice-President—Charles M. Odell, Resident Engineer, Dominion Coal Company.

The retiring president is Colonel Thomas Cantley, Chairman of the Board of the Scotia Company.

Arrangements are being made for excursions to the collieries and to the neighbouring steel works.

This is the first time that the Mining Society's Meeting has been held in the colliery town of Glace Bay. The Dominion Coal Company will place its Officials' Club Rooms and the Committee Room at the disposal of the Society for the meetings.

Later announcement will be made of the programme and papers.

MINING SOCIETY OF NOVA SCOTIA DEPLORES INADEQUATE SALARIES PAID TO GEOLOGISTS.

At a recent meeting of Council of the Mining Society of Nova Scotia the following resolution was adopted and forwarded to Ottawa:—

"It has come to the notice of the Council of the Mining Society of Nova Scotia that owing to the inadequate salaries paid by the Survey and Mines Branch of the Geological Department, some of the staff have been forced to resign. In the interest of the mining industry we wish to protest against the scale of salaries now being paid to such highly trained technical men whose services to the country are of such value. We would urge that steps be taken immediately to make the salaries paid sufficient to attract and retain for the service a class of men of the standard formerly associated with the work of the Department."

MINING AND MINERAL PROSPECTS IN NORTHERN ALBERTA

The Government of Manitoba has issued a well-prepared and beautifully illustrated pamphlet, written by Dr. R. C. Wallace, the Commissioner for Northern Manitoba, in which the intending settler, prospector or investor can find up-to-date and accurate information on all that relates to mines and minerals in this interesting and promising country. The work deals with the geological features, the history of mining development, the metallic and non-metallic deposits and the economic situation. A complete bibliography is appended and a synopsis of the regulations governing mineral rights. This is publicity of the right kind, emanating from accurate sources, and is in every way commendable.

OBITUARY.

Capt. David Kyle, M.C.

We regret to publish the announcement of the sudden death from pneumonia, following influenza, of Captain David Kyle, M.C., Vice-President and a Director of the Algoma Steel Corporation, at the early age of thirty-six years.

Mr. Kyle was born in Scotland, and came to the Sault in 1910 as engineer in charge of the construction of the Merchant Mill, and was later in charge of the erection of the gas engines. When that work was completed, he joined the staff of the Steel Plant, and was placed in charge of maintenance.

In 1912 he was made General Superintendent of operations, and in the Autumn of 1914 left the service of the company to go overseas, where he won the Military Cross. In 1917, by special arrangement with the military authorities in London, Captain Kyle was allowed to return to Canada, and again take his place in the executive offices of the Steel Company. Two years later, when Mr. Franz came back to the Sault from Cleveland, Captain Kyle was elected a director and made vice-president of the company.

Captain Kyle had no relatives in Canada. The regard in which Captain Kyle was held by his business associates and the officials of the Algoma Steel Corporation, is a sufficient testimony to his engineering ability. He was an ardent sportsman, and took a lively interest in the local football and cricket matches.

R. H. Brown.

With the passing of Mr. R. H. Brown, of Halifax, is severed a link with past history of the coal and associated steel industries of Nova Scotia.

Mr. Brown was the son of Richard Brown, who came from England to be the Manager of the General Mining Association in 1826 and continued in that position until 1864, when he retired and was succeeded by his son, who administered the association's affairs until its properties were acquired by the Nova Scotia Steel Company in 1900. Mr. Brown continued to act as manager for the new company until 1901, when he retired from active management. A continuous administration by father and son for seventy-five years is worthy of record.

No two single men have left a more enduring mark on the coal industry of Nova Scotia than Richard Brown and his son. Both were men of great industry and of little personal display.

Mr. R. H. Brown was President of the Mortgage Corporation of Nova Scotia, and was at the office when he was seized by a fatal illness at the age of eighty-two years. Notwithstanding his age, Mr. Brown was an active man and usually walked to his appointments. He was a modest, kindly man, and generous in his support of good causes.

In recognition of his long-standing in the mining profession, and of his length of membership, Mr. Brown was a few years ago made an Honorary Member of the Mining Society of Nova Scotia. Under his direction some of the earliest submarine coal-mining in Nova Scotia was undertaken, and several historical papers by Mr. Brown are included in the Transactions of the Mining Society. With his death comes a break in the long tradition that links coal-mining in Nova Scotia to such notable names of past years as the older and younger Haliburton, Lyell, Dawson, Logan, and last, but not least in the regard of students of the early days of Nova Scotian geology and mining, Richard Brown, the elder.

Molybdenite Deposits of Lacorne Township, Abitibi, P.Q.

By ADHEMAR MAILHIOT, Professor of Geology at l'Ecole Polytechnique, Montreal.

In accordance with the instruction from Mr. Theo. C. Denis, Superintendent of Mines of Quebec, the writer spent a few days during August last on the Eureka property in Lacorne Township, County Temiskaming, making a geological examination of the molybdenite deposits.

The area is located at the south-west corner of Lacorne Township. The nearest railway station is Amos on the National Transcontinental Railway, 433 miles west of the city of Quebec and 141 miles east of Cochrane, Ontario. From Amos the route to the district follows the Harricana River, on which unobstructed navigation is possible for gasoline launches and small river steamers from the railway crossing to the landing on the Askigwaj River, about two miles from the Eureka mine. The distance from Amos to the Landing is about 30 miles, and within this distance the river locally expands into three lakes which are known respectively from north to south as lake Figuery (or Peter Brown), lake La Motte (or Jack Pine), and lake Malartic (or Seal's Home). The stretch of river between lake Malartic and lake De-Montigny is locally called the Askigwaj River. The landing to the mine is situated about two miles beyond lake Malartic on the Askigwaj River. A concession road two miles long, partly built, leads from the landing to the mine.

The country along the water route is of low relief and heavily covered with stratified clay deposited in the bottom of a very extensive lake that, geologically speaking, recently occupied the region of the "Clay Belt" during the recession of the glacial ice-sheet. The valley of the Harricana River is well suited for farm lands and the Quebec Government, for the last five years, has been encouraging colonization in that district. The region under consideration is situated just north of the height of lands and drains into James Bay through the string of lakes and the Harricana River.

General Geology.

The General geology of the region as outlined by Dr. J. A. Bancroft, in his report to the Bureau of Mines of Quebec in 1912, indicates that the oldest rocks within this region belong to the Keewatin. They comprise a complex of igneous rocks both extrusive and intrusive, together with bands of highly altered sedimentary rocks. These ancient sedimentary rocks are represented on the property of the Eureka mine by the bands of micaceous schistous rocks which have been cut by granite masses and pegmatite veins. These Keewatin rocks occupy a vast area along the Harricana River from beyond the town of Amos to the north to the Thompson River which flows into Long Lake to the south.

The Keewatin rocks were invaded later by huge masses of acid rocks through all this part of the country. These intrusions belong to the Laurentian. The rocks are mainly granites and rock types which have been evolved from the differentiatoin of a granitoid magma. The hills of the northern and central parts of the La Motte Township, and the prominent hills of the central and southern portions of Lacorne Township are composed of granite. The prevalent type is a quartzose biotite granite frequently displaying pegmatite characteristics, as is the case for the pegmatite dykes in which molybdenite is found on the Eureka property, associated with sericite and a little pyrite. At the mine the main batholithic granite mass has penetrated the Keewatin in the form of apophyses and tongues. The pegmatite dykes are clearly subsequent to the granite intrusion, and represent the last stage of the igneous activity in this region. The pegmatite matter was accompanied by sulphurous vapours which have impregnated the nests of sericite in the dykes, and the vapours seem to have also penetrated into the pegmatite itself while it was still in a viscous state.

Veins Nos. 1 and 1A, Eureka Molybdenite Property.

Economic Geology.

The development and prospecting work has been done to date on the two claims forming the southern part of lots 1 and 2, range 1, Lacorne Township, forming an area of 70 acres. Moreover, the work has been limited to the parts of these lots where the superficial layer of loose material was sufficiently thin to reach the rock with the least cost.

In the cleared part a series of pegmatite veins were uncovered along the contract between a biotite granite and a mica schist; some of these pegmatite veins cut the mica chist, but there exist always tongues of granite at the spots where the mineralization is more abundant. The presence of granite has an influence upon the richness of the mineralization.

The veins have a general direction N. 70 to 80° E. and dip 40 to 70° to the south. They constitute a series of close parallel veins disposed in echelons over a cross distance of about 600 feet. Their width varies from a few inches to several feet.

Test pits have been put down on most of the veins and on vein No. 4A a shaft 7 x 8 feet has been sunk in its wider portion to a depth of 45 feet with the inclination of the dip. The shaft was full of water at the date of my visit. In this vein the mineralization took place in the sericite which forms lenticular masses along fissures in the pegmatite. These fissures are irregularly distributed in the pegmatite from the centre to the walls. The quartz and the feldspar of this pegmatite vein are also well impregnated with molybdenite, and then this mineral forms crystals and pockets having larger size than those disseminated through the sericite where the molybdenite is fine grained.

The description of the mineralization of vein No. 4A can be applied to all the veins of the property. Prospection trenches made upon different veins show the same order of mineralization.

Besides these big veins there exists a distinct series of small stringers of variable direction. The veins Nos. 8, 9, 11, and 15 on the plan belong to that group. Their widths vary from 1 inch to 15 inches and molybdenite is frequently accompanied by fluorite and molybdite. Whenever these stringers cut the black mica schist, they contain no sericite, but only quartz and Feldspar; on the other hand when they cut the granite the molybdenite is disseminated through the sericite which is very abundant.

Development and Prospection Work.

The development work on the property consists of trenches and a shaft sunk to a depth of 45 feet. Seventeen veins had been discovered at the date of my visit on the stripped surface, and it is reported that prospecting has uncovered a certain number of promising veins on the north-east corner of Malartic Township just south of the main workings.

We give hereafter the description of the work done on these veins individually.

Vein No.1.—This vein has a length of 110 feet with an average width of 4 feet. At the western end the vein is 6 feet wide and it narrows down towards the east to 2½ feet. This vein has been partially trenched. The vein material is formed of quartz, feldspar and sericite, through which molybdenite is disseminated, and a little tourmaline.

Vein No. 2.—The length is 130 feet, the width averages 3 feet. Two rock excavations have been made, respectively 5 and 6 feet deep. The minerals are the same as those of vein No. 1.

Veins Nos. 4 and 4A.—These two veins have a parallel direction and can be followed over a distance of 350 feet. At the western end these veins are separated by a band of schist having a width of two feet, and this band widens to about 15 feet towards the east. Their width varies. Vein No. 4 is 2½ to 4 feet. Vein No. 4A has a constant width of about 5 feet. Towards the western end a shaft has been sunk to 45 feet on vein No. 4A. In the shaft the vein is 3 to 5 feet wide. At the bottom it is said to have 2½ feet. (The shaft was full of water at the date of my visit). The sericite is abundant in the quartz and the molybdenite is fairly well disseminated through the sericite. Quartz and feldspar are also mineralysed with molybdenite. Tourmaline is not abundant..

Piles of Picked Ore from Vein No. 1.

Vein No.5A.—Lenticular vein. The hanging wall is granite and the foot wall is schist. A trench 60 ft. long has been made to uncover the vein, and a rock excavation 5 feet deep. The quartz is different from the other veins, being of a bluish black color and vitreous. The sericite is abundant carrying disseminated molybdenite.

Vein No. 5A.—This vein is cutting alternate bands of schist and granite. Length 80 feet, width 10 to 18 inches. The vein matter is pegmatite containing abundant sericite carrying much disseminated molybdenite. A trench 100 feet long was made to uncover the vein.

Vein No. 6.—Cutting alternate bands of schist and granite. The width varies from 8 inches to 5½ feet. The vein has a lenticular form, with its maximum width at the middle. The length uncovered by trenching is 200 feet. The vein carries much sericite with molybdenite and very little tourmaline. Two rock excavations have been made each 5 feet deep.

Vein No. 7.—Cutting alternate bands of granite and grey schist carrying pyrite. Length uncovered by trenching 300 feet. Four rock excavations have been made having each an average depth of 5 feet. This vein contains large pockets of tourmaline towards its western end. At this end the vein bifurcates in two other veins having each one foot in width, separated by a band of schist two feet wide. The average width of the main vein is about two feet.

There exist two small outcroppings north of vein No. 7, one has a width of 3 feet and the other 10 inches. These two outcroppings can be followed for a distance of about 50 feet each.

Vein No. 8.—Cutting alternate bands of schist and granite. Length 300 feet. Average width 18 inches. One rock excavation 5 feet deep. The vein is a pegmatite carrying tourmaline, sericite, molybdenite and a little pyrite. The grey schist contains also a little pyrite.

Vein No. 9.—Cutting alternate bands of schist and granite. Length 200 feet. Average width 2½ feet with a minimum of one foot. One rock excavation 5 feet deep. The vein is a pegmatite carrying tourmaline, sericite and molybdenite. The sericite is present in the form of nests facing the schist bands only.

Vein No. 10.—This vein is formed of a series or parallel stringers cutting the granite. The vein is uncovered for a distance of 60 feet. The vein matter is the pegmatite containing a little tourmaline, sericite and molybdenite.

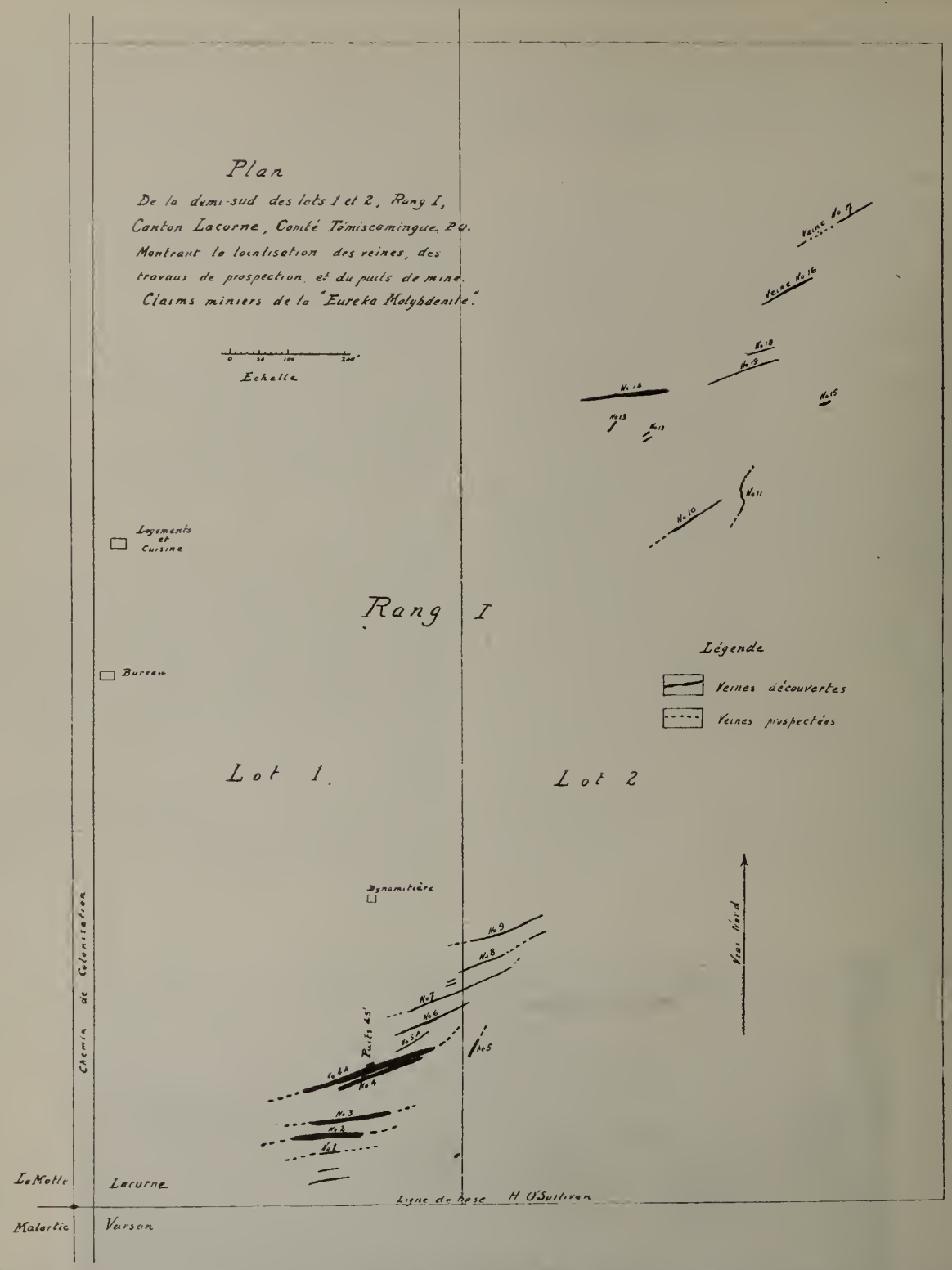
Vein No. 11.—This vein cuts the grey schists following the bedding planes. It consists of two parallel stringers. Average width 10 inches. The minerals are: quartz, feldspar, fluorite, molybdenite, molybdite with a few particles of tourmaline.

Vein No. 14.—Cutting the granite. Length uncovered 25 feet, width varying from 1 to 5½ feet. Minerals present are: quartz, feldspar, molybdenite and a little sericite.

Vein No. 16.—Cutting the schists towards the east and a dyke of quartz porphyry towards the west. Length 75 feet. Width varying from 6 to 15 inches. The minerals present are: quartz, feldspar, tourmaline and molybdenite. This last mineral is more abundant where the vein cuts the porphyry dyke. A rock excavation 12 feet long, 4 feet wide and 4 feet deep has been made. There is no sericite in the vein, as is the case in the other veins cutting the schists.

Vein No. 17.—Cutting the green and grey schists, Length uncovered by trenching is 75 feet. Its width varies from one inch to the east to 8 inches to the west. The vein pinches out towards the east. The minerals present are: quartz, feldspar, a little tourmaline and molybdenite.

Vein No. 2, Eureka Molybdenite Property.



Plan showing position of veins and mine buildings, Eureka Molybdenite Property, Lacorne Township, Que.

AWARDS BY THE INSTITUTION OF MINING AND METALLURGY

We are informed by the Secretary of the Institution of Mining and Metallurgy that the following awards have been made by the Council of the Institution of Mining and Metallurgy:

1. Gold Medal of the Institution (premier award) to Mr. H. Livingstone Sulman, M. Inst. M. M., in recognition of his contributions to Metallurgical Science with special reference to his work in the development of Flotation and its application to the recovery of minerals.

2. "The Consolidated Gold Fields of South Africa Ltd., Gold Medal to Mr. William Henry Goodchild, M. Inst., M. M., for his papers on "The Economic Geology of the Insizwa Range" and "The Genesis of Igneons Ore Deposits"

3. "The Consolidated Gold Fields of South Africa Ltd.," Premium of Forty Guineas to Dr. Edward Thomas Mellor, H. Inst. M.M., for his paper on "The Conglomerates of the Witwatersrand".

The Gold Medal awarded to Mr. Sulman is the highest recognition in the power of the Institution to confer. The original and monumental nature of Mr. Sulman's treatise on flotation has been widely recognised.

The Rice Lake Gold District, Manitoba

By REGINALD E. HORE

The Rice Lake Gold district, Manitoba, lies east of Lake Winnipeg, near the edge of the great area of Pre-Cambrian rocks which makes up such a large part of Northern Ontario and Northern Manitoba. It is only 120 miles from Winnipeg, but in country quite different from that of the prairie cities. It is not mountainous country by any means, but is rocky and wooded and poorly drained. It is attractive country to the trapper, but not to the agriculturalist. It is not yet developed by the miner. It is not traversed by railroads. It has no good waggon roads and few roads of any kind. In summer, it offers attractions to the venturesome, for its rivers and lakes make travel by canoes both possible and pleasant. In winter, dog teams are the chief motive power, but there are two winter roads on which horses may be used in travelling from the railways to the mines.

For mining purposes the winter brings advantages in the improved transportation facilities. There is now being taken into the district machinery and supplies for mines that will be practically cut off from the outside world during the summer. The canoe routes make good travelling for passengers and light freight; but are of very little use for heavy freighting, as the cost is in most cases prohibitive. In winter the cost of transporting material from the railway to the centre of present mining activity is about $35 per ton. The route most used is from Riverton across Lake Winnipeg to Manigotagan and thence by a road to Rice Lake and thence to Gold Lake. There is a much shorter winter road from Mile 69 on the Canadian National Railway, Victoria Beach branch, but there has been much trouble with the muskeg portions of this road this winter. An early very heavy snowfall last October protected the muskeg from frost and made the road impossible for some time.

While the Rice Lake district is as close to Winnipeg as Muskoka lakes are to Toronto, the former trip takes about two days instead of three or four hours. Leaving Winnipeg in the afternoon, Riverton is reached at night. From Riverton to Manigotogan is only about 40 miles, but it generally takes about a day to cross the ice. There is a stopping place at Hecla, a village on one of the islands. It is a cold trip in midwinter, but can be made with a fair degree of comfort by using a canvas covered sleigh or "caloose" heated by a small stove. The fishermen on the lake, most of them Icelanders use snow plows to keep a road open when the snow gets deep. These plows have been utilized in taking freight across for the mines.

At Manigotagan there is another stopping place and stables. It is advisable to spend the night here unless fresh horses are available. There are, however, two cabins at twelve mile intervals along the road to the mining district which afford possible, though not very comfortable, shelter.

From Manigotagan, or Bad Throat, settlement the road runs eastward. It follows the north bank of the Manigotagan river for a short distance and then crosses to the valley of the Wanipigon, or Hole, river. It follows this river for several miles, passing south of Wanipigon lake and thence to Horseshoe lake. From here it runs south to Rice Lake and then southeasterly to Gold lake and then on to Long lake.

Most of the present activity is in the vicinity of Gold lake where the Gold Pan mine is situated. This property has attracted much attention because of the richness of its ore. The deposit was partially developed a few years ago and very high grade ore encountered in places. Development was chiefly confined to the immediate vicinity of the shaft, which is located where a diabase dyke crosses the vein.

The Gold Pan vein is nearly vertical and strikes northwesterly. It is said to be traceable on the surface for over 3000 ft. crossing the Gold Pan and Gold Seal claims and extending in Gold Pan Extension on the northwest. Near the Gold Pan shaft the vein is in feldspar porphyry and grey felsite.

Arrangements have been made to resume work at the Gold Pan. The mine has been dewatered and development should soon be in progress again. Some well-known Winnipeg business men are now identified with the enterprise. Mr. Gordon McTavish, secretary of the company, is taking an active part in the work. Mr. J. B. Tyrrell has been engaged as consulting engineer. Mr. Frank Phillips is mine superintendent.

Near the Gold Pan are the Moose, Brooklyn and Gold Pan Extension. Some development was done on the Moose a few years ago under the management of F. M. Connell, Jack Redington being in charge at the mine. Development at the Brooklyn was begun early in 1919. A. L. Anderson being in charge and Dan MacDonald mine foreman. Work at the Pan Extension is to be begun shortly. Other properties in the immediate vicinity will doubtless receive attention this year. The rocks in this area are well exposed. Between the rock outcrops, however, there are muskegs that effectually hide portions of the veins.

The pioneer property of the district is the Gabrielle, which is situated on Rice Lake. This property was partially developed a few years ago, but has been recently idle. Recently arrangements have been made for the resumption of development work at the Gabrielle. Mr. J. B. Tyrrell has reported favorably on it and has been retained to advise on the development work.

East of Wanipigon lake and north of the river of that name is the Bellevue mine. This property has been partially developed and is equipped with a 20-stamp mill. It is at present idle, but it is understood that development work here is being planned.

Further south in the vicinity of Long lake, gold has been discovered on several properties. Further east also, numerous finds have been made. There is undoubtedly a large promising field here for the prospector.

The Rice Lake district warrants more attention than it is at present getting from the Dominion and Provincial Governments. In spite of its nearness to the business centre of Manitoba, it is without reasonable transportation facilities. Its development depends of course primarily on the nature of the gold deposits, and will come in the course of time if they prove so good that a profit can be made in spite of the high cost. But under present conditions the exploration must continue to be slow. A little encouragment on the part of the Governments might make the difference between an idle wilderness and a thriving industry east of Lake Winnipeg in the immediate future.

RARE METALS IN SUDBURY NICKEL ORES.

The recently issued report of the Ontario Bureau of Mines again calls attention to the fact that the ores mined in Sudbury district for their nickel and copper content contain important quantities of rare and precious metals: platinum, palladium, rhodium, gold and silver. The actual amount of these metals in the ore mined is not reported. It is known that some is recovered in the refineries, but much of the platinum and palladium is not. According to the Royal Ontario Nickel Commission the average precious and rare metal contents of the Copper Cliff smelter mattes for the 3 years ending 1915 was 0.1 oz. platinum, 0.15 oz. palladium, 0.05 oz. gold and 1.75 silver perton. At this rate the mattes produced by the company in the year 1916 would contain 5,640 oz. platinum, 8,460 oz. palladium 2,820 oz. gold and 98,709 oz. silver. The recovery reported for that year was 3,495 oz. gold, 110,285 oz. silver, 1.016 oz. platinum, 1,335 oz. palladium and 257 oz. rhodium. There would naturally be some difference in recovery from the estimated contents of the matte; but the figures indicate that a large part of the rare metals was lost, supposedly passing into the nickel.

Concerning the recovery made by the other large nickel producer, whose refinery is in Wales, there is an almost entire lack of information. It is understood that the mattes produced at the Coniston Smelter are richer in precious and rare metals than those from Copper Cliff. It is also understood that a more complete recovery is made in the Wales refinery than in that at Hoboken, but the British operators do not report the recovery made. Assays of samples of the Mond Company's matte made on behalf of the Ontario Nickel Commission indicate that it is considerably richer in the platinum group metals than is that produced by the International Nickel Co.

It may be taken for granted that the operating companies recover as much of these rare metals from their mattes as their processes of refining permits. The Mond company's process is well adapted for recovery of the rare metals, but the Orford process is evidently not. In the latter process much of the platinum and palladium goes into the nickel and Monel metal and is doubtless left there because it does not pay to take it out. The announcement therefore that there appears to be a possibility of adapting electrolytic methods to the refining of nickel at certain stages of the Orford process is an important one. If all the rare metals can be economically saved the production of platinum and palladium from Sudbury ores will be much larger in the future. We do not know exactly what it is at present, but we do know that there is a possibility of greatly increasing it.

The electrolytic process referred to in the Bureau of Mines report is one devised by Geo A. Guess, professor of metallurgy at the University of Toronto. Prof. Guess has found that if an anode of crude nickel which may contain copper and iron, is electrolyzed in a bath of nickel sulphate in which is suspended finely divided calcium carbonate, there is deposited on the cathode, which is suspended in a sack diaphragm, metallic nickel practically free from copper and iron. The copper is precipitated as a double basic sulphate of copper and nickel, which is quite insoluble. The removal of most of the copper of the matte is an obvious preliminary step to the Guess electrolytic process. This could be done as at present by fusion with salt cake and coke.

If such a process as Prof. Guess has devised were in use, the recovery of rare metals from Sudbury ores would be a comparatively simple matter and Canada would take its proper place as an important producer of palladium and platinum, metals which command prices several times that of gold.

As pointed out by the Ontario Nickel Commission the importance of the precious and rare metals in the ores mined in the Sudbury district is even yet practically unrecognized. The Commissioners say: "Anything which can be done to encourage the better recovery of these metals, or enforce the use of refining processes which recover them, would be justifiable, and particularly so now that platinum and palladium are increasingly required and stand at as high a price." It is to be hoped therefore that the Guess process will be given a fair trial. Some progress has already been made in testing it at Copper Cliff. The International Nickel Company has only recently completed a $5,000,000 refinery at Port Colborne and will perhaps be content with its process until it has very convincing envidence of possible improvements. The company has however shown readiness to scrap plant at Copper Cliff when better methods were found and if convinced that the Guess process can be used advantageously there will doubtless be changes made at Port Colborne.—R.E.H.

NOVA SCOTIA NOTES.

The production of the Dominion Coal Company's Glace Bay Collieries during January was as under:

Dominion No. 1	30,021
Dominion No. 2	50,459
Dominion No. 4	26,216
Dominion No. 5	8,615
Dominion No. 6	21,462
Dominion No. 9	25,831
Dominion No. 10	10,513
Dominion No. 11	15,110
Dominion No. 12	16,790
Dominion No. 14	15,189
Dominion No. 15	12,335
Dominion No. 16	12,847
Dominion No. 17	928
Dominion No. 21	13,620
Dominion No. 22	14,135
Dominion No. 24	1,374
Total	275,445

An interesting feature of the individual outputs is the inclusion of two new producers, namely, No. 17 Colliery, and No. 24. No. 24 is an opening on the Emery Seam, and its production, added to that of Nos. 10 and 11, the other Emery Seam mines gives a total of almost 27,000 tons of coal from that seam, or approximately ten per cent of the general production.

Production in January, 1919, was 276,036 tons, and in January, 1919, 273,929 tons. The mines worked steadily throughout the month, and the output obtained represents about the present capacity of the collieries. The unusually low temperatures, and the lack of rain which marked most of December and all January in the district, caused a shortage of water which interfered to some extent with production.

It is reported that a resumption of operations at the Broughton Colliery of the Cape Breton Coal, Iron and

Railway Company is contemplated. This mine has not produced since early in the war period. This property has had a most unfortunate history. The capital invested was almost entirely English, and the representative of the bondholders is Wm. Hanson & Sons of Montreal. A shipping-pier near Mira Bay was projected to load the coal from this colliery into vesesls, and heavy expenditure was incurred on the construction of a railway from the mine to the pier site, which involved some heavy cutting and filling, but the project was never completed.

The Anglo-Newfoundland Co. at New Campbellton has completed the dredging at the pier in Kelly's Cove, and has now a sufficient depth for loading vessels. The production during 1919 was about 12,000 tons, and it expected to market 50,000 tons in 1920. Work has hitherto been carried on in the Four Foot Seam, but another seam, which was worked by the former operators, is now in process of being re-opened, and a new bankhead and other necessary equipment is being provided in readiness for shipping when the season opens. This point of supply will attract considerable schooner business, as it is accessible through the Gut of Canso via St. Peter's Canal and the Bras d'Or Lakes, giving a sheltered route for Prince Edward Island schooners, and the likelihood of quick despatch. All coal from this mine must be forwarded by water.

TORONTO NOTES

(From our Toronto correspondent)

Considerable interest was displayed in Toronto at the announcement from Prescott that coal had been discovered in the new quarry being opened at Old Windmill Point, east of Prescott. Samples taken forty feet below the surface have been forwarded for analysis. Those on the claim they have struck a rich vein of anthracite.

Professor A. P. Coleman, of the University of Toronto stated that he did not think that there was any anthracite, but anthraxolite may have been found. "Anthraxolite is a valuable mineral and burns like anthracite," he said, "but it has never been found in sufficient quantities to be worth working. Generally the seams are an inch or so thick, and are practically valueless for commercial purposes. The largest deposits have been found in the Sudbury district, but even there they have never been put to any commercial uses."

According to reports from Huntsville there are prospects of a big mining boom there this spring. It is stated that Israel Ward, a local minerologist, in association with two prominent mine experts from Cobalt, closed an option on a piece of mining property three miles east of Huntsville. They are arranging to continue development. Radium, in quantities which promise to make the property one of huge value, is said to have been discovered and platinum, gold and silver are said to be there in paying quantities. Reports from Huntsville say that the options obtained are valued into the millions.

At the annual meeting of the directors of the Dome Lake Mining and Milling Company, held in Toronto this week the retiring directors were re-elected without change. Drifting is being continued on the 600-foot level, with a view to picking up the ore bodies indicated by the diamond drilling. This indicates the presence of two layers, one 60 feet in length and assaying $19.00 a ton, and the other 84 feet in width, assaying $11.20. The mill treated 4,433 tons of ore, containing $30,322. The net recovery was $23,832, an extraction of 78.85 per cent. The mill was only in operation three months owing to the fire. The broken ore reserves are shown at 2.422 tons, which at $89.70 a ton are valued at $23,424.

Representatives of all classes of the mining industry have for the past few days been conferring with the view to organization and this week the proposition took concrete form in the formation of the Ontarion Mining Association, the objects of which will be to endeavor to stabilize and look after the interests of the industry generally. The organization is a development of the Northern Ontario Mine Owners Association. The present organization has been organized on a broad basis and takes in many big concerns. Those at the organization meeting included men who are prominent in the iron, steel, nickel, silver gold and copper industries and after some discussion it was decided to form a company without share capital and to maintain an office in Toronto in charge of a salaried secretary.

The officers chosen were as follows: President A. D. Miles, of the International Nickel Co.; First Vice-President, F. L. Culver, President and General Manager of the Beaver and Kirkland Lake gold mines; Second-Vice-President, G. C. Bateman, General Manager of the La Rose Mine; Secretary, B. Neilly, M.E. A board of Directors was chosen in which are representatives of the industry from all parts of the Province.

Prince Rupert, B. C.

The installation of a Smelter for the treatment of silver-lead-gold ores at Port Edward, near Prince Rupert, provided a site can be secured from the townsite and the Provincial Government is said to be assured by George B. McMillan and Colonel Coy, who represent the Company interested. Mr. McMillan has told the Prince Rupert Board of Trade that, after an investigation of six or seven months, they were satisfied that, when the Smelter is ready there will be a sufficient tonnage of ore available to keep it in continuous operation. They probably will be prepared to commence taking ore, it was said, within the year. There is more than enough water at Port Edward both for the electrolytic zinc process and the smelter and, as the Company expects to have several of its own boats engaged in the transport of ore, it was essential to obtain a suitable waterfront site.

A delegation from Prince Rupert recently waited on members of the Provincial Government advocating the adoption of a policy having as its object the establishment of a metal refinery in British Columbia. Chief among the arguments in support of the petition is that of the necessity of doing everything possible to readjust the trade balance. With copper going out of the country for refinement to be re-purchased in the finished manufactured article by Canada one serious obstacle to the removal of the present intolerable condition was apparent.

Our Northern Ontario Letter

THE SILVER MINES

Receiving from $1.35 to $1.37 an ounce for spot silver in New York, plus a premium of some 15 per cent on New York funds, the Nipissing and the Mining Corporation of Canada were last week able to ship some 401,000 ounces of silver bullion which may be estimated at a value of upwards of $622,000. The week's shipments rank among the most valuable ever sent out from Cobalt.

Recent bullion shipments have all been to the Far East, purchased in New York on China's account. The demand that has arisen in the Far East is said to be exceedingly keen. Taking this into consideration, and in view of the shortage of output all over the world, the metal authorities continue to believe that no material recession in quotations may be looked for.

The achievements of such leading mines as the Nipissing, Kerr Lake and Mining Corporation during the opening month of the year, and as shown in official figures, is pointed to locally as a fair indication of the general prosperity in all parts of the camp. The near-demoralization of finances as indicated in the abnormal exchange rates is a factor that is going far to swell the treasuries of the precious metal mining companies. "It is like finding the equivalent to 15 per cent of our gross production," one operator stated to your correspondent. The importance of this may thus be realized. The added revenue entails no additional expense.

At the Chambers-Ferland, operations are being conducted successfully at the lower levels, and conditions which were formerly believed to not extend to that depth have now been found to do so with the result that a substantial tonnage of low grade ore is being developed. In the south cross-cut between the Nipissing and the LaRose nothing of material importance has been discovered. The work, however, is being continued.

Max Morgenstern, a minority shareholder in the Buffalo Mines has made application to restrain the Mining Corporation from proceeding with its plans in connection with the Buffalo mine, following the recent purchase of control. Details as to the action have not been announced officially. It will be recalled that the Mining Corporation bought out Mr. Charles Denison, former holder of about 75 per cent interest in the Buffalo.

During the month of January the Nipissing Mine produced silver at the rate of $10,626.16 every twenty-four hours. The large output was more or less of a surprise for the reason that the first week or so of the new year is usually taken advantage of as a time to clean-up following the close of the past year.

In his regular monthly report to the president and directors, Hugo Park, manager, states:

"During the month of January the company mined ore of an estimated value of $329,401 and shipped bullion from Nipissing and custom ores of an estimated net value of $134,199.

"Underground development and production was satisfactory for the month, notwithstanding that it was a short period, due to the annual clean-up at the mills and general repair work around the various shafts.

"Development work on vein 544, at 73 shaft, was in the main encouraging. The vein is erratic, both in width and assay. At times it has been as high as seven inches in width and assaying from a few hundred to several thousand ounces. Other work at 73 shaft continued to be favorable.

"Development work on vein 109 from a winze level 90 feet below the tunnel gave good results during the month. Two raises are developing a satisfactory ore shoot. One of the raises shows two inch vein assaying 4,000 ounces at the present time. Drifting on vein 99 at the lower level was also satisfactory during the month. The face of this drift is now showing one inch of ore assaying several thousand ounces to the ton.

"The low grade mill treated 5,839 tons. The high grade plant treated 98 tons. The refinery shipped 100,902 fine ounces of bullion.

"The following is an estimate of production for the month of January:—

Washing plant	$143,370
Low grade mill	186,031
Total	$329,401"

The Miners' Union of this district has under contemplation a scheme to take a referendum of all its members for the purpose of determining whether or not the organization will break away from the International, and as to the choosing of a future course. Opinion seems to lean strongly in favor of forming a district union, according to advice to your correspondent from representative labor leaders. The present movement has only to do with organization, there being no dispute involved as regards wages and conditions in Cobalt.

The Cobalt Branch of the G.W.V.A. have passed a resolution urging the Minister of Mines to select a returned man to fill the vacancy on the staff of Ontario Mining Inspectors caused by the death last fall of Mr. A. H. Brown. It is urged that the appointment be based on merit.

In the Gowganda district the usual activity continues. The deal for the Dodds property at Leroy Lake has finally been closed and it is proposed to commence exploration work within the next few weeks.

Arrangements have been made to begin work on the Kilpatrick property, in the Miller Lake district, Gowganda. The deal involving the Miller Lake Everett with the Kilpatrick is still pending. Harry Holland, one of the original members of the Borden Battery, will take charge of work on the Kilpatrick.

The shaft on the Kells property in the township of Corkhill has reached a depth of about 60 feet. Drifting operations are being carried on at this depth, pending the completion of the installation of a compressor. It is stated that silver values continue to the present high.

The Famous Orr case, having to do with a fight instituted by minority shareholders of the Orr Gold Mines against the Kirkland-Porphyry Company has drawn to a close, as is shown in the following summary of and extracts from a judgment of Mr. Justice Sutherland:—

"It is said that Wettlaufer and Wills held all the bonds land Company that according to the terms of the agreement of September 15th, 1918, that Wettlaufer would be getting more for his stock in the Orr Company than would the minority shareholders and if the agreement were carried out would be in a more secure and preferential condition.

"It is said that Wettlaufer and Wills held all the bonds of the Kirkland Company except those remaining in the company's hands unissued. It is evident that the sale under the terms of the agreement by the Orr Company to the Kirkland Company would be a sale where a Company wih valuable property would be transferring to a company with no property of proved value and taking pay in stock of the latter company share but subject to first charge against all the assets and property of the latter company, including the property proposed to be conveyed to it by the Orr Company.

The agreement between Wettlaufer and Kirkland is unfair and oppressive to the minority shareholders of the Orr Company and one which the Kirkland Company holding a

majority of the stock therein could not properly make. The proposed sale by the Orr Company is a fraud on its minority shareholders and those in control of the Company were acting oppresslvely and in such a way that the minority shareholders will not get as much for their shares as the majority.

The sale is in reality a sale by the vendor to himself, the sale having been previously agreed upon. Those in control of the Company were dummy directors and had no alternative than to act as their masters dictated. The majority shareholders cannot dispose of the assets of the Company for their own use and benefit.

The minutes stating that sufficient work had been done to show that $2,000,000 of ore was in sight and then further stating that the company was not in a position to develop the property do not seem very reasonable nor does the statement that consideration on the basis of share for share, had been carefully considered. I am of the opinion that the price was wholly inadequate.

The agreement of September 5th, 1918, says the old directors of the Orr Company were to resign and the new directors were to be nominees of Kirkland Company and were to enter into an equitable agreement with the Kirkland Co. to sell them the assets of the Orr Company. The agreement was certainly far from equitable.

If the directors of the Orr Company wished to be fair and reasonable when valuable ore was found they would have called together a meeting of shareholders to discuss the matter. This was not done, moreover the notice calling the meeting of shareholders to ratify the by-law and option disclosed as little as possible of the transaction.

The plaintiff in each action will therefore have judgment perpetually restraining the defendant companies from carrying out the proposed sale with costs."

The annual report on the Temiskaming Company's property, just issued shows that production during 1919 amounted to 243,037 ounces of silver, as compared with 420,078 ounces in the previous year. Labor troubles at Cobalt were an unfavorable feature of the mine's operations.

Earnings were $295,252, compared with $425,014. The surplus on mining account was $70,448 compared with $135,-394 in 1918. The surplus account had a balance of $922,738 at the end of 1918, which with last year's surplus made $993,-186. Depreciation amounting to $29,170 was provided for, and a dividend of $10,000 was paid, leaving $864,016 in surplus account at the end of 1919. A pocket of high grade ore was found in the middle of April on the Gans property, and other rich patches in the same area gave encouragement and stimulated further exploration in the older workings of the property. Development work for the year amounted to 2283 feet. Ore production for the year had net value of $283,623, and shipments had a value of $225,596. Costs averaged $15.61 per ton milled.

Increasing Mine's Life

General Manager Gordon F. Dickson in his report, says: "The results of the year's work may be viewed with satisfaction. The discovery of rich ore in the southern extension of the vein system in the Gans area is an important feature, and one that opens up possibilities of increasing the length of life of the mine. Although the ore so far proved in the vicinity has been limited in quantity, there is scope for further exploration, and from the development scheme at present in view of favorable results may be reasonably anticipated. The tonnage of milling ore produced during the last few months from the older workings of the property has been the means of maintaining operation on a profit earning basis. The active development program at present in progress gives encouragement for the belief that further additions of profitable ore may be riscovered.

Aided by Discoveries

President J. P. Bickell, in his report, says: "The high average price of silver has enabled the profitable working of low grade deposits, thereby permitting the execution of an extensive development and exploration scheme, which otherwise would have been impossible without drawing upon the company's cash reserves. In process of this development work, occasional patches of high-grade ore were encountered To avoid possible misconceptions, no official statements were issued at the time, pending sufficient development to warrant a reliable estimate of their importance. Subsequent results proved to be the wiser course, as these occurrences were all of minor importance.

No Assurance of Dividends

"The present outlook does not permit of any assurance being given with regard to future dividends, and the disbursement of 4 per cent. paind January 31 this year should not be considered as the forerunner of regular dividend payments. The future policy in this respect depends entirely on developments and the maintenance of the company's sound financial position."

Assets of the company are now given as $3,653,256, compared with $3,893,463 a year ago.

MINING PERSONALS.

Harry Darling, manager of the Porcupine Crown mine, has returned to the North after an absence of more than two years. Mr. Darling was in Cobalt on a brief visit prior to proceeding to Timmins where he will perhaps remain for the next month.

Frank C. Loring has returned from a business trip to England, according to advice just received from New York.

W. E. Simpson, general manager of the Miller Independence Mines attended the annual meeting of the company held last week in Dayton.

H. C. McCloskey, manager of the McKinley-Darragh Mines, spent several days in Toronto on business.

Frank Groch has returned from a business trip of some weeks, spent in part in the western states, as well as a visit to Cleveland.

Neil Morrison of the Kells property, at Elk Lake, has returned to the property after a business trip to Haileybury and Cobalt.

J. B. Tyrrell, Minig Engineer, Confederation Life Building, Toronto has returned from a business trip Western Canada.

Mr. H. C. CROW.

PAINKILLER LAKE DISTRICT; NORTHERN ONTARIO CARTWRIGHT GOLDFIELDS LIMITED

The "Journal" is informed by Mr. H. C. Crow, President of the Cartwright Goldfields property that arrangements for the financing of the enterprise have been arranged, and that by Spring an outfit of machinery will be installed, and development proceeding. Before the fire in 1916 destroyed the buildings and plant, this company had expended $75,000 on the property.

Operations were recently resumed on a portion of the claims north of the Lake, upon a vein which varies from 2 ft. up to 7ft. in width. Sinking a shaft on the main vein has commenced and it is hoped to reach a depth of 10 ft. by Spring. Surface assays gave up to $43.00 in gold. The shaft is down 20 ft. and the vein is six feet in width at this depth.

Up to recently the dificulty of obtaining labour was great, but conditions in this regard are improved, and advantage is being taken of the winter roads for hauling in machinery during the Winter.

Recently, the Cartwright Goldfields sold part of their holdings to La Santa Lucia Gold Mines, Ltd. This company is making preparations to open a shaft. With this addition to the mines already in operation on the Painkiller Lake, much optimism is felt as to the prospects of this district next Spring.

INDIAN RUPEE EXCHANGE—TEN RUPEES TO THE SOVEREIGN

Moreton Frewen, whose writings on Indian exchange are familiar to those interested in the silver question, made the following comment to a representative of Dow, Jones and Co., publishers of the Wall Street Journal, on the change which has been made in the gold value of the Indian rupee:

"The news is of the very highest interest, and did Wall Street apreciate it, it would overshadow in its permanent importance all the other exchange happenings in this crisis in exchange. The information is only quite clear as to one point. The Indian Government has decided to fix its rupee exchange at ten to the sovereign in place of its 'gold exchange' rate established in 1898 of fifteen.

"This is really wonderful news. It promises permanent exchange with India at ten rupees for five gold dollars. It also fixes Chinese exchange at, say 3 taels for five gold dollars, and the Mexican dollar at par. There can be no reason that if the Government of India refuses to sell exchange at a lower rate than ten rupees for a sovereign, silver can never fall lower than, say, $1.30 per ounce at the mines.

"The Government of India is not only the greatest silver buyer in the world, but also by far the greatest seller. Every Wednesday the India Office sells at the Bank of England to the highest bidders six million rupees of 'council bills,' two million ounces of silver. Now, according to the London cable, the Government of India is apparently to 'put in the peg' below which they will not sell and that price is the equivalent to $1.29 per ounce. Silver can never fall below $1.29."

Robert Bonar, for the past five years superintendent of the Pacific Coast Coal Co. at South Wellington, has left for Michel, B. C. where he will make his home.

CORRESPONDENCE FROM BRITISH COLUMBIA THE METAL MINES.

Stewart, B.C.

That there will be something approaching a rush into the Salmon River District, northern British Columbia, as soon as the season breaks, appears to be the conviction of those closest in touch with the situation. The strike on the Premier Mine and the development of other properties in the vicinity, together with the frequent reports of the staking of claims of promise, have had the effect, without a doubt, of attracting widespread attention to that part of the northern country. In British Columbia mining circles it is the confident belief that the towns of Stewart and Hyder, the portals through which prospectors, miners, and others who would enter to the new mineral camp must pass, are about to experience a boom. Real estate already is said to be selling at high figures in both towns and it is known that many enterprising Canadian businessmen are waiting only for more propitious weather to establish themselves at Stewart. Doubtless not a few Seattle, Wn., people have the same plan in contemplation with respect to Hyder. In short, the feeling in this province is that the camp is to be permanent and that it is likely to become one of the most important in a mining sense on the Pacific Coast. While the Premier Mine is the scene of operations, one shipment of between 300 and 400 tons already having been shipped over the snow to the Taeoma Smelter and another having been ready a couple of weeks ago; and while development continues on the Big Missouri and a number of other properties, there are many owners of claims and prospectors wintering in Stewart, Hyder, Vancouver, Victoria and Seattle prepared to "hit the trail" either for their properties to take up work where it was left off or to strike into the hills in search of prospects. Quite possibly, too, there are some "tenderfeet" who, fascinated by the reports of the richness of the ore of the Premier Mine, are arranging to cast in their lots with their tougher and more experienced fellows. On this point Mr. Dale Pitt, Assistant Manager of the Premier Mine, seems to show some concern when he says that there is a misleading impression that the country back of Stewart is another Klondyke. He adds that it should be understood that it is a hard rock camp, and that money is needed to develop it. For the benefit of those who may not understand, Mr. Pitt's statement will bear supplementing. In and around Stewart the snow usually remains until the month of April and in the hills in some places it persists until the month of June. Although everything possible is being done to prepare for the accommodation of the hundreds of visitors looked for those proposing the trip will be well advised to take with them tents and blankets. Previous mining excitements have taught that such utilities often turn out to be essential and, in any event, are a necessary safeguard against emergency. With these few words of, possibly gratuitious advice, it may be stated that marked activity is being evidenced, not only by the miners, but by the Provincial Government and, according to report, by the officials of the Alaskan Territory, in preparing for the opening up of the Salmon River zone. The British Columbia Government, although no official statement is yet available, is expected to continue the road built last summer from the international boundary to the Premier Mine in order that transportation facilities may be furnished other properties rapidly being brought to the shipping stage and to such prospects as

may develop favorably. The road between Stewart and Hyder, short, but involving extremely heavy and expensive construction, also is complete. The Premier Mine Company, it is understood, carried the road from Hyder through American territory to the Canadian boundary, from which point it was taken up by the Provincial authorities. Governor Riggs, of Alaska, it has been reported, will recommend that further work with a view to the improvement of transportation facilities be carried out on the Alaskan side during the coming summer. At the present moment he is in Washington, in company with C. F. Caldwell, a British Columbia mine operator of prominence (at least, their departure was announced through the daily press), engaged in the discussion of this matter with administrative officials. Mr. Caldwell is an ardent advocate of the necessity for the building of a railroad from tidewater into the Salmon River District, and it is likely that governmental support of this project will be urged. Further confirmation of the importance with which the northern mining camp is considered is found in the announcement that a special mail contract has been entered into for the benefit of the people of Stewart whereby mails are to be conveyed to them from Anyox once a week during the winter and twice a week during the summer, transportation to be provided by a substantial power-boat.

Atlin, B.C.

While British Columbia has been comparatively free of trouble with respect to boundaries in its placer mining camps disputes sometimes arise. One of these has been before the courts for some months. The disputants are Isaac Matthews and L. Schultz, the former being the owner of the Poker placer gold claim on Spruce Creek in the Atlin district and the latter the owner of an adjoining claim known as the Peterboro. Mr. Schultz, in the course of operation, permitted his men to encroach beyond what Mr. Matthews considered the line. In the action that followed, Mr. Matthews was upheld, whereupon he followed up his success with an action for damages to the extent of $100,000. This latter litigation is about to come to trial and developments are being very closely followed by the placer miners of the Atlin camp.

Barkerville, B.C.

J. M. Yorston, who represents the Cariboo District in the Provincial Legislature, reports that development work is proceeding on the Prosperine Mountain properties. While no statement is made by Robt. A. Bryce, who is in charge of the work, there has been no abatement of activity at the camp and the general understanding is that results so far are satisfactory. Residents of the district confidently anticipate that the property is to prove one of the biggest quartz mines in the province. Mr. Yorston also states that some excitement was occasioned recently by the discovery of quartz gold in the creek about three miles from Barkerville. Much is expected both by miners and settlers from the Pacific Great Eastern Ry., now being constructed through the Cariboo into the Peace River country. There is no doubt that prosperity will follow the completion of this new railroad because it will open up a country rich in mineral and agricultural possibilities.

The plans which the Cariboo Gold-Platinum Extracting Co. Lad. are said to have in view with respect to the Cariboo are attracting much interest. This Company's property, situated about 20 miles east of Quesnel, consists of five leases on the river and a ranch of some size, the latter having been acquired recently. Plant now is being transported over the Cariboo Road which, when it is assembled, will consist of a dragline excavator with a Shearer & Mayer one-yard bucket, a specially designed concentrator with a capacity of from 25 up to 150 tons of black sand a day, and the machinery required for the development of steam power. G. J. Marsh, president and general manager of the company, states that he has been successful, after twenty-five years of experiment, in the extraction, at a reasonable cost, of gold and platinum from the black sand. In describing his method he asserts that the sand first is crushed to a 200-mesh screen and afterwards treated by an electro-chemical process. Tests, Mr. Marsh declares, have proved its commercial feasibility. The importance of this to British Columbia is emphasized by indication of the many creeks, rivers and beaches where deposits of black sand are to be found; and also the fact that in dredging and other placer operations black sand is the source of nothing but trouble, its high specific gravity making it impossible to recover its gold and platinum content at a profit. Mr. Marsh appears to be confident that his company's success is assured. Before operations started about $250,000 will have been invested and the capital, it is said, has been raised in Minneapolis. To induce individual miners to produce black sand concentrates for treatment at the extraction plant Mr. Marsh has a portable concentrator which he proposes distributing, by sale or lease, and by means of which he has visions of the bars of the Fraser and other rivers being exploited.

Grand Forks, B.C.

Active operations are proceeding at the Waterloo Mine under the management of G. A. Rendall. A shipment to the Trail Smelter, Consolidated Mining & Smelting Co. of Canada, consisting of 361 sacks of high grade silver-lead ore is reported to have been made. Last summer a shipment of 10 tons brought good returns. W. J. Banting's Lightning Peak Property is being developed as shipment of six tons being packed out to Edgewood to be forwarded to Trail. This, of course, is high grade ore.

Kaslo, B. C.

The Utica Mine, on Paddy's Peak is attracting much attention in this district. A portion of the mine workings was leased to A. J. Poyntz, formerly superintendent of the property, and shortly afterwards he made a strike of such richness that it is estimated the returns approximated $100,000. His lease is to expire in the course of two months and it is expected that C. F. Caldwell, one of those chief interested will take steps to interest capital in the further development of th property. The ore taken out by Mr. Poyntz contained high silver values.

Nelson, B. C.

The striking by the Nugget Gold Mines Ltd. of an ore body at a depth of nearly 1200 feet, which it would appear, confirms the sanguine expectations of company officials, is described by James Anderson, a well-known operator of Kaslo, B.C. as the most important mining development in the Slocan for many years. "This" he says "is the greatest depth obtained in any workings in the Camp and the success of the Nuggett people will encourage others on Sheep

Creek and throughout the Slocan to sink or drift for greater depth on their ore deposits. This should result in cheaper mining and greater production.'' At a recent meeting of the directors of the Company a statement was read from R. H. Stewart, engineer in charge of development, to the effect that he proposed turning on the vein and would start drifting immediately. Milling, it was thought, would commence about May 1st.

Three Forks, B.C.

That a new strike has been made on the Queen Bess at Three Forks, B.C. is reported, it being said that three feet of high grade ore has been exposed between the seventh and eighth levels. This is the mine which gave Clarence Cunningham, one of the largest individual operators in the Province, his start. For the most part its ore has been shipped direct to the smelters.

Vancouver, B. C.

Recent resignations of members of the Geological Survey of Canada will have a serious effect on geological research work in British Columbia. A short time ago announcement was made of the leaving of a number of the members of the board. This caused some alarm among those interested in the Board's activities in the Canadian West but the feeling has been considerably accentuated by the report that J. S. Stewart and Leopold Reinecke also have retired. Four of those who are withdrawing from government service were particularly well qualified, through practical personal experience, to continue the work in this Province and Charles Camsell, chief of the geological survey in Vancouver, points out that these men cannot be replaced. It is observed that, unless the Dominion Government recognizes the value of the geological survey to the Canadian mining industry by offering such inducement as will assure the retention of the best brains among gealogists, this branch of the Canadian Department of Mines must become disorganized.

Victoria, B.C.

Since the meeting of the British Columbia Legislature the development of the iron ore resources of the country by the establishment of an iron and steel industry has been the subject of much comment. F. A. Pauline, one of the members, addressed the House on this question at length, referring to the fact that in Seattle, Wn., a firm is engaged in the production of the highest grade pig iron from the magnetite ores of the Province by the electro-thermic method and advising that something be done to place the industry on a footing on the Canadian side. A. P. Gillies, a promoter who claims to represent eastern capital, has endeavored to interest the cities of Vancouver and Victoria and through them the Provincial Government in the launching of the industry on a considerable scale. He wants the government to guarantee interest on a bond issue of $5,000,000. The matter has not as yet beeen formally brought before the Provincial Executive. Meanwhile the Department of Mines is proceeding with plans for the further investigation of the limonite and hematite deposits of the Bridgewater River section, Lillooet Mining Division, on which Wm. M. Brewer, government mining engineer, reported favorably last summer.

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THE COLLIERIES

Commenting on the coal mining development on Vancouver Island, B. C. during the past year Wm. M. Brewer, government mining engineer, observes that two mines haveeen added to the active shippers. These are the No. 5 Mine, at South Wellington, the property of the Canadian Collieries (D) Ltd., from which coal has been mined on a commercial scale since early in 1919 and the Wakesiah Mine on the Wakesiah Farm, property of the Canadian Western Fuel Co., Ltd., which began producing commercially about October, 1919.

''Amongst new development'' Mr. Brewer continues ''or prospecting work there is the diamond drilling being done by the Canadian Collieries (D) Ltd. on the Tsa-ahl River, which empties into Baynes Sound about 5 miles southerly from Union Bay in the Comox Section of the Nanaimo Mining Division, also the reopening of the old slope by the Canadian Western Fuel Co., Ltd., on the Wellington seam, southerly from the Harewood Mine. The slope had been driven about 400 feet and abandoned by the former management. During the past summer the old workings were unwatered and examined with the result that the General Manager, George A. Brown, ordered that the workings be reopened and extended and the mine placed on a producing basis. This may be worked as Harewood No. 2 Mine, with a new railway connection, or the underground workings may be extended to connect with the haulage system on the Harewood Mine and the coal transported through that mine to the transportation system now in use.

Mr. Brewer also refers to the transfer of the Grant Mine, Nanoose Bay, to the Nanoose Wellington Coal Co., Ltd. Since the change of management considerable new construction and development work has been undertaken. This is itemized as follows: Two return tubular boilers, 125 H. P. each, one, 150 KW Electric Generator, one electrically driven Centrifugal Pump for Coal washery and fire protection, capacity 450 gal. per minute, two storage tanks for fire protection and coal washery, capacity 25,000 gallons, one coal washing plant, jig washer, screening plant, picking table, loading boom and bunkers for three grades of coal, the whole to be electrically operated, new office building and other new housing.

The underground development has been pushed on steadily, consisting of a main East level, and a counter level, driven approximately 1900 feet in the last year, with stalls driven to the rise and slope to the dip, and with entries turned off East and West. The mine is worked on the pillar and stall system.

NEW MINING COMPANIES.

The Stemwinder Mining Company, Limited, has been granted letters of incorporation for the purpose of prospecting, exploring and developing mining property and to carry on the business of a mining, milling, reduction and development company. Among the incorporators are :H. A. Harrison, W. J. Beattie, T. J. Carley, G. D. Kirkpatrick and J. F. Van Lane, all of Toronto.

A number of Ottawa men have formed a company which has been incorporated under the name of the American Mining and Milling Company, Limited, for the purpose of carrying on a general mining business. Among the incorporators are D. A. MacArthur, N. G. Larmouth, J. T. Richards, all of Ottawa.

LT.-COL. NISSEN SPEAKS.

Inventor of "Nissen Hut" Gives Interesting Address.

The Engineering Society met at a special meeting on Friday, January 30th, to hear Lt.-Col. N. P. Nissen speak on his invention, "the Nissen Hut." The auditorium in Gordon Hall was filled almost to capacity, and with quite original humor Col. Nissen held his audience with fixed attention and caused many a hearty laugh.

Prof. McPhail in his own inimitable manner introduced the speaker and informed his hearers that Col. Nissen studied at Queen's in 1894, and while here installed the machinery in the Mining Mill. Col. Nissen improved and perfected the Nissen Stamp, an invention of his father's, and besides being the inventor of the Nissen Hut was also an artist of note.

Rising to address the Society Col. Nissen said he was the most maligned man in the British army. Having heard such dreadful things about the Nissen Hut he apologized for ever having invented it. He once heard a Tommy describe it as, "One of them huts you sit down in but couldn't lean back." He then went on to explain that it was while serving in an R.E. Field Company at Ypres he realiezd the need of a standard hut for troops. In designing such a hut he was confronted with many problems: it would have to be perfectly dry, manufacture, transportation and erection to involve a minimum of labor, materials easy to procure and inexpensive and each part would have to be interchangeable. While working out the problem of its shape he recalled the Kingston skating rink, and he said that was the real father of the Nissen Hut.

These huts were used by all the Allies. Over 100,000 were manufactured and shipped to every theatre of war. Later Col. Nissen designed a circular portable hut with improvements in ventilation. The latter was eight feet in diameter, held twenty men and weighed only thirteen hundred weight. The signing of the armistice, however, came before these could be sent to France.

Col. Nissen exhibited a statuette he had designed and modelled for the institution of Mining and Metallurgy to commemorate one hundred and fifty members of the Institution who, serving in the Tunnelling Companies had been killed in action. The statuette is indeed realistic. It is the production of a tunnelling officer in thigh boots, ankle deep in Flanders' mud, in the act of plunging the handle of an exploder to "blow the Hun." —From the Journal of Queens University.

Power House and Shaft, Brooklyn Mine.

DEEP MINING IN MICHIGAN COPPER DISTRICT.

Direct Hoisting Contemplated from Depth of 10,000 Feet.

By R. E. HORE.

Plans are now being made for mining at greater depths at the Calumet and Hecla and Quincy copper mines in Northern Michigan. These are already very deep mines.

The Calumet lode is one of the best known ore deposits in America. It is the copper-bearing portion of one of the conglomerate beds interstratified with the volcanic rocks of Keweenan Point. The conglomerate is a relatively thin bed which has been traced more or less continuously for several miles. The ore bearing portion is almost entirely confined to that part, about two miles long, which outcrops on the property of the Calumet and Hecla Mining Company. The copper occurs as native metal. The rock is made up largely of pebbles of felsite and quartz porphyry cemented together with small particles of rock, calcite copper and some hematite, quartz, epidote and chlorite. The thickness of the lode as determined by mining operations is from 10 to 20 ft. The lode strikes No. 33° E. and dips to the northwest at about 38°. There are several incline shafts in the lode. Mining operations have been continuously carried on for many years, and the problems encountered with increasing depth have been satisfactorily solved. The methods devised have permitted the complete extraction of the ore and when a stope is finished there are no pillars of ore left standing. The support necessary during the mining operation and for a short time after is obtained by the use of heavy timber. The system adopted makes long support by stulls unnecessary, the hanging being allowed to cave or shot down to provide its own support. A substantial pillar is left at the shaft to be recovered only when the ore on either side is all extracted. Stoping is started at the boundary of a shaft block and retreats towards the shaft. A solid row of heavy stulls at the level alone gives the necessary protection during the period of working the stope below. The miners are always working under a stope that has only recently been mined and in which the timbers are still strong. The method has been in satisfactory use down to the depth of 8,100 ft., the deepest of the slope shafts in the Calumet lode. It is now proposed to make the 8,100 ft. a main haulage level and to sink sub-shafts from that level to a depth of 10,000 ft.

At the Quincy mine the Perrabic amygdaloid lodes are worked. The lodes here dip more steeply than at Calumet, the Quincy near the surface being about 54°, but becoming flatter with depth. At a distance of over a mile down on the slope the dip is about 40° and in the northern part of the mine 38°. The lodes strike N. 30° E. and dip to the northwest. They have been developed on the Quincy for a length of about three miles and a depth of over one mile. Machinery is now being installed to permit direct hoisting from a depth of 10,000 ft.

At the Quincy mine there is less timber used than on the Calumet lode. Broken waste rock is used to fill the stopes as soon as possible after the ore is etxracted. There have been many severe underground disturbances due to crushing in the Quincy mine, but the present policy of leaving large shaft pillars and filling the stopes quickly with waste appears to be giving satisfaction. In the earlier days insufficient support was

provided and the mine is still subject to "air blasts," owing to failure of support in old workings. The management is confident, however, that mining can be safely carried on at much greater depth if the stopes are promptly filled after the ore is extracted. The installation of the new hoisting engine is evidence of faith in the present methods.

Aside from the problems arising from the great pressure at the depth where mining is to be carried on, there are big problems in hoisting. The two companies are attacking this problem in different ways. Their success in overcoming such problems as depth has increased may well lead one to have confidence that the engineers of the Quincy and Calumet and Hecla companies will in both cases give good exhibitions of the possibilities of mining copper at still greater depths.

ONTARIO'S GOLD PRODUCERS

There has just been published by the Ontario Bureau of mines a report on mining in the Province during 1918. This contains the statistical review by L. W. Gibson, Deputy Minister of Mines, and the usual reports of the inspectors of mines. There is also presented the first report of the Joint Peat Committee and the report of the Advisory Gas Board. The publication is Part 1 of Vol XXVIII. Part II, entitled "Abitili—Night Hawk Lake Gold Area," the authors being C. W. Knight, A. G. Burrows, P. E. Hopkins and A. L. Burrows, was published some time ago.

A preliminary report on production in 1918 was published in March 1919 and much of the other information in this final report was given out by the Bureau several months ago. There is much new matter, however, bearing on progress in 1918 and in many cases information gathered during 1919 by the staff of the Mines Bureau has been incorporated.

An analysis of the gold production of Ontario shows that there was milled during 1918 875,593 tons of ore which yielded 411,878 oz. gold valued at $8,502,480 and 73,753 oz. silver valued at $71,366, a total of $8,573,846. Of this $7,833,965 is credited to Porcupine and $636,667 to Kirkland Lake area. The 816,037 tons of ore from Porcupine mines yielded an average of $950 per ton and the 53,523 tons from Kirkland Lake mines yielded $11.81 per ton. The tonnage milled and the gold produced for every producer in Ontario is given.

Ten mines contributed to the Porcupine output in 1918,—Hollinger, McIntyre, Porcupine Crown, Dome Lake, Schumacher, Porcupine V.N.T., Dome Davidson, West Dome and Newray. Several of these are not producing at present owing to the high cost of operating.

The chief producer outside the two main areas was the Croesus. From this property 692 tons averaging $93.61 per ton was taken in 1918. The mine has been closed down for some time. The Patricia now idle obtained $10,113 from 1,502 tons of ore.

In Western Ontario the chief gold producers in 1918 were the St. Anthony, which is now idle.

While several of the properties which produced some gold in 1918 are at present idle, it is expected that the 1920 output will be much larger than that of 1918. The chief producers Hollinger and McIntyre are making great headway and the Dome is again in operation after a long period of non production. Progress of the Kirkland Lake mines was halted by labor troubles in 1919, but it is expected that the favorable development of this area will soon be reflected in increased production.

Assistance to the gold mining industry is coming from an unexpected source—the high rate of exchange. During the war the cost of gold mining increased rapidly and has remained high. The operators have been in an unenviable position as regards sale of their product, the price being fixed. It has been frequently been argued that the price of gold is too low, but the arguments did not help the producers in their battle wih increased costs. In the present exchange situation the gold producers have an advantage as welcome as it was unexpected. The selling price of gold in Canada remains nominally as before, but with a premium in acordance with exchange that makes it posible to secure the same price as could be obtained in the United States.

THE JOINT COMMITTEE OF TECHNICAL ORGANIZATIONS

The Joint Committee of Technical Organizations was formed in Toronto during the war to bring together engineers for war work. The several technical organizations having Toronto branches each sent representatives. The Committee did useful work during the war and it is now planned to put the organization on a peace basis. It has served the purpose for which it was brought into existence, but there seems to be good reason for the perpetuation of such organization as it bring together men from several branches of the engineering profession.

The first representative of the Toronto branch of the Canadian Mining Institute on the Joint Committee was Mr. W. E. Legsworth. He did not long continue to attend the meetings of the Committee, however, for his keen interest in the work started by the organization led to his being selected for the important position of Director of Vocational Training where he found so much work to do in all parts of the Dominion that he had to give up entirely his engineering practise Mr. Legsworth succeeded in interesting Prof. H. E. T. Hamilton in the work and the latter appointed Director for Ontario, built up an organization that did splendid work. The early meetings of the Joint Committee therefore were in no small measure responsible for bringing from the ranks of Toronto many engineers, two men who did work of great public value; work that has been creditable to the engineering profession and of great assistance to thousands of return soldiers.

The work of the Joint Committe has been naturally varied for there were many different things to occupy its attention. The Dominion Government evidently approved of the work, for during the war it granted money to help defray the expenses. This grant is no longer available and the new work and new methods of financing it make reorganization necessary.

The Toronto branch of the Canadian Mining Institute at a meeeting on Jan. 31, decided in favor of proposals to reorganize the Committeee and to appoint representatives. There was some discussion as to whether there was further need for the Joint Committee, and there was opinion expressed that such a Committteee might take too much authority on itself and undertake to act as representative of all the local technical societies.

B. C. NOTES—CONTINUED

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Hazelton, B. C.

The Golden Crown Group of mineral claims situated near Usk on the Grand Trunk Pacific Railway is being systematically developed by the Kleanza Co., Ltd. Three veins carrying gold—silver—copper, values have been traced and prospected by a series of open cuts and stripping for a distance of three miles from Gold or Kleanza Creek over the summit to the Copper River slope. In the summer diamond drilling is to be started. Water power has been secured on Gold Creek and a dam is under construction which will assure the development of three thousand horse-power.

Atlin, B. C.

The Engineer Mine, Atlin, B. C. has been thoroughly inspected by a number of American engineers with a view, it is said, to its purchase. This is one of the best-known lode gold mines of the Province. As far as it has been developed the richness of the quartz in places has been shown to be remarkable. Capt. Alexander, who lost his life when the S. S. Sophia foundered, was offered over $1,000,000 for the property. On his death it fell to Allan Smith, who was financially interested with Capt. Alexander. Subsequently Mr. Smith died. Since then the mine has been idle but it is said that the title has been straightened and residence of the Atlin District are looking forward to the resumption of operations on a considerable scale.

Stewart, B. C.

A 100 ton concentrator and flotation mill is to be installed at the Premier Mine, reports from the north being to the effect that machinery is being taken in now in order that it may be transported over the snow by sleigh. The plan is to set up the plant during the summer so that it will be ready for operation early in the fall.

Hyder, Alaska.

Until a few weeks ago Hyder probably was the most "wide open" town on the American continent. Its daily life recalled Bert Harte's narratives of early California days. John Ronan's appointment as United States Marshall has effected a complete change. Gambling and "Blind Pigs" have been closed down and the prosperous little mining town is now quiet and respectable.

Alice Arm, B. C.

The La Rose Mine, Alice Arm, has made a shipment to the Trail Smelter on which a gratifying return has been secured. This property is situated near the Dolly Varden. A tunnel has been drifted 250 feet disclosing a good body of ore. Plans are being made for extensive development next summer.

Prince George, B. C.

The Taltapin Mining Company is making satisfactory progress in the development of the Silver Fox Group on Anderson Creek, 22 miles from Burns Lake on the Grand Trunk Pacific Railway. A tunnel is in 30 feet exposing 4 feet 6 inches of ore which is said to run $800 to the ton by fair sampling, the values being in silver, lead, copper, gold and zinc.

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Phillips Arm, B. C.

A well defined quartz vein, said to be eight feet in width, has been located on the Amethyst Group of Claims. The ore returns gold-silver-and copper values. The Bluebell property, on the opposite side of the Arm to the Amethyst, is reported to be bonded to the Ladysmith Smelter interests.

Salmo, B. C.

The Nugget Gold Mines, Limited., whose tunnelling operations at Sheep Creek for the purpose of striking at depth the vein of the Motherlode Mine have attracted considerable attention, announce that the object of the work has been attained. It is said that the tunnel has cross-cut a vein of good-looking quartz. The vein is twelve feet between walls. There are three feet of rich looking ore, the balance being crushed quartzite." Assays are reported to have given returns of about $17 a ton.

Nelson, B. C.

J. R. Hunter, President of the Nelson Board of Trade, in his annual report refers to the mining situation of the District in part as follows:

"The Eureka and Granite Poorman Mines have been bonded to Walla Walla capitalists, who are at present driving a long cross-cut on the Eureka with the object of striking the ore bodies at greater depth. When this is done and a slipping is commenced the ore will be treated at the Granite Mill, which has been equipped with a flotation process, which, according to tests, will mean a great saving in ore values. It is also the intention of the owners to carry out extensive developments on the Granite Poorman as well, so that we can look forward to great activities.

"The Molly Gibson has been under development and considerable shipping has been done. The Ivy Fern (Cultus Creek) which has been bonded by the Consolidated Mining and Smelting Company, is being developed by the driving of a cross-cut tunnel to strike the main ore bodies at depth. A great deal of surface work also is being done. This is going to be one of the great tonnage properties of the Interior.

"We might also mention the Nugget, Motherlode and the Emerald, the latter having just completed a new mill for the treating of its ores. Its showings are most satisfactory and it no doubt will be one of the big producing properties."

The Rambler-Cariboo Mines, Ltd., has completed its title to the Jennie and Last Chance Claim by making the large payment of $25,000 on the purchase price of $60,000. The new ground gives the Rambler 1650 feet on the strike of the vein which already has yielded between $2,500,000 and $3,000,000.

Trail, B. C.

In only three weeks of shipping receipts of ore and concentrates at the Consolidated Mining and Smelting Company's smelter at Trail new stand at 19,872 tons, of which 1,138 was concentrates and the balance ore. The receipts for the week ending January 21st were 7,758 tons, of which 244 were concentrates. The week's shipping list consists of 19 properties or groups of properties and during the three weeks 32 properties or groups of properties have shipped. An average of 6,624 tons of smelter feed per week for the three weeks is considered an excellent start on the year's work.

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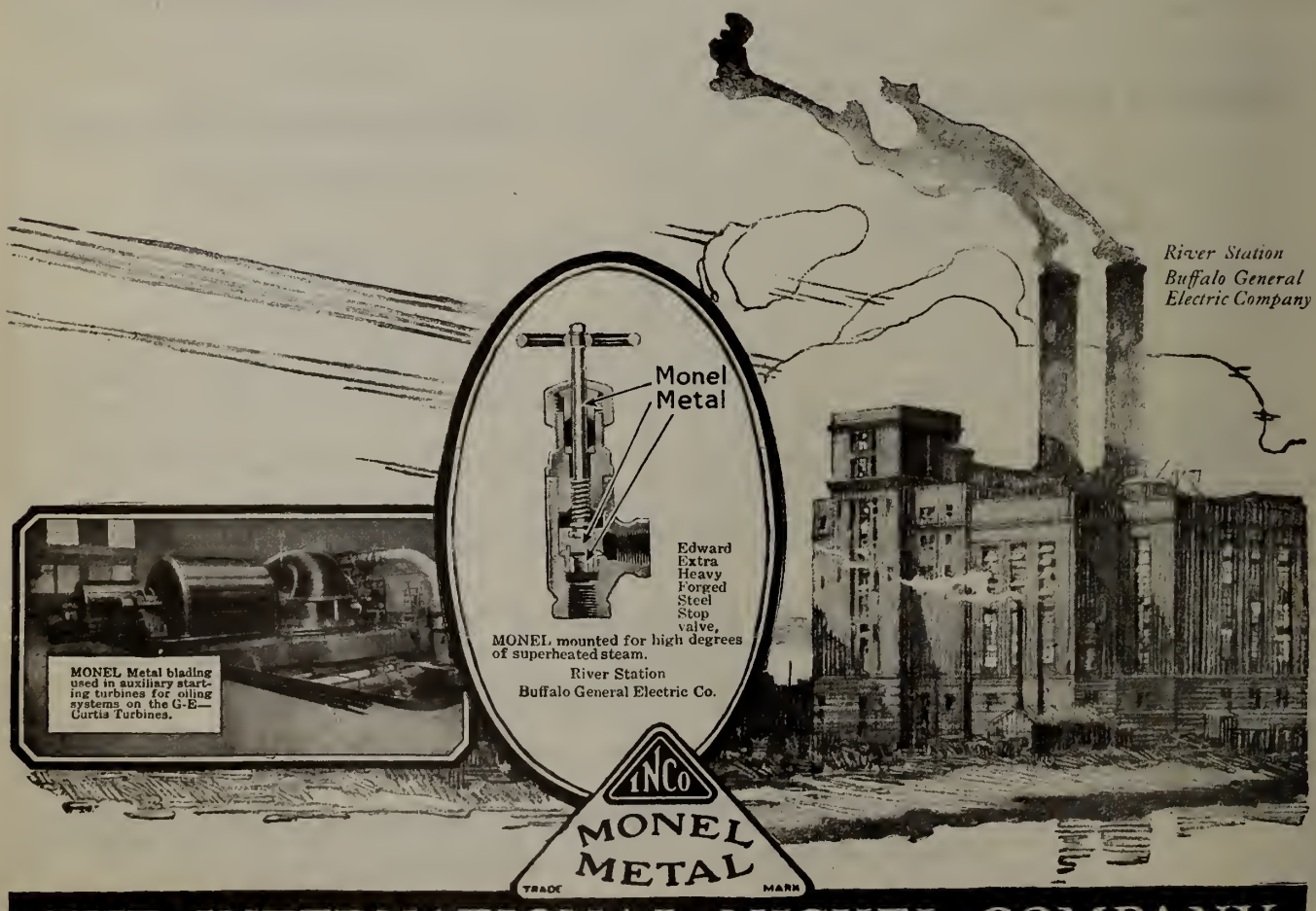

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:-: EDITORIAL :-:

The Availability of Labour in Canada

We call our readers' attention to the note on the labour situation in Canada which appears in this issue. It is specially contributed by one who is in the closest touch with the questions surrounding the availibility of workmen for the mineral and associated metallurgical industries of Canada. It will be found to confirm the forecast which appeared in the "Journal" in October 1918 * of an impending shortage of unskilled labour, and indicates that before very long the Government will have to consider not only the relaxation of the present stringent immigration regulations, intended to act as a deterrent to the incoming of this class of workmen, but will require to resume the former policy of attracting emigration to Canada. Our correspondent points out that the diminished value of European currency in Canada, and the greatly increased expense of railway and steamship transportation are in themselves factors that will tend to restrict emigration from Continental Europe in a very marked measure.

The shortage of unskilled labour is already acting as a brake on production in the East. In the West conditions are easier, but the coal mines and steel works of Nova Scotia, the lumbering, metallurgical and mining industries of Quebec and Ontario, are all suffering from a shortage of men who are willing to work with their hands, and an over-supply of men who are not so willing. It is certain that the type of emigrant now coming into Canada will not undertake the kind of employment that the Italian, Hungarian, Galician, Pole, Russian, Bukovinian and Finnish labourers did before the war.

One partial solution of the difficulty is the substitution of mechanical devices for hand labour, and much progress has already been made in this direction. At one large mine, situated in a locality where labour was formerly plentiful, not less than ninety-five per cent of the ore handled underground is loaded by mechanical shovels. A recent article in this Journal, and a much more detailed article in a recent issue of the "Engineering and Mining Journal" show that mechanical loading devices are now available in much variety and suited to many differing underground conditions. Shovels can be obtained for use in open-face work and in high seams, or they can be obtained for use in the confined conditions of heading and development work. In practice they are found to increase production and materially decrease costs of production, and although the capital expenditure required is not light, the choice of the operator will shortly lie between introducing mechanical methods of handling the product of the mine, or cessation of production. The mining company handling large quantities of ore, stone or coal, that does not include among its appropriations some expenditure on the adaptation of mechanical handling devices for underground use is neglecting an obvious precaution, in the light of the forecast made by our contributor.

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* Vide "Canadian Mining Journal," No. 22, 1918. Possibilities of European Immigration after the War" by F. W. Gray.

Mining "Investments"

One of the features of newspaperdom today is the extent of unrestrained advertising of gold and silver mine promotions. "Age cannot wither, nor custom stale their infinite variety" and the apparent freshness of their appeal is contemporary confirmation of the everlasting renewal of the confiding ones. We recently heard of a gentleman—a prosperous plumber—who testified to his contempt for the uninteresting character of Victory Bonds as an investment. "Give me," he said, "something sporting, something on which I shall either made a lot or nothing." Just how much of the lure of mine promotion advertising lies in this frame of mind, and just how much is pure flat-catching would be difficult to estimate, but judging by the full-page advertisements that are run in our most reputable newspapers, the audience of the mine promoter must be large and avid.

In the Montreal Star there appears an advertisement of the Little Gem Mining Company, and truth to say, the literature of this promotion is a gem. "If," says the tempter, "if you think our proposition is too good to be true, why not then be a sport if you think it is

a gamble, and buy 1,000 shares or even 100 shares? You will find it is one of the squarest games you ever played, and the pot you win will be the largest you ever dreamed of, "ALL DEPENDING ON THE AMOUNT YOU ANTIE UP." Our surmise would be that the author of this diamond of appeal knows more of poker than his spelling of the word "ante" would indicate.

This Journal knows nothing of the little Gem Mining Company, except that it is stated to be in Alaska, but we believe there is no real necessity for Canadian investors to gamble on a pot in Alaska, seeing that so many are sitting in at the feast of Canadian mine promotion at this date. The most glittering ornament among the coruscation of promises in the advertisement is the statement "Dividends sure unless "an earthquake destroys the mine, or the boat with the "machinery is sunk en route."

The mining engineer on whose report the glowing nature of the prospectus is based is R. David Reese, M.E., to whose character testimony is borne by Mr. G. Goldstein of Goldstein's Emporium, Juneau, Alaska. If there is anything in a name Mr. Goldstein should be well qualified to pass upon a gold mine.

Now we know nothing of Alaska, Mr. Reese, or the Little Gem property, but, if Canadian investors feel in serious need of a little poker game there are quite a number of domestic ventures that are daily recommended through our newspapers, sandwiched in between advertisements of Victory Bonds and provincial long-term notes, and cunningly alluded to in the letterpress of the financial page, . beflowered with a verbiage that is redolent of diabasic flows, batholiths, circulating solutions and differentiated magmas that sound like something but mean really nothing.

EN PASSANT.

We recently noticed in a Toronto newspaper some artless references to a gentleman named John Jones who it is said is noted from Cobalt to Alaska as a prospector. He is making a trip into the "North Country"—a delightfully vague terminology, — to locate a "huge tract of coal-bearing country, of which word was brought back by a traveller a quarter of a century ago." In this legendary region it is ingenuously remarked: "There is some coal, lignite. How much, "Jones is going to find out. Lignite is a soft coal, "but Jones is strongly of the opinion that the coal "will get harder the deeper it is mined. The geological "formation is very similar to that of the Pennsylvania "mines, where the surface of the coal is lignite, grad- "ually improving and getting harder as it is mined."

We had not heard of this remarkable natural phenomenon of Pennsylvania. Perhaps if they dig a little lower there may be diamonds. It is an interesting hypothesis. Mr. Jones's remarks, as interpreted by the reporter sound rather like the prospectus of a gold mine, of which Mr. Jones should not be ignorant, because it is further stated that "Jones knows the history of the North from A to Z, not only its commercial aspect as set forth by company prospectuses, but the very human history of the mining and timber lands, where law is often an unaccepted theory and men become plutocrats by the simple expedients of stealing their neighbor's timber or flooding them out of their mines." Oh, Mr. Jones!

But Mr. Jones had still more wonders to unfold to his trusting auditor. He informed the reporter that Northern Canada is a neglected El Dorado, and that he could talk on the subject for a day and a half and touch but the fringe. We can believe it. Nevertheless it is recorded that "Mr. Jones outlined it in a few words, and then—took the reporter into the yard and showed him his dogs." Mr. Jones should write mine promotion literature. He is wasted driving a dog team. Or perhaps, it is the reporter that has mistaken his vocation?

NOVA SCOTIA NOTES.

Malagash Salt.

The "Journal" is informed that very satisfactory progress is being made with the development of the salt deposit at Malagash, owned and operated by Messrs. Chambers of New Glasgow. About ten tons daily are being produced, and users of the salt are pleased with its quality. The property is of course capable of much larger development, but up to the present, the expenses of equipment and development have been met out of the proceeds of production and no large capital expenditure has been made. In view of the promising nature of the deposit, and its great economic importance to the fisheries which are so large a source of revenue to Nova Scotia, it may be anticipated that before long the property will be developed on a much larger scale.

Coal Production.

Coal production is proceeding at a brisker pace, particularly at the mainland collieries. In the Pictou Field the coal required to fill the sales programme of the Nova Scotia Steel and Coal Company is not only taking all the production of the Acadia Coal Company, but arrangements have been made by which the production of some of the smaller operators in this field is being taken by the Scotia Company.

The coal mines of the Scotia Company at Sydney Mines are working to full capacity, the production being at the rate of from 50,000 to 55,000 tons monthly, or approaching pre-war figures.

The mines of the Dominion Coal Company are working steadily, but the rate of production remains very much below previous figures. This company is more affected by the shortage of suitable labour than any other operator in Nova Scotia nor under present immigration regulations and the cost of railway and steamship transportation does there seem any immediate likelihood of additional suitable labor being secured.

Notes on the Labor Situation in Canada

(Specially Contributed.)

Previous to the war Canada got its common labor supply largely through immigration from Continental Europe.

During the period of the construction of the Grand Trunk Pacific and Canadian Northern railroads thousands of Italian, Austrian, Hungarian and Russian laborers came into the country.

When the war broke out in 1914 practically all the Italian and Russian laborers of military age either went back to Europe to join the army or joined the Canadian forces.

The subjects of the Central Powers were of course not allowed to leave Canada and during the winter of 1914-15 when industrial conditions were very bad and these men could not get work some thousands of them were gathered up by the Dominion Government Authorities and placed in internment camps in various parts of Canada.

During 1915 and 1916 when conditions had improved and when industrial plants and mines were working to capacity some hundreds of these laborers were released on parole from the internment camps for work in different parts of the country to make up to some extent for the shortage of common labor then existing. These men were all paid the regular wages that pertained to the industry in which they went to work.

At the conclusion of the war and as soon as travelling facilities could be obtained thousands of these laborers left Canada to return to their homes and at the present time other thousands are waiting to go as soon as passports and transportation are available, so that it looks at present as if there would be a serious shortage of common labor in the country when construction work starts up in about three months time—as it is very doubtful if the countries to which these laborers belong will sanction their leaving home for some time at least. It might be here mentioned that all or nearly all these men made big wages and took away with them hundreds of thousands of dollars in the aggregate.

Even if the men wanted to return to Canada and their governments were willing to give them permission to come the cost of travelling has advanced to such an extent that it is practically prohibitive. For instance a ticket from Europe to Canada that in pre-war days could be purchased for $30.00 now costs $75.00 and the recent enactment of the Dominion Department of Immigration whereby laborers and mechanics coming into Canada must be in possession of $250.00 adds to the difficulty particularly as the value of Continental money is now less than half of what it was in pre-war days.

One thing regarding new immigrants coming to Canada is practically certain and that is that men who have spent five years in the armies of Europe no matter how anxious they might be to get away from there cannot gather up sufficient money to travel under the above conditions.

The situation therefore that confronts the employer of common labor today is something as follows:—Some thousands of laborers have gone to their homes in Europe, other thousands are anxiously waiting to go and when railroad construction and other public works start up in April and May there is no available common labor.

There is no immigration into the country at present but some relaxation of the Government Regulations will no doubt be made.

It is well known that railroad construction and as a matter of fact all construction work pays higher wages to laborers than do the industrial plants—the reason for this being that construction is only temporary work whereas industrial plant work is looked upon as permanent nevertheless the question of permanency does not enter largely into the calculations of a man looking for a job. He goes where the wages are highest and consequently the construction job gets the pick of the men while the industrial operator takes what is left.

A perusal of the Trade Journals shows that the United States steel plants and coal mines at present are working to the limit of their labor supply and they are unable to take any more business, as their unfilled tonnage orders are growing larger each month, and it is reasonable to assume that this state of affairs will also apply to Canadian plants. It is hard to see how production can be increased if there is a shortage of labor to produce.

SHORT COURSE FOR THE PAS PROSPECTORS.

Will Begin With Meeting of Manitoba Branch of Canadian Mining Institute.

Arrangements have been made for a short course for prospectors and others interested in mining development in The Pas field, during the fortnight following the Dog Derby, on March 17. The course will begin with an open meeting of the Manitoba branch of the Canadian Mining Institute, on Friday evening, March 19th, in the Community Building. It is intended that the course take the form of short talks, followed by discussions on the following:

The characteristics of copper ore.

Field relationships of copper deposits in Northern Manitoba.

Copper smelting and refining.

The copper market.

Zinc-copper ores and their treatment.

Gold and associated minerals in Northern Manitoba.

The field relationships of gold deposits in this district.

The treatment of gold ores.

What assistance should the gold mining industry obtain?

Some unprospected fields in Northern Manitoba.

Blowpipe and other methods of ready determination of ores and other minerals.

The marketing of prospects.

A representative collection of specimens from all known properties in Northern Manitoba has been assembled for reference, and a general collection of ores will be provided for practical study. Lantern slides will be used for purposes of illustration. It is hoped that all who intend to be in town for the Derby will, if interested, co-operate in this course.

Engineers and the Mining Industry

By R. E. HORE.

Man has become dependent on the products of mines for his existence. There may be places were people can live comfortably, like Adam in the Garden of Eden, without utilizing or knowing anything about metaliferous minerals or of coal or oil; but without the products of the mines most of us would be far from contented, even if we had many other things that Adam had to live without. It may therefore be said to be the function of the people engaged in mining, to supply us with certain materials necessary for our existence. Those who do no mining must provide the miner with other necessaries, if they wish to get a share of the products of mines. It is up to those who operate mines to see that the exchange is on a fair basis. They must give close attention to the selling of their product as well as to the work of mining and treating the ores, so that those who supply the necessary money and those who do the necessary manual labor will all be well paid.

Those who undertake mining ventures are doing something for the public good; but they are not doing it for philanthropic purposes. Their purpose in producing metals or fuel is to obtain a surplus of something that can be exchanged for some other things they want. Money being the medium for the exchange, the primary purpose of mining ventures is to make money.

Those who devote their lives to the application of science to mining are commonly called mining engineers. It is a function of the mining engineer to use materials, energy and money to the best advantage in the working of ore deposits. This function of the mining engineer is comparable with that of the civil mechanical or electrical engineer and brings him into close touch with men of those professions. Some of these men are connected with industries in much the same way as the mining engineer and have constantly to keep in mind whether proposed work will be profitable or not. Many engineers however, are engaged in work, such as that of public highways, railroads, power development etc., in capacities which place on them no responsibility as to whether it will pay profits or not. There are some mining engineers working in a similar capacity for large companies, but the mining engineers in more responsible positions have constantly to keep in mind that the purpose of their work is to make a profit for those who finance the venture. He has also the task of finding more ore as the work proceeds.

While in the operation of a mine the mining engineer has to assume duties not incumbent on many of his professional relatives, he has still more diversified duties in the early stages of development of a property. When work is begun, there is little known concerning the amount and value of ore in any deposit, yet the engineer must decide on the possibility of minig it at a profit. He has also to decide whether the possible profits warrant payment of large sums to the owners for the property. If he wishes to operate the mine himself he has then to demonstrate some financial ability in finding the necessary money. Comparatively few mining engineers have the necessary money to bring a prospect to the producing stage; but many have undertaken the task of raising money as well as spending it. The mining engineer is thus called upon in some cases to do many things that are not commonly called engineering.

The impossibility of determining beforehand the extent and value of an ore deposit makes the development of mineral property a hazardous enterprise. The engineer who advises development work cannot demonstrate the value of the property until the job is finished and the ore is all mined out and sold and the plant is scrapped. He can however, examine the property carefully and obtain more useful information on which to base an opinion than can the average person. His report on a prospect is an opinion based on the facts obtainable and its value lies in the fact that the trained, experienced observer sees more and is more likely to interpret facts correctly than is the inexperienced. Any engineer's report on a prospect is however, best regarded as but an expression of opinion. Those who provide money therefore for the development of prospects must properly consider that they are venturing into the unknown, and that they may lose all the money spent in development work. The justification that the engineer has in recommending such speculation lies in the possible large profits that may accrue. If the many mineral discoveries made each year a very small number prove be of any consequence and few of these prove worthy of development. Engineers knowing the facts are not inclined to be overly optimistic about any prospect.

Favorable reports are not numerous. Mining engineers are sometimes charged with being unduly pessimistic, but in most cases it is the ore deposits rather than the examining engineer, that is the cause of disappointment. A lot of time and money is spent in the search for ore deposits. It is a function of the mining engineer to see that the prospective expenditures are warranted and to advise his clients of his opinion. His experience and training can reasonably be expected to assist him in forming an opinion, that is more valuable than that of most men. In all cases however, it should be understood that the engineer in recommending development of a prospect is advising speculation rather than investment. He can give no definite assurance of success; but he can indicate to those who are willing to take big risks, possibilities of making large profits. Having a special knowledge of ore deposits and the methods and costs of working them, the mining engineer can properly advise speculative enterprise. All producing mines were in the prospect stage at one time in their history and they would still be prospects if no great risk had been assumed by those who developed them.

Many engineers must devote their attention chiefly to the economical working of ore deposits that are already partially developed; but others must undertake the more hazardous task of developing prospects and in some cases the financing of the enterprise. Since financing must be undertaken at a time when the value of a mining property is unknown the mining engineer who undertakes to find the money for development work is faced with a problem in finance quite as important as his technical problems. He must also have executive ability for the carrying out of the work which his technical training and experience and his knowledge of the property suggest.

The mining engineer has also work of quite another character. Mines are commonly the pioneer industry in otherwise undeveloped places. The men in charge of operations become naturally leaders in the mining community and they naturally take greater interest in the welfare of their employees than is to be expected in the case of industries in large cities.

While the services of the mining engineer are needed in the development of properties and in the determination of methods of mining and of the necessary machinery, tools supplies and labor when mining is begun, they are also needed at all times during the life of the mines. The engineer who constructs a concrete highway or builds a bridge can turn it over for public use and feel satisfied that he has finished the job. The equipment and development of a mine is a very different matter. Every day's work in the mine brings new engineering problems and it thus becomes desirable that the operation of a mine should be in charge of an engineer until the ore is all extracted. The most suitable equipment and methods cannot commonly be definitely determined very far in advance of development. Changes to meet new conditions are constantly necessary. The appointment of mining engineers to the positions of mine managers is a natural consequence of this necessity for the continuous service of engineers.

PROF. GWILLIM REPORTS ON BRITISH COLUMBIA OIL PROSPECTS.

The report of Professor Gwillim on the oil possibilities of the Peace River District of British Columbia was brought down in the Legislature at Victoria by Hon. T. D. Patullo, Minister of Lands, who stated that Prof. Gwillim was appointed in May last to make a geological reconnaissance of areas in the Peace River country where strata formations were believed to correspond with those being investigated in Alberta, where extensive exploratory work was being carried on.

A comparison is made between the oil-bearing formations in Southern Alberta and similar formations found in the Peace River district, the latter of which are declared to be on a larger scale. It is pointed out that the strata are traced from the up-thrust and crumpling of the Rocky Mountains down to the rolling foot-hills until they flatten out and decline at low angles beneath the great trough or syncline which crosses the Peace River. It is the opinion of Prof. Gwillim, therefore, that the portion most worthy of closer investigation is the strip of country lying between the gentle dip towards the great syncline and the area of disturbed geology adjacent to the mountains.

The following formations, says the report, were met with in descending order.

1. Smoky River shales.
2. Dunvegan sandstones.
3. St. John shale.
4. Bullhead sandstone, with trassic shales and sandstones below. The Bullhead sandstones are considered to be the shoreward equivalent of the Peace River sandstones and Loon River shales. It is near the base of the latter that oil is found on the lower Peace River at about 1,100 feet below the river level.

Prof. Gwillim's report says that the Bullhead sandstone is a geological equivalent to the oil or tar-bearing strata of the lower Peace River, Athabaska River and of the Black Diamond area in Southern Alberta. "These Bullhead sandstones are structurally favorable, that is, there are rolls, saddles or anticlines, covered by St. John shale," the report continues, "which is impervious enough to hold down any oil beneath them. There is no proof that oil exists in or beneath the Bullhead sandstones, but the possibilities are sufficeient to justify extensive reconnaissance work in adjacent areas by a large oil corporation."

Commenting upon the report of Prof. Gwillim, Mr. Pattullo says: "From the work carried on by Prof. Gwillim last year it seems highly desirable that much more extensive work of a general character should be carried on during the coming year, with some detail work in certain localities. The report is of a valuable character, and the good work must be continued this year."

MR. F. B. MACAULAY'S APPOSITE PARABLE.

The House of John Bull & Sons.

"An American professor has been kind enough to suggest that Canada is insolvent because she does not pay gold. We may compare our position with that of two men, each of whom owns a number of highly profitable farms, and has other industries. One however, is more southerly than the other, and can grow crops which the other cannot. The northern man buys the southern products. He offers in payment wheat or flour, but is told, 'I do not need that; I have all I require of my own.' He is offered beef and pork, with the same answer. He is offered lumber and paper, and is told, 'Yes, I will take some of that, but not enough to cover the amount you owe me.' The southern man says, 'Pay me gold,' which of course the northern man cannot get anywhere. Finally the southern man says, 'I will take a mortgage on some of your farms for the amount, but I will only take it at fifteen per cent. discount.' Is the northerner insolvent? Rubbish. He is highly prosperous and able to pay everything, if only his southern uncle would take the kind of goods which he produces. Insolvent? Not at all, he is merely showing bad business judgment in buying from the wrong person. He begins to look around, and finally remembers that he actually belongs to a big firm, John Bull and Sons, and that another member of that firm, who happens to be his father, has factories that can supply much of what he needs, and another member a brother, has southern farms which could be developed to supply all the tropical goods he requires. What does he do? He begins to deal with the members of his own firm, and to develop their resources, and soon his problems come to an end.

"That is the lesson from our exchange situation with the United States."

The coal problem of the United States, and of Canada also, is to a great extent one of haphazard production, uncoordinated with transportation facilities; and varying seasonal requirements for coal accompanied by seasonal limitations of transportation and production. The coal problem is probably seventy-five per cent a transportation question.

The Ore Deposits of Goudreau and Magpie-Hawk Areas, Michipicoten District, Ont.

The Summary Report of the Geological Survey, Part. E., 1918, contains a detailed report by W. H. Collins on the pyrite and iron ores of the Michipicoten District in which pyrite mining was greatly stimulated by increased domestic demand for sulphuric acid caused by war requirements and the cessation of shipments of Spanish pyrite. In 1918 the Survey entered this field with the intention of aiding prospecting and development.

An attempt was made to assign some definite stratigraphic horizon in the Keetwatin to the formation which carries the iron ore and pyrite. A tentative effort was made to recognize some of the members of the Keewatin group, arrange them in order of age, and even to represent them thus on the maps. The Report states:

The attempt met with only a small degree of success. It was soon found in Goudreau area, explored first, that most of the iron-formation rests upon light coloured porphyries which, being volcanic flows, are, therefore, older. Also, that the flows above the iron-formation are largely, if not altogether, dark-coloured greenstones. On this basis the Keewatin in Goudreau area was separated into three parts; an older group of light-coloured acid volcanics, an intermediate one of iron-formation, and a younger one of dark-coloured, basic volcanics. Later on, however, it developed that this classification is only approximate; that there are a few acid volcanics apparently younger than the iron-formation and quite a few basic volcanics older than it. Nevertheless, the subdivision was successfully used in searching for and locating belts of iron-formation not heretofore known, so it has some practical value.

An attempt to make a like threefold subdivision in Magpie-Hawk area failed. It is quite remarkable how many of the volcanics found in Goudreau area are also present in this area; but the distinction between acid and basic volcanics is not so pronounced. There are many of intermediate character, which could not be placed unhesitatingly in one division or the other, even on a lithological basis. It was also discovered, in the case of the Bartlett range, that the iron-formation does not lie between acid and basic flows but apparently within one acid tufaceous formation.

The main structural relationships of the rocks are shown in Fig. 1.

Pyrite and Iron Ores.

Pyrite, siderite and hematite are constituent part of the Keewatin iron-formation in Michipicoten District, and the pyrite deposits may be classed as range deposits for the most part. There are a few smaller bodies of high-grade pyrite presumably derived from the range deposits by solution, transportation and redeposition. There are still other small bodies in the Pleistocene drift, where the drift has been replaced by pyrite sand and granular silica, deposited from the mineralized waters that drain off the iron ranges. Thus there are three distinct types of pyrite deposits in this district.

An example of a replacement deposit in the drift is shown in Fig. 2, which refers to the Rand Consolidated Company's pit at Goudreau. This deposit

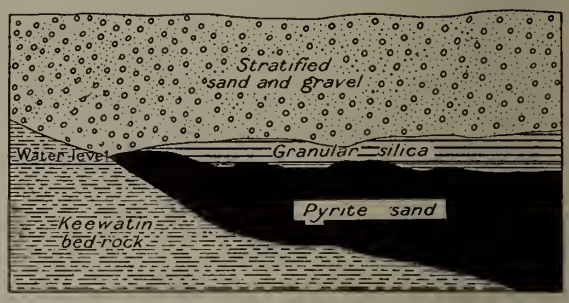

Figure 2. Diagram showing geological relationships of the body of pyrite sand in the Rand Consolidated Company's pit, Goudreau. This body is younger than the Pleistocene drift.

is modern in age, and the concentration is so perfect that the sand shows 95 per cent pyrite by analysis. The Report discusses at length the probable process by which this pyrite sand was laid down, and remarks that the similarity between the recent replacement deposits and the Keewatin iron ranges is sufficiently remarkable "to suggest that the banded silica and pyrite of the latter may have been concentrated by processes of solution and redeposition analogous to those which manifestly gave rise to the younger deposits."

The iron formation is composed essentially of banded silica, pyrite and siderite or sideritic limestone arranged in stratiform form. The banded silica is so perfectly stratified that the whole iron formation must be assumed to have been deposited horizontally in the first place and over considerable areas. Later earth movements have complicated the structure to an inexplicable extent.

An effort has been made in Figures 3 and 4 to indicate the general stratigraphic character of the iron-formation by placing side by side cross sections of different parts of the ranges in both areas, those in Figure 3 representing surface exposures, whereas those in Figure 4 are from diamond-drill borings. The sections were selected so as to be as repre-

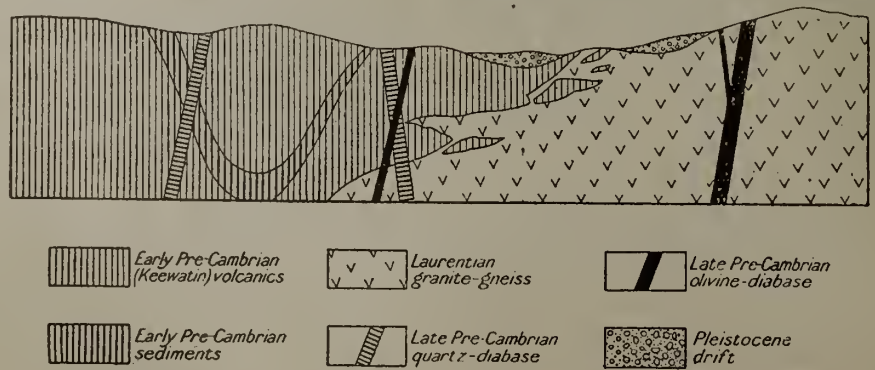

Figure 1. Diagram representing the main structural relationships of the rocks in Michipicoten district.

sentative as possible of the principal ranges examined. They do not, however, illustrate such extreme types as the body of siderite at Leg lake, Magpie-Hawk area, or the Dreany range, near mile 182 on the railway, which consists solely of banded silica.

The iron ranges vary in thickness from about 2 feet to 500 feet, and in apparent length from a few yards to more than 7 miles. They are associated exclusively with volcanic formations. No clastic sediments occur near them, with the exception of the conglomerate and sideritic greywacke on Parks lake, and these appear to be only a volcanic tuff modified by water action. As a rule the underlying volcanics are acid, and more or less tufaceous. The overlying volcanics are prevailingly greenstones, especially in Goudreau area, where they are also ellipsoidal but the range east of Parks lake lies in part between acid flows and tuffs. There is nothing then in the environment of the iron-formation that suggests it to be sedimentary.

The successive materials passed through in drilling in this district are discontinuous, lenticular bodies more or less complexly imbricated, and drill holes must be placed fairly closely together before the sections can be interpreted accurately. But when any range is considered as a whole (see Fig. 3) the general sequence, namely, banded silica, pyrite (or hematite), siderite, is obvious and without exception, whether all three or only two members are present.

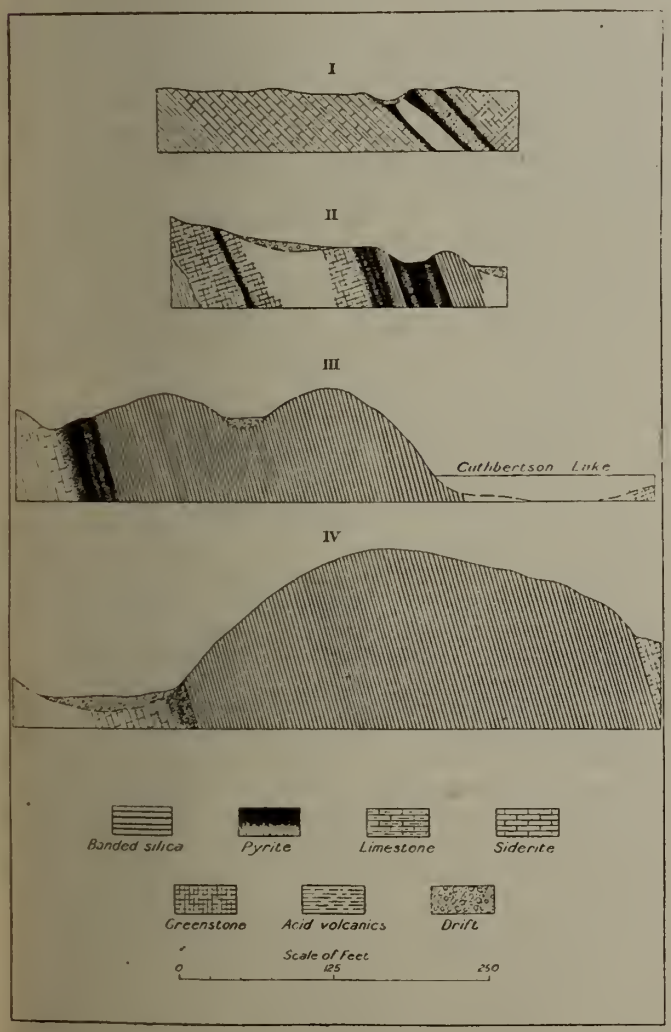

Figure 3. Cross-sections of iron formations showing the stratigraphic arrangement of banded silica, pyrite, and siderite, or sideritic limestone, and the topographic expression of each. I Near middle of mining location J. L. 10, Goudreau area.II. Along east boundary of mining location A. C. 39, Goudreau area. III. Near east end of Cuthbertson lake, Magpie-Hawk area. IV. Near middle of the Bartlett group, Magpie-Hawk area.

Among the properties described are those of the Nichols Chemical Co. lying immediately north-east of Goudreau Station on the Algoma Central, where in 1918 ore was being taken at the rate of 150,000 tons for the season, and 300 men were employed.

The Rand Consolidated Co. holds properties which are a continuation of the Nichol Company's main range known as the Morrison No. 4 Group. Another property owned by this Company is the Morrison No. 2 on which are two parallel iron ranges, on the southern range of which much diamond drilling has been done along a distance of 3,800 ft. These holes show a pyrite deposit ranging in thickness from 12 to 50 ft. at a depth of from 60 to 200 ft., which, assuming the ore body to be continuous between the holes, would indicate a probable ore content of 1,250,000 tons. The drill-core analyses are not available but it is intimated that a large part of the ore may not contain more than between 25 to 35 per cent of sulphur.

Considerable space is devoted to a description of the Josephine Mine, which is too long to quote here.

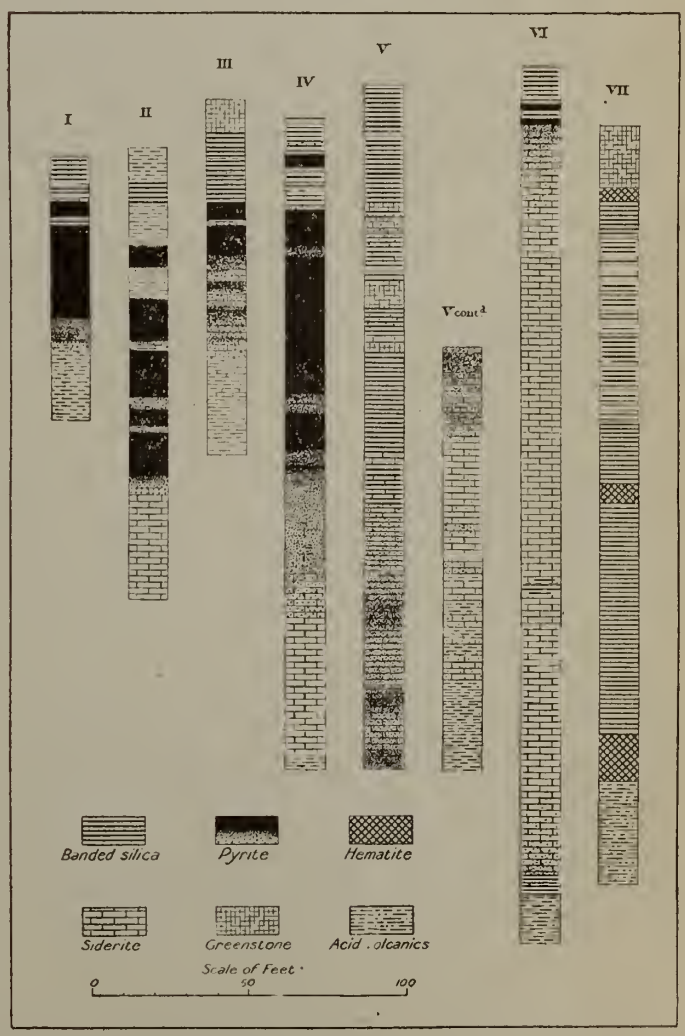

Figure 4. Diamond drill sections of iron formations showing in more detail than Figure 3 the stratigraphic arrangement of banded silica, pyrite, and siderite, or sideritic limestone. The drill logs have been corrected so as to show true thickness in each case. I. Hole No. 15, C deposit, Nichols Chemical Company's property, Goudreau area. II. Hole No. 8, Morrison's No. 2 property, Goudreau area. III. Hole No. 16, Morrison No. 3 property. IV. Hole No. 8, Morrison No. 1 property. V. Hole No. 1, Bartlett property, Magpie-Hawk area between 950 feet and 30 feet. VI. Hole No. 111, Helen mine, Magpie-Hawk area between 450 feet and 850 feet.

Thirteen drill holes are said to have been put down, which indicate the presence of an oval area of iron ore, which, if reckoned on a basis of all ore carrying over 30 per cent metallic iron, would give an estimated content of 2,250,000 tons of hematite, or 1,300,000 tons at a 50 per cent metallic iron basis. At least 850,000 tons is believed to be recoverable.

Gold.

Gold was reported from near Webb lake, Goudreau area, early in 1918. Considerable prospecting ensued during the summer of that year, trending in the direction of Missinabi station, on the Canadian Pacific railway. Fresh discoveries were reported during July and August from the east side of township 26, range 27. Only those within the Goudreau map-area, however, were visited by the writer.

The most important among these lie in the McCarthy-Webb group of claims situated just north of Webb lake. Small veins of the same appearance were seen near S.S.M. 1778 and also on the portage between Bearpaw and Pine lakes. At all three places the prospective ore-bodies are quartz veins intersecting on ash-grey feldspar porphyry, the second Keewatin formation described in this report.

McCarthy-Webb Property. Messrs. D. J. McCarthy and W. H. Webb, Sault Ste. Marie, Ontario, hold and are doing the assessment work on a group of seven claims situated around Webb lake, township 27, range 27. The gold-bearing veins lie north and northwest of the lake, in a small rocky area circumscribed by heavily drift-covered country. This area is underlain by a fairly massive feldspar porphyry, traversed in a direction of about north 60 degrees east by occasional shear zones a yard or less in width. The porphyry is intersected by two sets of veins, one parallel to the shear zones, one at right angles to them. A dyke of late Pre-Cambrian olivine diabase cuts across veins and porphyry alike.

Veins of the first set are vertical, from ½-inch to 18 inches wide, and rather crooked, as if they had been disturbed a little since they were formed. Individual veins do not appear to continue greatly in length, but veins and veinlets are commonly grouped lengthwise along-shear zones. They consist of white quartz carrying some pyrite and occasional small particles of visible gold. The schistified porphyry for 2 or 3 inches on each side carries pyrite and, when crushed and panned, yields finely divided gold.

Veins of the second set cut across the others at right angles and are plainly younger than the first set. They dip vertically but, unlike the first series, are clean-walled and occur singly. They are from 6 to 24 inches wide and apparently longer than the other veins. They contain the same association of white quartz, pyrite, and some visible gold, but in addition a surprisingly large amount of tourmaline in the form of shiny black, needle-shaped crystals. The cross-veins have not as wide margins of mineralized wall rock as the older group.

Though none of the veins seen in July, 1918, is large, there is an extraordinary number of them. Over a dozen were seen, and gold was observed in almost as many places. A majority are too narrow to be mined singly and too far apart for two or more to be exploited from a single opening. One of the vein-filled shear zones, however, is 4 feet wide and reported to carry gold across that width. There is also a mineralized width of 3 to 4 feet at one place close to the trail between Webb and Lovell lakes, where a cross-vein 18 inches wide intersects one of the Shear zones. Satisfactory assay samples were not obtained, but encouraging returns are said to have been obtained from cross-section samples collected by the owners.

General Sir Newton Moore, after visiting the steel and coal plants in Nova Scotia recently, expressed his opinion as follows: "What is essential is that production be increased to the maximum output of the plants and mines, thus reducing costs." This opinion may seem trite, but it is none the less true, and it has a much wider application than to the conditions of Nova Scotia.

DON'T WORRY ABOUT ENGLAND.

Mr. J. B. Tyrrell, the well-known Toronto mining engineer, who has just returned to Toronto, from a business trip to England, is decidedly optimistic over the outlook in mining and commercial circles generally in England. English mining companies are largely interested in gold mines and Mr. Tyrrell says that the old established mining industries not only went on receiving small dividends during the war but the added price for gold as well. The South African mines do not have to sell in the English market now and when gold is selling as it does now for 129 shillings an ounce, the enormous profits being earned can be understood. The owners and shareholders of these mines, who had to economize closely during the war, find that the exchange may be against England in matters of trade, but in the matter of gold mining it is very much in her favor.

"So the gold miners are all feeling reasonably comfortable", said Mr. Tyrrell, "The shareholders in oil companies have also been doing well since the war. These companies had men out locating good new districts, but it was impossible at that time either to purchase or to conduct big drilling campaigns. Now the war is over and money can again be sent out of England for investment elsewhere. The result of the knowledge obtained during the past few years is being used and a considerable amount of money is being invested in oil territories in various parts of the world. In fact, during the war, while the nation was fighting desperately, a few of the older men were gathering information which they are now beginning to use for the advancement of British interests and British commerce. The time has now come when they are using that information. So while there may appear to be rather unrestrained speculation in London at the present time, most of it is founded on reliable information which has been collected during the past five or six years.

"The mining people are not worrying seriously over the exchange situation. True, it happens to some extent in the obtaining of funds in this country from England for steady investments where only a moderate interest could be expected, but it will not prevent of bringing out funds to Canada for mining development where there is a probability of substantial returns. If you can show a fair speculation and the chance of good returns they are ready to go in.

"Whatever the laboring classes in England may be doing, the financial men and mining people in London are hard at work. Work is the basis of success and as long as people are willing to work from morning to night there is no such thing as failure. The leaders in the commercial world of England have never worked so hard as they are working now and those in other walks are following their lead. While some may be crying blue ruin, it does not amount to much and there is no real reason for it. Unfortunately some of the worst abuse of England is Journal in the country's own newspapers. If one believed some of the London papers, he would be convinced that the British Government and executive were the biggest rogues in the country. Possibly the Irish people read these attacks and take them at their face value, but the people as a whole in England know how to discount these attacks."

THE GOLD PAN MINES, MANITOBA.

Several hundred shareholders in the Gold Pan Mines, Limited, met in response to a call by the directors. A report had been received from R. W. Brigstocke, who recently sampled the property near Gold Lake, and the directors desired to sound the shareholders as to the proper action to take.

It will be remembered that J. B. Tyrrell, inspected the claim last October, but as at that date the shaft had not been unwatered, he could only form an opinion by surface examination and from heresay. He was, however, impressed with the desirability of continuing exploratory work underground, and had expected to be able to return later in the winter and sample the Gold Pan, but was called at short notice to London. The property having been put into shape for an examination by Mr. Phillips, superintendent, the directore felt forced to find another engineer as they did not care to spend money in what might prove a vain quest. Their choice fell upon Mr. Brigstocke, who had worked in close connection with Mr. Tyrrell, and has for the past fifteen years confined himself closely to the pre-Cambrian formations. He is well known in Sudbury, Cobalt and Porcupine, having been manager of the Drummond silver mine, and the Long Lake gold mine, as well as acted as consulting engineer in numerous cases.

Mr. Brigstocke spent a couple of days taking samples, and came to an adverse conclusion regarding the property. Thus there were two reports which the directors desired to lay before the shareholders.

Almost unanimously, those present were of the opinion that exploration should be continued for several months, and at the end of such period a fresh examination be made, either by Mr. Tyrrell or some other engineer recognized as competent, and that the future should be regulated by the results disclosed by this third examination.

The meeting was called to order by Frank O. Fowler, who presided, and the minutes of the previous meeting together with the conflicting reports were read by the secretary, Gordon C. McTavish. A copy of Mr. Brigstocke's report will be mailed to each shareholder as soon as it comes off the press.

C. A. B.

Winnipeg "Free Press"

GOVERNMENT ENGINEER RECOMMENDS BUILDING OF LAND AND WATER ROAD TO RICE LAKE, MANITOBA.

Recommendations by V. H. Campbell, engineer of the provincial reclamation department, for the construction of a summer road to the Rice Lake goldfields, were received by Hon. George A Grierson, minister of public works, today. Mr. Campbell recommended that communications with the goldfields be opened by means of water transportation and the construction of a summer road 14 miles long, to cost approximately $15,000. He also recommended as the best method of opening the goldfields, the construction of a light railway from Great Falls, on the Winnipeg railway, into the interior, a project which would entail an expenditure of approximately $350,000. It was announced today that the latter recommendation would not be considered by the government at present.

The plan which will receive government approval is the water and land route, it is stated. Launches will be employed to traverse the Winnipigon river to Bellevue landing, a distance of 4 miles. From there a summer road will be constructed for a distance of 14 miles to Caribou lake, in the heart of the mining country. This road would traverse a country part of which is thickly covered with spruce and poplar and the remainder with granite boulders. From Caribou Lake, the major portion of the mines are within easy canoe distance.

It was also announced that the construction of the road would be contingent upon an undertaking on the part of the mine owners to furnish the launches necessary to carry material over the water route. On the road recommended by Mr. Campbell there is only one portage, in contrast to the present one, which has fifteen.

TEXT OF TELEGRAM SENT TO OTTAWA BY THE MINING SOCIETY OF NOVA SCOTIA.

"It has come to the notice of the Council of the Mining Society of N. S., that owing to the inadequate Salaries paid by the Survey and Mines Branch of the Geological Department, some of the staff have been forced to resign. In the interest of the Mining Industry we wish to protest against the scale of Salaries now being paid to such highly trained technical men whose services to the country are of such value. We would urge that steps be taken immediately to make the Salaries paid sufficient to attract and retain for the services a class of men of the standard, formerly associated with the work of the Department."

Text of Resolution adopted by the Mining Society of Nova Scotia re Salaries of Geological Survey.

RESOLVED—That the Council recommend that at the forthcoming Annual Meeting of the Society the Secretary be requested to communicate with the Canadian Mining Institute, the Canadian Society of Engineers and any other Canadian Society interested in the development of the mining resources of the Dominion, to the end that united action be taken by all representative of the mining industry of Canada to bring to the attention of the Minister of Mines, Ottawa, the present unsatisfactory status of the Geological and Mining Departments of the Government, and in connection with the foregoing, to urge that in view of the great importance at the present time of the utmost development of the mines of Canada which the Geological and Mining Branches of the Canadian Government could assist materially, the mining fraternity view with the greatest alarm the depletion of the staff of the Geological Branch by the recent resignation of several of its most experienced and vaulable members, due principally to the low scale of remuneration prevailing in the department, urges on the Minister of Mines the complete reorganization of the Department including the uniting of the Geological and Mining Branches under one executive head, and providing for a salary scale and such regulations as to service under the Mines Department as will attract and hold the services of the geologists and mining engineers of experience and repute, and further encourage graduates of our engineering universities to enter the service of the Department with a view to its being their life work.

Our Northern Ontario Letter

THE SILVER MINES.

As time goes on and the New York quotations for commercial bar silver show no signs of receding, and, as the rate of exchange between Canada and the United States continues to rule high, the first-named condition is gradually being accepted as more or less permanent. The high rate of exchange, while not expected to long continue as at present is nevertheless believed to be a condition to reckon with for at least several months, although it may have a gradual decline.

Provided these fairly generally accepted conclusions prove to be correct, the net profit to be derived from the operation of the silver mines of Cobalt during 1920 may be expected to surpass any previous record. To-day the leading mines are realizing more than $1 an ounce net profit on the silver they produce. Even at the smaller mines, believed some time ago to be "on their last legs," so to speak, the margin per ounce of net profit now going to their treasury is almost equal to the gross value of their entire output had quotations remained as in the opening year of the late war.

Max Morgenstern, of New York, minority share holder in the Buffalo Mines has failed to secure an injunction restraining the company from passing a by-law authorizing the sale of the company's assets to the Mining Corporation of Canada for $462.000. The application was dismissed in the absence of any proof of fraudalent intent being established. As a consequence of this, it would appear, the Mining Corporation will now be free to carry out its proposed scheme of development on the recently acquired Buffalo Mine.

Development work on the University property of the La Rose Consolidated has recently resulted in opening up encouraging quantities of high grade ore. As a result of this as well as the expectation that the annual report for 1919 will be quite favorable, the La Rose is attracting more than usual attention.

Reports published in some of the Toronto papers that the Trethewey had made another shipment of high grade ore from its Castle property at Gowanda, are not correct. These reports had it that $60.000 worth of ore had just been sent out. The truth is that the Tretheway is making good headway in the development of the Castle, and is meeting with exceptionally favorable results. Early in January a shipment of about ten tons of high grade ore sent to Cobalt for treatment. As regards the present, there is no indication of a shipment for another month or so at least. It is learned that about five tons or so is now in bags at the mine as a part of that being assembled for the second shipment.

A plan is under way to bring about a merger of the Adanac mine with the Victory Silver Mines. The latter was formerly known as the Hylands property and was only recently taken over under the new name. It is situated between the Ophir and the Gifford Extension, and lies within 660 feet of the Adanac. The plan is to merge the two properties, with a capitalization of $2,500,000 shares divided into 2,500,000 shares of the par value of $1 each. Of this, 1,000,000 shares are to go to shareholders of the Adanac and 1,000,000 shares to the Victory Silver Mines, thus leaving 500,000 shares in the treasury with which to finance operations. It is believed that the acquisition of the Victory Silver Mines' property would greatly strengthen the outlook for the Aranac, as it comprises a piece of territory where geological conditions are very favorable which has not been explored. Provided such a consolidation were to be carried out, the shareholders of the Adanac would receive one share of the new issue for three shares of the old, and woud have the advantage of the money to be derived from the sale of half a million treasury shares for development work, as compared with a depleted treasury as at present.

The mining interests of the province of Ontario have formed themselves into a new organization known as the Ontario Mining Association. Their aim will be to assist the mining industry. Contrary to intimation in press despatched, the organization will not play politics but will bend its effort toward closer cooperation between all concerned. The officers appointed at the first meeting are provisional. Permanent officials will receive endorsation at a subsequent meeting. This may be held in Toronto during the second week in March at which time a large number of minig men will be there for the purpose of attending the 22nd annual meeting of the Canadian Mining Institute, to be held in the King Edward Hotel, on the 8th, 9th, and 10th of March.

The Dodds property, having been purchased by Toronto and Montreal interests, is now figuring in a merger with the Silver Bullion property. Both properties are in the Leroy section of the Gowanda district. The merger is to have a capitalization of $1,500,000 made up of 1,500,000 shares of the par value of $1 each. It is stated that no stock will be offered for sale, the proposition being more or less a close corporation, the finances for development work being raised privately.

JANUARY ORE STATEMENT

Following is a statement of ore shipments over the T. & N. O. Ry., for the month ending January 31st, in tons of 2,000 lbs.

Silver Ore.

Cobalt Proper.	Tons.
1. Crown Reserve	19.97
3. Dominion Reduction	29.00
2. Coniagas	125.95
4. Hudson Bay	30.81
5. LaRose	106.99
6. McKinley-Darragh	107.98
7. Northern Customs	43.96
8. O'Brien.	64.01
9. Peterson Lake	30.54
10. Temiskaming	92.54
11. Trethewey	71.03
	722.78

The above shipments were made to the following Companies:

CANADA	
Coniagas Reduction Co., Thorold.....	68.14
Deloro Smelting & Refining Co., Marmora..	263.93
UNITED STATES	
American Smelting & Refining Co., Pueblo..	252.19
American Smelting & Refining Co., Perth Amboy	30.54
Pennsylvania Smelter, Carnegie.	107.98
	722.78

Price of Silver.

Jan. 12th.	Highest	137.000
Jan. 16th.	Lowest	128.500
	Average	132.827

THE GOLD MINES.

The premium on United States money continues to be an important factor in swelling the amount of revenue at the gold mines. In discussing the matter with the correspondent of the Canadian Mining Journal, A. F. Brigham, general manager of the Hollinger Consolidated, stated that while such a premium was quite welcome under the circumstances, yet a condition resembling normal was much to be preferred.

The labor supply at the gold mines continues to improve gradually, and the efficiency of the men has improved. With 1,100 men and 58 machines employed, the Hollinger is now treating an average of about 2,300 tons daily, or an average of well over two tons per man on the pay-roll. This compares with a low record of less than one and a half tons about the time the armistice was signed with the Central powers. Current costs are $4.77 per ton, and mill heads average around $8.75 a ton. The average value of the ore in reserve is estimated at $9.09 per ton, and it may thus be seen that the policy of the management is exceedingly conservative and that the physical condition of the mine is being strengthened rather than impaired. From 170 to 180 stamps are being operated, the balance of the total of 200 not yet having been brought into play. As regards future plans, it is officially learned that instead of sending a large volume of ore through one main haulage level as was the former practice, it has been decided to establish a complete electric haulage unit at intervals of every 150 feet in depth, beginning at 500 feet. This will avoid too great a centralization and attendant congestion. While endeavoring to pay as high wages as possible so as to attract adequate men to the mine, the general manager is also keeping in mind that while paying dividends which represent only reasonable interest on the capital invested, he must also provide earnings which will represent a reasonable return of capital involved.

The directors of the Dome Mine will pay a visit to the property about the end of February. The president, Mr. Bache, will not visit the mine until after the close of the company's fiscal year, March 31st. As regards achievements at the Dome, nothing of an official nature has been given out for some months. Reports that mill heads have been ranging from $7 to $8 per ton have been interpreted in the North as an indication that the physical condition of the mine may be impaired. As to this, the interpretation may be entirely wrong, but in the absence of official information such a belief is gaining ground. In the meantime, with a force of between 300 and 400 men on the pay-roll and the steady shipment of gold bullion from South Porcupine lends to the operation an outward appearance of prosperity. In connection with the option which the company holds on the Dome Extension, it is intimated in usually well informed circles that a request may be made for an extension of six months time.

The Clifton-Porcupine has everything in readiness to turn on electricity on March 1st at which time the number of machines employed will be doubled from two to four. At present development work is being carried on at the 200-ft level. It is proposed to crosscut east and west over a total length of about 800 feet for the purpose of opening up eleven known veins. Accordingly as these veins are opened up, the policy will be to drift along those which appear to be the most important. Up to the present a substantial tonnage of ore has been opened up on the Boulder vein. A two-ton shipment was made recently to the Temiskaming Ore Testing Laboratory at Cobalt for the purpose of testing its value.

The McIntyre Porcupine main shaft is nearing the 1,600 ft. level and is soon to become the deepest shaft in this country. Ore deposition is being found to continue without any signs of diminution. The mill at present is treating upwards of 550 tons daily and the output is not far under $6,000 every twenty-four hours. A force of approximately 360 men and about 30 machines are employed.

Reports are current that the controlling interests of the Porcupine Lake Gold Mining Company are considering a plan to resume work in the spring. The property is situated at the North end of Porcupine Lake and has been idle for some five years. When operated in 1914 a shaft was put down about 285 feet. Ore deposition was found to be more or less patchy, but would appear to offer inducement to proceed further with exploration work.

It is learned that the Tashorn Mining Company may decide to arrange for the re-opening of their property situated at Tashota in the Kowkash mining district. Whether or not the plan includes a re-organization, sale, or private capital advancement had not been learned. It will be recalled that this was about the only property to be explored to any very great extent following the rush of prospectors to the Kowkash field some years ago. The result of work at that time on the Tashorn was generally understood to have been favorable. A shaft was driven to a depth of something like 200 feet, and considerable drifting was done.

The Lake Shore Mine at Kirkland is operating on a normal basis, and mill heads are again running high. From achievements during the opening month of the new year, it is evident that the 1920 yield will greatly exceed that of 1919. A full force of men has served to bring the mill up to full capacity.

At the Wright-Hargreaves all is in readiness to proceed with the installation of the big new mill. All the heavy parts have been transported to the mine, and with the arrival of spring the work of placing the concrete foundations will be commenced, following

which the installation of the equipment will take place. It is believed that barring unforeseen obstacles the Wright-Hargreaves will be treating close to two hundred tons of ore daily before the end of the summer. The mine is situated adjacent to the Lake Shore, has the eastward continuation of the Lake Shore vein system, and is under efficient management. It owns nearly three-quarters of a mile in length of the auriferous zone which has made the Kirkland Lake camp an important gold producer..

At such properties as the Ontario-Kirkland, the Canadian-Kirkland, Green-Kirkland, Bidgood and Fidelity, advice received is such as to arouse general optimisim over the liklihood of the extensive growth of the camp.

The new mining plant on the Mondeau property of the Peerless Mining Company has been placed in operation, and underground operations have been resumed at full blast. A force of about 40 men are employed. It is stated that the Timmins' interests of the Hollinger are interested in the exploration and development of the Mondeau.

The station at the 500-ft. level of the Miller Independence mine has been completed and the work of driving a cross-cut north to the downward continuation of the rich ore body is to commence at once. It will be recalled that the gold tellurides found some time ago caused somewhat of a sensation. The sinking of a central shaft so as to cut the ore body at a depth of 500 feet followed, and as this prorgam nears completion it is becoming the centre of considerable interest. W. E. Simpson, the newly appointed general manager has taken up residence at the mine.

MORETON FREWEN POINTS OUT NECESSITY TO INCREASE SILVER PRODUCTION TO PROTECT OUR GOLD RESERVES

N. Y.—Moreton Frewen, British economist and authority on silver says: "The Wall Street Journal of Feb. 9, contains a digest of our Board of Trade figures from the Manchester Guardian which presents the most interesting exchange position in modern economics. The writer has spent much time in the far East, and the press of this Continent has never perhaps taken seriously my conviction that the great and new industrialism of Asia, showing itself in the cotton mills of Bombay, the jute mills of Calcutta, the great iron industries of Hankau—a hundred more, were created and their baneful competition fostered by low exchange and equally that the low exchange value of silver was destroying your exports to Asia of cotton and wheat and lumber and steel rails.

"Before giving figures of the cotton trade arising from the recent great jump in silver, let me refer to the then quite unprecedented fall in silver in 1907—the greatest fall in any 18-month period, particularly marked during the last nine months of 1907. Elihu Root, then secretary of state, at request of Senator Lodge sent a circular to all your consuls in Asia asking information. The circular was sent out some months too soon to secure maximum results in case of remote provinces in China. But the replies were most educational and were all the same way. I must confine myself to a single small table from Consul Greene at Dalny, in Manchuria:

Dalny Value of Imports.

	Cotton Goods	Flour	Exchange
March quarter, 1907	$709,969	$301,123	.57
December quarter, 1907	204,904	73,969	.47

"Still only half awakened and relying chiefly on what Prof. Francis A. Walker had written me in 1894, that the world-wide financial crisis had resulted from the great break in silver exchange in 1893, you may recall perhaps that in early months of 1907 I anticipated a great financial crisis at hand, publishing this forecast in many newspapers and reviews here and in England.

"Now let us look at the figures from the Manchester Guardian. The sterling rise in silver last year was from 48½ pence in January to 76¼ in December. In January England's export of piece goods to China was six million yards, in October it had risen to 45 million yards and in November was over 40 millions. I expect when we get the returns for December and January the figures will be more sensational still.

"Thus much China; but in case of India every effort was made by her government to tie the rupee down to 16 pence. You recall the flagitious attempt by Lord Reading to purchase in advance all the silver product of this continent at 86 cents an ounce—an attempt happily frustrated by Emmett Boyle and the other western governors. So that the Indian figures, unlike the China figures present a tampered silver exchange, not a free exchange—they represent a final and despairing effort by the government of India to tie silver down and for that very reason a comparison of Bombay and Calcutta cotton imports with the Chinese 'free silver' exchange is all the more interesting. Whereas, then England's piece goods exports rose within the twelvemonth 600%, these exports to Bombay and Calcutta barely donbled (50,000,000 yards to 100,000,000).

"I need hardly point out that the present premium on your dollar and present discount on our pound sterling, if these should continue, will build up your cotton exports to China and India at expense of England. There is today an exchange premium behind your cotton export to, say Shanghai, represented by the full fall in sterling exchange. Massachusetts for three Shanghai taels gets five gold dollars, Manchester for the same three taels gets not a sovereign, but only eleven-sixteenths of a sovereign. Although it is far from clear at this moment what the government of India is aiming at, one point is certain, they have fixed their rupee exchange at such a price that silver can never again fall below 129 cents an ounce. As this becomes generally recognized,new silver mines should be opened and the silver urgently needed to protect our western gold reserves against the Asiatic drain should be forthcoming. But the expansion will require time. Which is to win in this terrible race the man in the silver mine or the man in the pulp mill?

"Let me appeal confidently to public opinion here to express itself as the accumulating evidence presents this mighty exchange problem more fully. It is a problem on which all other exchange problems turn. From the Babylonian era, as Prof. Max Muller pointed out, at what time the ratio was 1 to 14, until 1873, because of 'free coinage' at leading mints the ratio of value of the two metals in the world's market varied never more widely than between 1 to 14 and 1 to 16. Calonne's French Mint law the law, the law of 1903, is simplicity itself and is invicible in its

simplicity. Let me leave it on your pages for a new generation to admire.

"To every person bringing to the mint 1 kilo of gold, nine-tenths fine the same shall be given back to him transformed into 155 disks of 20 francs, of which the total shall be reckoned at 3100 francs. And to all persons bringing 1 kilo of silver nine-tenths fine, the same kilo shall be returned to him coined into 40 five-franc pieces of which the total shall be equal to 200 francs. The debtor may tender these gold and silver disks at his option and can obtain for them a full receipt for his debt."—Boston News Bureau.

Detroit, Mich. Feb. 20|20.

The Editor,
Canadian Mining Journal.

Dear Sir:—

The effort of the mining engineers of British Columbia to receive government recognition if not entirely successful will have accomplished much in that it has once more started their Eastern brethren thinking and talking on the subject. Thought and words following a good sample should beget action. In the vernacular of the day "They started something". I do not intend to comment on the British Columbia action as the Journal has covered their case both pro and con very ably. However I would like to point out that recently the engineers of Ontario had an opportunity to insert an opening wedge which seems to have been entirely overlooked.

Last year as we all know the Ontario Government framed a remarkably good blue-sky law—remarkably good insomuch as it afforded great protection to the investing public and made provision for its own enforcement. The reason the law was drafted was because public sentiment demanded it—get that—public sentiment demanded it. But certain "so-called" brokers saw where their combs were going to be cut and hurried long dispatches over the wires to the Toronto papers telling of the great indignation and dissatisfaction among mining men throughout the north. Being in the North at the time both in Cobalt and Porcupine I had an opportunity to discuss the provisions of the law with several men who were claim owners and therefore most deeply interested. The majority of these men seemed inclined to favor it and certainly weren't tearing the rugs with rage as we were lead to believe by newspaper reports. But certain elements saw the handwriting on the wall and proceeded with all their might to do battle for their very existence. With the help of all whom they could coax or coerce they attacked the bill in its one vulnerable point—namely that political influence would largely determine the findings of the government officials appointed to enforce the law.

Here is where the engineers lost their opportunity. The government wanted to pass the bill but the first rule of politics is "If you can't make a friend don't make an enemy." Now if the engineers had offered to form themselves into a body patterned for example like the Ontario Land Surveyor's Association and take over the duties that were to be assigned to the different district inspectors, the government would have been forced to accept the offer to save its face with the public and the broker's argument re political influence would have been met. Those who read the draft of the bill will agree that any qualified member of an association with an iron-bound set of rules and definitions could meet the terms of the bill with fairness to all concerned.

Maybe it's not too late yet for although the Ontario Govt. has changed public sentiment throughout the country demands something in the line of a blue-sky law. How are engineers organized and equipped to get what they are after—government recognition through the medium of this law? Last time one element of the mining community put up a real fight and got what they wanted. Why can't the engineers be next

Trusting that the Journal can scare up a little action or discussion on the subject from its readers who are better qualified to speak than myself, I am

Sincerely,
Dion S. Halford.

C. M. I. TORONTO MEETING.

Provisional programme, Monday, March 8th.

Morning Session.

Addresses of Welcome; Presidential address by D. H. McDougall; Mineral Statistics for 1919 by John McLeish, T. W. Gibson, T. C. Denis and W. Fleet Robertson (or by proxy); General business: Status of the engineer, etc.

Afternoon Session.

"Ferro-Alloys in Canada," by G. C. Mackenzie; "Electric Smelting of Tin Ore," by B. G. Cobb; Two papers on the Plate Mill of the Dominion Iron and Steel co., and one on "Economies in Steel Plant Management," being arranged for by Mr. F. W. Gray, Secretary, Iron and Steel Section; "Iron Ranges of Michipicoten District, Ontario," by W. H. Collins.

Evening Session.

"The Mining and Smelting Operations of the International Nickel Company of Canada," written by The Company Staff. (Lantern slides); "Operations at Alfred Peat Bog" (illustrated by moving pictures), by A. A. Cole; "Some Aspects of the Mining Situation in the Middle West," by R. C. Wallace.

Tuesday, March 9th.

Morning Session.

Formation of Proposed Coal Section of the Institute; "Coal Mining in the Province of Alberta," by J. T. Stirling; "Fuel Problems of Western Canada," by W. J. Dick; "Coal Supply of Canada," by F. W. Gray; "Lignite in Saskatchewan," by A. McLean; "Briquetting Industry," by E. Stansfield.

Afternoon Session.

"Future Prospects for Oil and Gas Production in Ontario," by M. Y. Williams; "Natural Gas in Ontario," by E. S. Estlin; "Oil Possibilities in Western Canada," by D. B. Dowling; "Oil Problems in Canada," by T. O. Bosworth; (Subject to Dr. Bosworth's being in Canada).

Evening Session:

Smoker and Concert in Pompeian Room; (Chairman, Mr. G. G. S. Lindsey and Colonel J. J. Penhale).

Wednesday, March 10th.

Morning Session:

Discussion on Institute's Prospecting Scheme, following an address by J. A. Campbell, M.P., on "Attitude of Canadian Governments toward Mining Development."; "Britannia Mines, British Columbia," by S. J. Schofield; "Progress Notes on the Investigation of the Quebec Asbestos Deposits," by R. Harvie and E. Poitevin; "Asbestos Mining," by J. G. Ross.

Afternoon Session:

Discussion on nickel coinage; "Lost Placers of Ontario," by A. P. Coleman; "Recent Developments in Mining in Northern Ontario," by J. G. McMillan; "Geology of Silver Islet and Vicinity," by T. L. Tanton; "The Nipissing Mine," by H. Park; "Minerals of Eastern Ontario," by J. W. Evans.

Evening.

ANNUAL DINNER at 7.30 p.m. in the Pompeian Room.

British Columbia Letter

METAL MINES

Victoria, B.C. Further evidence that the prospectors are proceeding with their organization in this Province is obtained in reports from Rossland and Hope of the launching of local associations. At Rossland officers have been elected and the machinery prepared for action. The prospectors of Hope, however, are somewhat in advance of this, having passed a resolution for submission to Hon. Wm. Sloan, Minister of Mines, putting themselves on record as viewing with alarm "any proposed legislation which may have a tendency to discourage capital or to lessen the prospectors' chances of reward by placing iron or other ores on the reserve list, ultimately causing him to either abandon his vocation or leave the Province for some other more favorable field." This, no doubt, has referenc to a statement made in the "Kings's Speech" on the opening of the Legislative Assembly that legislation might be expected to be placed before the House reserving some of the iron ore deposits of British Columbia in order to facilitate the promotion of the iron and steel industry.

Mining men anticipate that some important amendments to the Placer Mining Act of British Columbia will be considered by the Provincial Legislature during the session now in progress. That changes are in contemplation cannot be doubted inasmuch as the Minister of Mines has made no secret of his dissatisfaction regarding present conditions and of his desire to enunciate a policy calculated to open up placer areas privately held without development. As in all cases of proposed changes to long established law and customs the problem is to work out a method that will have the result sought without imposing anything open to fair criticism on the ground of inequity or injustice.

The position obtaining in this Province with respect to placer mining is that there are over 1100 placer mining leases of which only something over 170 are fully paid up in regard to their rentals. The arrears as can be readily understood when it is stated that the annual fee for a creek claim is $75 and that for a bench claim $50, and that $1000 assessment work is required to be recorded on each lease amount to a very considerable sum in the aggregate. Some have estimated that it totals $600,000. It is true that the Placer Mining Act contains a provision that the Minister of Mines may cancel any placer lease in arrears of rentals but it is also a fact that the Act permits extension of a period of grace to placer lease holders on their advancing good cause for the benefit of such concession. It is only necessary to refer to the extremely onerous conditions the placer miner has been facing during th past few years to indicate the explanation of what has led to the present unsatisfactory situation.

Mr. Sloan is anxious that placer mining in British Columbia shall be placed on a new footing, with no hardship, if possible, to those who have been engaged in it in the past. While the contemplated amendments have not yet been placed before the Legislature there can be no doubt that, when drafted and submitted, they will be the crystallization of much investigation and matured judgment. It is thought likely that the fees will be reduced, especially in respect of the amount of assesment work required, the same being placed more on a par with the terms of the Mineral Act, only $100 assessment work per annum being asked for on a lode claim. Probably some equitable arrangement will be made for the payment of arrears on leases held by individuals or companis which have been under development or upon which it can be satisfactorily shown that development is planned. But such ground as is held, manifestly, for purposes of speculation no doubt will be thrown open, the leases being cancelled.

That such legislation will be endorsed cannot be questioned as the importance of stimulating the gold production of the country is generally recognized.

With the acquirement by the Consolidated Mining & Smelting Company of a bond on the Big Interior Group of Mineral Claims, situated about ten miles from the head of Great Central Lake, Vancouver Island energetic development of the property is expected. In his preliminary report for the year 1919 Wm. M. Brewer observes that "it has been handicapped by lack of transportation, also because, although there is good reason to consider that the ore body is so extensive as to promise a tonnage possibly equal to the Hidden Creek Mine of the Granby Company at Anyox or the Britannia Mine, yet the expense of proving its value will necessarily be so great as to tax the resources of any except a corporation as wealthy as the Consoli dated. Reference too, is made to the Great Central Lake is likely to overcome the transportation problem should the property prove up to expectations on exploration and development.

The Lucky Four Group, situated on the Cheam Range of Mountains in the New Westminster Mining Division, is another property in which capital has become interested, it being authentically reported that a half interest has been secured by the Guggenheims. Wm. M. Brewer's 1918 report on this property stated, that copper ore, almost exclusively chalcopyrite, occurred in a wide zone or stockwork of metamorphosed argillites in which occur many narrow quartz veins. The line of strike of this formation is N 65° W. and dip nearly vertical, with high angle towards the north, so far as can be determined from the present condition of the prospecting work that has been done The stockwork is bounded on the northerly and southerly side by granodiorite which on the southerly side has a pronounced gneissic structure near the occurrence of ore. Apparently the metamorphosed argillites to a great extent form a capping covering bodies of solid ore." He adds that "from such an examination of the surface as is possible under present conditions the statement is warranted that he property bears all the indications of developing into one of the big copper mines of the Province," but promising to produce ore of a considerably higher grade than that of either the Britannia or Hidden Creek Mines.

Recent reports as to developments on the Indian Chief Group of Mineral Claims, Sidney Inlet, being carried on by the Tidewater Copper Company are extremely satisfactory. This property now is under the general management of H. W. Price who came to British Columbia from the management of an important South American producer. The underground workings have been extended about 600 feet, the Mill at the beach has been remodelled, its capacity being increased to treat about 200 tons of ore a day and water power developed to run the Mill, Compressor, and Electric Light Fans. A new ore body has been discovered on the northerly side of the mineralized zone, which has been crosscut for about 80 feet up to November 4th last. The face then still was in ore assaying 2.62 in copper and from a point 30 feet from the portal to the face on the date indicated the ore averaged 3.96 per cent in copper.

While on the subject of oil exploration in the Peace River it may be noted that theD'ArcyExploration Company, said to be subsidiary to the Anglo-Persian Oil Company, again is seeking, through a local representative, to obtain certain concessions with regard to that part of the northeastern section of the Province in question. The Company's claims are reported to be endorsed by the Vancouver Board of Trade. The Company asked for the exclusive right of exploration over a block of land sixty miles square. Five years is wanted to carry its work to the point where only one-tenth of tha area will be held. In return it undertakes, besides initiating a thorough exploration and, in the event of success, the establishment of an industry on a scale commensurate with the importance of the discovery to hand the Provincial Government the equivalent of one-eighth of the product at the casing head. Hon. John Oliver, Premier, and Hon. T. D. Pattullo, the minister directly interested, backed by the remainder of the government, are understood to be strongly opposed to the granting of any such concession.

An Order-in-Council has been gazetted at Ottawa doubling the rental on oil and natural gas locations in the western provinces and giving the Minister of the Interior greater control over oil and gas development. The rental in future will be 50 cents an acre for the first year and $1 for each subsequent year, such increase to apply on all applications submitted after March 1, 1920. Section 40 of the Petroleum and Natural Gas Regulations is rescinded and the following clause substituted: "A Company acquiring by assignment or otherwise a lease under the provisions of these regulations shall be a company registered or licensed in Canada and having its principal place of business within His Majesty's dominions."

Slocan, B.C. Activity continues in the silver belt of the Slocan, B.C. In addition to properties already mentioned development is in progress on the Anna, Meteor, Republic, Tamarack, and Twelfth of July Group. The Meteor was bought by W. A. Buchanan from George H. Aylard and associates. A long crosscut is being driven.

Alice Arm, B.C. Cold weather of exceptional severity has been experienced this wintr at Alice Arm. The townspeople were forced to cut through the ice to permit a boat from the outside to reach them. Passengers, freight and mail, however, were taken off and the trying situation of the residents was much relieved. The launch which has been making regular trips to Anyox, B.C., according to last reports, is frozen to the dock.

THE COLLIERIES

The Settlers Rights Act of 1919, passed by the Legislative Assembly early in that year and which did not receive the signature of the Lieut.-Governor pending advice from the Ottawa authorities, has been disallowed by the Dominion Government. The position taken by the Federal authorities is that the legislation is in conflict with the terms of the Order-in-Council under which the Settlers Rights Act of 1917 was vetoed. It is considered likely that the Provincial Government will ask the Legislature to re-enact the measure, its stand being that nothing is proposed under its authority that is not well within Provincial administrative rights.

To those interested in the coal mining industry in British Columbia the issue of this controversy is of importance. The Act of 1917, which was not disallowed before a number of Provincial Licenses had been issued, is responsible for the opening of the Cassidy Collieries of the Granby Consolidated Mining Smelting & Power Co., Ltd. These licenses, under which the Granby Co. is operating on Vancouver Island, now are the subject of litigation. The Settlers Rights Act of 1919 extended the period in which pioneer settlers within the Esquimalt & Nanaimo Ry. Belt, or the descendants or legal heirs of old-time settlers, could obtain title to the coal rights within the area of their realty holdings.

The Government of British Columbia has passed an Order-in-Council reserving for the people all the unalienated coal lands within the Province. This means that hereafter staking under the Coal and Petroleum Act is forbidden. Hon. T. D. Pattullo, Minitser of Lands, explains that it is the definite policy of the Government to put an end to alienation in respect of coal lands as already there are coal bearing areas, to which Crown Grants have been issued, which are being held out of production merely for speculation. He adds that it is proposed that use is to be the basis of all British Columbia alienation policies. This is taken to mean, in the case of coal for instance, that no part of the public domain may be taken up by individuals or corporations unless satisfactory guarantees are forthcoming that it is their intention to take immediate steps to make it productive.

The Jingle Pot Mine, B.C. Coal Mines Ltd., which property is situated near Nanaimo, B.C., has closed down after having been in operation since 1907. Although the area of coal bearing land controlled by the Company was small—only 71 acres— approximately 800,000 tons of coal were taken from the Mine during the twelve years, or an average of about 11,266 tons per acre. The highest daily production was attained in the year 1912 when the day's output averaged 525 tons. The somewhat odd name "Jingle Pot" is said to have be derived by a unique method introduced when the mine opened up for underground signalling. An ordinary iron pot was hung up inverted, a piece of railroad steel being suspended and used as a bell clapper. From the jingling sound which this device made sprung the mine's name.

BOOK REVIEW.

A HANDBOOK FOR NEW CANADIANS

In the lumber camps, in the vicinity of steel works, and at coal and metalliferous mines in Canada, there has for a number of years been proceeding an unostentatious but worthy work, now called the Frontier College, but formerly and perhaps better known as the Reading Camp Association, under Mr. Alfred Fitzpatrick, which has for its object the Canadianizing of the newly arrived immigrant, so that he may become a help to this country and not a distrubing and unsettling force. The writer, during his connection with the coal and steel companies of Nova Scotia, had occasion to come into personal contact with the endeavours of Mr. Fitzpatrick and his assoeiate, and desires to bear testimony to the impression then gained that this work was pursued with such excellent and pure motives, and such good results; under such conditions of personal saerifice and absence of gain, as to be a souree of refreshment and almost of wonder to observers. The instructors of the Reading Camp Association merely asked for employers of labour the permission to ereet a tent or frame building in which to hold the classes, and, after working themselves as day labourers and thereby supporting themselves, these instructors would spend their evenings teaching to foreigners the rudiments of English and the principles of our Canadian citizenship and popular government.

Mr. Fitzpatrick has now published a volume designed as a primer for newly arrived Canadians. This primer is drawn up from full personal experience of the outlook of the average immigrant from Continental Europe. As Mr. Fitzpatrick says in his preface: "The immigrant finds himself in the midst of new conditions. He lacks the language and everything combines to make him the prey of unfavourable circumstances. Even the better informed of his own race, already in Canada, are sometimes ready to take advantage of him. Particularly does this apply to the masses of unskilled labourers."

Mr. Fitzpatrick's referenee to the exploitation of newly arrived foreigners by his own countrymen in Canada is not strained. They are oftentimes the very worst foes of the newly arrived immigrant, who are rack-rented and overcharged for supplies in a shameless manner. Usually the gentlemen who thus take advantage of their knowledge of the immigrant's language combine the illicit sale of bad liquor with their other commercial enterprises, as all residents of mining camps will bear witness.

The "Handbook for New Canadians" contains practical information about Canada, about employment and modes of payment, banks, remittances of money, schools, the police, the seasons, birds, animals, and many other things that are all new to the immigrant. Information is given abont our geography, our form of government, and Canadian history. A specially valuable chapter is that on naturalization, which the book urges should be regarded as a prize to be striven for, and as a badge of honour to the new Canadian. A vocabulary of common words in parallel columns of Italian, Freneh, Swedish, Ruthenian and Yiddish is given compared with the corresponding English word idiom. The book is a real text-book of Canadianism, and employers will be helping along a good work, and materially assisting themselves by giving it eireulation among their foreign employees, and by also giving to the Frontier College the small assistance that it asks.

Ed.

MINING INSTITUTE MEETING WILL BE BEST EVER.

At the meeting of the Toronto branch of the Canadian Mining Institute on Saturday Feb. 21 further progress on preparations for the Annual Meeting March 8—10 was reported. Dr. W. G. Miller, who presided at the meeting in the absence of Mr. C. E. Smith, stated that he had seen most of the papers that are to be presented and that he believed them to be of high order and that they would make the technieal sessions very interesting. Mr. C. W. Knight, secretary of the meeting committee announced that arrangements have been made to have special cars, pullman and diner for the trip to the International Nickel Refinery at Port Colborne on Thursday. It is expeeted that many will wish to take this trip and those doing so should advise the excursion committee, of which Dr. T. L. Walker is chairman, early. The Smoker and Concert on Tnesday evening is to be one of the rousing old time parties, with Col. J. J. Penhale and Mr. G. G. L. Lindsey in charge. Those wishing to attend should advise Assistant Secretary Rose on the first day of the meeting so that arrangements can be made to seat everyone. Those who wish to attend the Dinner on Wednesday evening should notify Mr. Rose not later than Tuesday.

Two of Ontario's biggest mines will receive attention at the meeting. On Monday evening the mining and melting operations of the International Nickel Company of Canada will be described by, E. A. Collins presenting a paper written by members of the staff. On Wednesday afternoon, H. Park, superintendent of the Nipissing, will describe Ontario's most successfnl silver mine.

Recent developments in Manitoba and some of the problems to be solved will be indicated by Dr. R. C. Wallace, Mining Commissioner of Northern Manitoba, in a paper to be presented Monday evening.

The afternoon session on Monday will be specially interesting to those in the iron and steel industry. On Tnesday morning coal will be the chief topic and in the afternoon oil and gas. The Wednesday sessions will be devoted chiefly to metals and asbestos.

The Ladies' Committee has arranged a program for entertaining visiting ladies. Tea will be served at Mrs. J. B. Tyrrell's on Monday and at the Art Museum on Tuesday afternoon. On Tnesday evening there will be bridge at Mrs. R. F. Segsworth's. Mrs. D. A. Dunlop, Mrs. James McEvoy, Mrs. J. P. MacGregor, Mrs. W. A. Parks, Mrs. R. F. Segsworth and Mrs. J. B. Tyrrell form the committee.

The splendid program arranged for the meeting and the excursion on Thursday should bring a record attendance.

The announcement was made in Toronto this week that the Department of Mines had authorized the closing of the Recorder's Office for the Larder Lake Mining Division, which has been located at Matheson. The present branch office at Swastika is made the head office for the Division, and George Ginn, formerly Assistant Recorder at Swastika is appointed Recorder. One of the requests made of the Cabinet when Premier Drury and his colleagues visited Northern Ontario in December last was that the Swastika Division be extended. This has now been brought about by the closing of the Matheson office.

METAL QUOTATIONS.

Fair prices for ingot at Montreal 24th February.

	Cents per lb.
Electro Copper	24½
Casting Copper	24
Lead	12
Tin	77
Zinc	12¼
Antimony	13½
Aluminum	34

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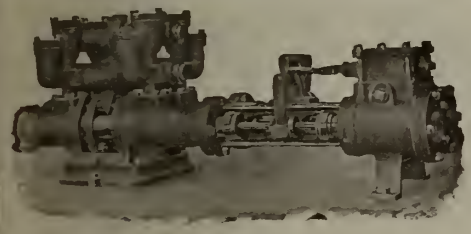
PREPARING FOR THE CANADIAN MINING INSTITUTE MEETING.

Additional features announced for Meeting.

In addition to the various features of the annual meeting of the Canadian Mining Institute to be held in the King Edward Hotel, Toronto, on March 8, 9 and 10, as previously announced, the local committee has arranged for a trip to the International Nickel Company's plant at Port Colborne. Special pullman and dining cars will be attached to the train. The Goodyear Tire Company's factory will also be visited while the members are in Toronto. H. Parks will give a lantern talk on the Nipissing Mine. Tuesday evening there will be a vaudeville show at the King Edward Hotel for the entertainment of the members and a number of good speakers have been secured for the annual dinner on Wednesday evening. All indications point to the most successful annual convention the Institute has yet held and the prospects are that the atte-dance will be a record one. One of the items for the first day will be an address by J. A. Campbell M. P. on the attitude of the Government towards mining development.

ASSOCIATED GOLDFIELDS.

At the head office of Associated Goldfields, the company which is developing a large orebody at Larder Lake, Ontario, news has just been given out of important developments. Mr. A. J. Moore, the consulting engineer, has reported the finding of a large body of $12 ore. The company has previously been counting on a large tonnage of comparatively low grade material. Plans are now being made for the development of the richer ore.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STATUS OF THE ENGINEER

At the meeting of the Toronto branch of the Canadian Mining Institute on Saturday Feb. 21, the chief topic of discussion was the proposed engineering bill. A committee of the Engineering Institute of Canada has been industriously working on the problem of improving the status of the profession, and during the past year there have been many conferences at which there were representatives of the Toronto branch of the Canadian Mining Institute. It is proposed to bring up the subject at the annual meeting of the Institute and Mr. James McEvoy has been asked to introduce the discussion on Monday morning, March 8th. At the meeting of the Toronto branch last Saturday, attention was directed to some objectionable features of the proposed bill. The objections were stated in a communication from the Sudbury branch Mr. J. P. McGregor, secretary of the Toronto branch read the communication and his reply.

It will probably be admitted by most engineers that some legislation to protect the men of their profession and the public is desirable. A few engineers have interested themselves seriously in this matter and after much deliberation are making proposals as to what should be done. It is now up to all Canadian engineers to consider whether these proposals would, if carried out, be in the public interest. The comparatively few engineers who have been active in this matter should be advised whether their views are fairly representative or not. It is not sufficient to thank them for their work without offering helpful suggestions. The proposals are up for discussion and should be criticized now, not after they have been put into effect.

It is well known that many unqualified men have posed as engineers in order to obtain some renumeration that would otherwise have been denied them. Such practice might conceivably be prevented by legislation. In applying for such legislation, however, it is quite possible that mistakes will be made. A simple bill framed to protect the public would meet with general approval, but such framing appears to be not easy. Most proposals made have objectionable features that are partly the result of an endeavor to be too specific. Proposals made by one group of engineers and considered very favorably by many are quite objectionable to another group. Apparently however, many of the objections have been met satisfactorily and the committee's work may soon result in proposals that will meet with general approval. It is now fairly well understood that the proposed legislation should not provide for any special privileges for engineers. It should provide for registration of engineers so that the public will know whom they are employing, but is should not prevent anyone else from doing the work if the employers are satisfied.

The Engineering Institute of Canada is not as a body applying for legislation for engineers. A bill drawn by a committee of that Institute has been given some publicity, but it is understood that application for legislation will be left solely with the engineers in each province. The Council of the Canadian Mining Institute has requested the various branches to consider the proposed legislation and to submit their reports to Council.

Some time ago it was agreed by the Engineering Institute of Canada that there would be no application for legislation by that body until the bill as affecting mining had been approved by the Canadian Mining Institute. This agreement is of no consequence under the present circumstances however, as the intention is to leave the application to engineers in the several provinces. There being no provincial organization in the Mining Institute it will not be an easy matter to get the opinion of the mining engineers in any province, and it is quite possible that an inadequately considered bill may be submitted to the legislature.—R.E.H.

IMPERIAL INSTITUTE TO ISSUE MONOGRAPHS ON MINERAL RESOURCES OF THE EMPIRE.

The Mineral Resources Committee of the Imperial Institute, of which Viscount Harcourt has succeeded the late Viscount Rhondda as chairman, has arranged for the issue of a series of Monographs on the Mineral Resources of the Empire, of which one on zinc ores has already appeared. Others on manganese ores and tin ores are now being published by Mr. J. Murray. The Monograph on manganese ores has been prepared under the direction of the Committee by A. H. Curtis, B.A., F.G.S., and that on tin ores by G. Davies, M.Sc. (Lond), F.G.S., of the staff of the Imperial Institute. In each case the book is arranged in three chapters.

The first gives a brief survey of the occurrences of the ores and of the characters and uses of the metals. The second chapter deals fully with the sources of the supply within the Empire, and the third describes shortly the deposits in foreign countries. The Monographs conclude with a bibliography of the principal publications of the subjects dealt with. The Monographs are published at 3s. 6d. net. Owing to its extensive employment in the manufacture of iron and steel, manganese was in great demand during the war.

World Supplies.

Unfortunately there was a serious shortage of manganese ores, as supplies from the Caucasus, the chief producer, was shut off, and shipping facilities restricted the amount available from India, which ranked second to Russia as a producer of manganese ores. At the present time the output from India is increasing, and Brazil has enormously enlarged its production, but in view of the disturbed conditions still prevailing in Russia, there is likely to be a continued shortage of the ore there for some time to come, particularly of the higher grades now required by metallurgists and in chemical industries. Several additional sources are indicated as possible contributors to the world's supply in the future.

The Empire is favorably situated as regards supplies of tin ore, and at the present time between 50 and 60 per cent of the world's output is obtained from British countries. Moreover, it holds a controlling influence in the industry of tin smelting and refining.

Federated States' Output.

The Federated Malay States is the most important tin producing area in the world, and most of its output, together with ore from Siam, the Dutch East Indies, South Africa and other countries, is smelted in the Straits Settlements. Bolivia and the Dutch East Indies are the chief foreign producers of tin ore. Owing to the war the German tin smelting industry has practically ceased, and another result of the war has been the establishment of a tin smelting industry in the United States, which country consumes 40 per cent, or more, of the world's output of tin.

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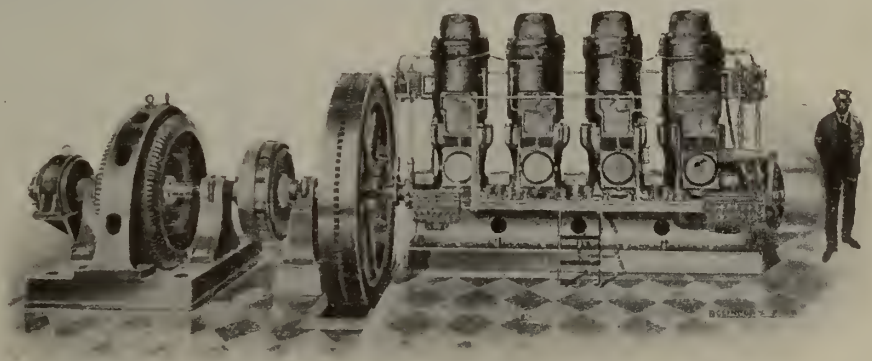

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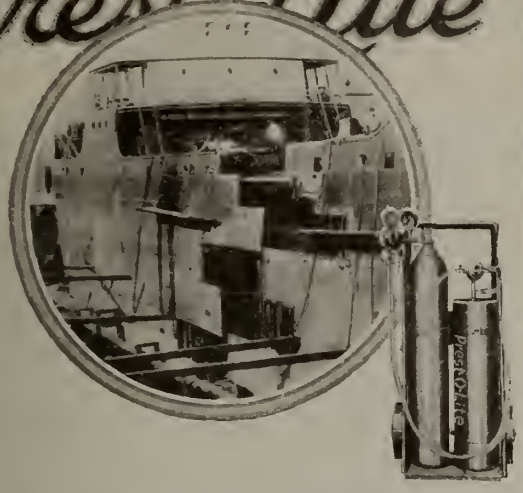

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EDITORIAL

The Mineral and Metallurgical Industries of Canada and Customs Tariff

The guiding principle in the policies of the farmers' organisations in Canada is the immediate financial betterment of the farmer through decrease in taxation and the lessening of the price of agricultural implements and accessories by the abolition of protective tariffs. Mr. T. A. Crerar has publicly stated: "I would absolutely root out the principle of protection in our customs tariff."

In a straightly drawn issue between the merits of free trade versus protection there is no discharge in the war of argument, and unfortunately persons who have strong convictions on either side appear to draw these convictions from a natural preference, or perhaps it should be called a prejudice, which takes no account of economic facts. These prejudices partake of the nature of religious leanings, or they may be likened to the incompatibility of temperament between the prohibitionist and the non-prohibitionist. It is as useless, and as profitless to indulge in academic argument concerning free trade as compared with protection as to argue about many other matters that are merely a reflex of two eternally opposed types of human nature.

Unfortunately those whose business is connected with the production of minerals and their utilisation in Canada must reckon with economic facts, chief among which is that the two most important branches of Canadian mining and metallurgy, namely, the production of coal, iron, nickel and various ferro-alloy materials, and their utilisation in the arts on the Canadian side of the border, are based upon protective tariffs. This is a fact that is thoroly appreciated by the farmers in the East, which accounts for their disapproval of the root and branch condemnation of all forms of protection favoured by the western farmers. The day is coming when this conflict of agricultural opinion will be cured by the industrial development of the West itself. When the enormous coalfields of Alberta are developed on a scale somewhat commensurate with their extent, then we may expect to see the industrial activities of the West exceed the industrial activities of the East in the proportion that the fuel supply of the West exceeds that of the East. The possession of coal spells commerce, industry, political power and purchasing power. Coal is the most important commodity in modern civilisation. Its value exceeds that of agricultural products, because without coal large agricultural production is impossible, seeing that neither the provision of modern implements or transportation are possible in the absence of coal. The cure for the single and very selfish vision of the western farmer is the admixture of manufacturing industries with grain raising, and this will come in time.

Meanwhile, however, there is a grave danger that in order to reduce the cost of farm implements the farmers' parties may be willing—if they obtain the power—to chance the destruction of the established industries of Canada, on which the purchasing power and wealth of our population depend. If the farmer thinks that he can escape the effects of the financial depression which would cover Canada from coast to coast were protective tariffs completely abolished, he is much mistaken. The price of wheat would fall, and even at reduced prices would be beyond the purchasing power of Canadian industrial workers. The facts are so inescapable that, should the farmers' parties control Canadian politics, it may be expected, when faced with the actual responsibility, they would do as many other parties with similar aims have done in Canada, and decide they dare not risk the commercial disintegration of Canada to achieve a temporary saving in a few selected agricultural accessories, and to test a pet political theory.

There should be no ambiguity among the mining men of Canada as to the protected nature of their industry. The fact should be freely and frankly admitted, and the necessary steps should be taken to safeguard the industry when tariff changes are proposed. We believe also that the industry should look at the largest aspect of the question, and should not urge the exemption of tariff duties upon some specialised and selected equipment needed in mining operations, without fully realising that the basic mineral and metallurgical industries are all protected by tariffs, and that requests for small and relatively unimportant exemptions on mining equipment, may effectively weaken and vitiate a principle that works to the benefit of the larger interests of mining men as a whole.

BLASTING COAL ON THE NIGHT SHIFT.

The Dominion Coal Company, under the direction of the General Superintendent, Mr. A. J. Tonge, has decided to extend the practice of night blasting to all its collieries. For a number of months past all the shots in the Caledonia Colliery have been fired at night, and the system has lately been given general adoption in Nos. 2 and 9 Collieries, where two seams of coal are worked to a common hoisting shaft. The holes are bored during the day, and at night they are charged and bored by shotfirers. These men are specially certified as to fitness, and have the status of an official. The "Special Rules" governing the practice of shot-firing require strict examination as to the presence of mine gas and dust.

An examination of the records of the mine explosions in Nova Scotia will show that most of them were connected with blasting. Approximately four hundred lives have been lost in Nova Scotia coal mines by explosions attributed to blown-out or "flaming" shots, and each of the larger explosions is believed to have been so caused. The object of Mr. Tonge's decision to confine shot-firing to the night shift is, of course, to minimize the loss of life which may follow blasting on the day-shift because of the larger number of men at work underground. The plan should also be attended with more efficient and skilful blasting, arising from the added knowledge that comes from specialization. The chief merit of the new plan is, however, that it removes from the mine, during the crowded day-shift, what has by painful experience been indubitably proved to be the proximate cause of all the great colliery explosions in Nova Scotia, and an infinitely large number in collieries in other fields.

The seductive literature of the "Little Gem" still continues to appear in the "Montreal Star", but as the Company ceases to give away money, (which we gather is the equivalent of the withdrawal of the stock offer) on March 6th, possibly readers will be shortly deprived of this source of amusement. The latest advertisement quotes a telegram received from the mine in Alaska, which reads: "Vein widening "Quartz two feet wider and looks very good and pans strong". For the benefit of investors it is explained that "The words 'pans strong' mean that the ore pans "lots of gold, and 'Quartz two feet wider' means con- "siderable more ore". The explanation of the meaning of the telegram would appear on its face to be elementary, not to say gratuitous, and discriminatingly adapted to the intelligence of the prospective investor.

WHAT IS A CONCENTRATOR?

The varied usage of the term concentrator has been well brought out by the recent dispute over the interpretation of the Assessment Act in Tisdale township. Whether or not certain property of the Schumacher, Dome Lake, McIntyre, Dome, Porcupine Crown and Davidson mining companies should be assessed or not must be determined by the applicability of the term concentrator, for under the Act such are not assessable.

In the treatment of ores after they are brought to the surface at a mine, various processes are used to separate and recover the valuable constituents. The elimination of any material of less value than the average gives a product containing a correspondingly greater proportion of desirable constituents. This gives an increased concentration and the process may be spoken of as concentration and the agent as a concentrator. The agent might be a person handpicking the ore, either picking out and discarding waste or picking out and saving the pieces of supposedly higher grade. Such a person might properly be called a concentrator. Again the agent may be a machine or a series of machines doing work of a similar kind—mechanically separating better from poorer material. Such machines might well be called concentrators. If the man who acts as picker used a hammer to break the ore he is sorting, he and his hammer are concentrator and crusher and since the degree of concentration which he is then obtaining, necessitates the breaking of the rock, the hammer becomes a necessary agent—a part of the concentrating machinery though not itself doing any concentrating. Among the earliest records of mining in America are the stone hammers which are found in hundreds in Michigan native copper districts. The native copper was obviously concentrated from the mixed masses of copper and rock by men who wielded hammers. The men equipped with stone hammers were not simply rock breakers they were concentrators. So also if machines are used to separate better from poorer material and other machines are used to crush the ore preparatory to sorting it, these other necessary auxiliary machines become a part of the plant that is called concentrating plant. The crushers are not primarily designed to do any concentrating, though commonly they do a certain amount, owing to the fact that some of the ore crushes more readily or into finer particles than the remainder. A crusher is not of itself a concentrator, but it can be, and in concentrating plants is commonly made to serve in some way as a concentrator by utilizing its classifying action.

A very different type of concentration is that effected in smelting operations. Here instead of fine crushing and subsequent mechanical sorting, melting at high temperature is used to concentrate the valuable constituent. In the ordinary furnace operation the object is to separate the molten mass into two parts in one of which will be concentrated most of the valuable constituent, while in the other will be the greater part of the undesirable constituents. Advantage is here taken of the behaviour of metals when in the liquid state and the furnace may quite properly be regarder as a concentrating device.

Still another method of concentration is that of utilizing the solubility of minerals in water in which has been dissolved some chemically active substance like sodium cyanide. In a dilute cyanide solution gold

and silver are soluble while many minerals and rocks are not. It is thus possible to effect a concentration of valuable constituents by separating a liquid part containing the metals from the solid part which contains relatively little of them. In the furnace, concentration is effected by the formation and separation of two hot liquid solutions, while in the cyanide plant, concentration is effected by the formation and separation of a cold liquid solution from a mass of solid particles. The cyanide plant, like the furnace, is therefore a concentrator. It is however not common practice among mill men to speak of either as concentrators, that term being used by them more specifically for plant used to effect concentration without solution.

What is meant by the term concentrator is therefore not easily determinable. When the average chemist or physicist speaks of concentration he seldom has in mind a machine for treating ores. If he happens to be interested in gold mining he probably considers cyanide plants and Wilfley tables and amalgamating plates all as concentrating machines. If he happens to be an iron furnace chemist he probably considers that concentration is very well effected in a furnace. The practice among gold and silver metallurgists however is to disregard the ordinary use of the term in order to have some useful name for the processes of effecting concentration in which resort to solutions is not used. The limited meaning of the term concentration has been generally accepted by each class of metallurgists. These same persons are however not very strongly inclined to reject the name concentrator for a plant in which solution processes are used. The term "mill" is frequently used as an alternative, but such use is open to objections also. Hence the latter is frequently used for all the buildings and plant at a mine in which the treatment of ore is carried on. The stamps, ball machines, tables, cyanide plant, melting furnace are frequently considered as parts of the concentrator. The term concentrator is used in gold mining districts practically equivalent to "metallurgical works". On the other hand the metallurgical works at Copper Cliff or Hamilton are not commonly called concentrators, and the terms are not equivalent.

Most of us would probably call the metallurgical works at Porcupine and Cobalt concentrators or mills indifferently not being satisfied that either was a good name. Where concentrators are named as not assessable the term concentrator will be more popular. In other places the shorter and more general term "mill" will doubtless continue to win favor until some more adequate nomenclature is adopted.

In the evidence, Mr. H. E. T. Haultain expressed the opinion that the term concentrator is understood to apply irrespective of whether the process is a mechanical one or if it is chemical. Mr. Gauthier claimed that if a chemical process is used it is not concentration. Mr. A. A. Cole would distinguish between concentrating, cyanding and amalgamating mills and is evidently of the opinion that the term concentrator is not applicable to the mills at Porcupine.

For the purpose of interpreting the Assessment Act the important determination to make is the common usage of the term concentrator in Ontario. Many will be found to agree with Prof. Haultain that the term is loosely applied to various kinds of mills in various localities. What names should be used for these mills is another matter.

The dispute should lead to the better nomenclature of metallurgical works. There is already a useful distinction made between two classes of works—mills and smelters. Mr. Cole's suggestions as to the classification of mills merit attention.

GRAPHITE IN SOUTH AUSTRALIA.

There is ground for believing that there is a bright future for the graphite industry of South Australia. The Director of Mines and Government Geologist, in his annual report, states:—"As in the previous year, a great deal of work was done in the testing of samples of graphite ore from Eyre Peninsula. The result was very encouraging, and taken in conjunction with the departmental reports on the mine, there is very good reason to believe that a valuable deposit of graphite exists in that locality, awaiting only the erection of a suitable mill to treat it. For the better treatment of samples of graphite ore, an experimental winnowing machine was constructed. The design was made in the department, and the construction carried out in workshops of the Public Works Department.

"Briefly this little machine consists of a narrow box, 2.5 ft. long, 2 ft. high, and about 8 ins. average width. A current of air is drawn through the apparatus by means of a small fan placed at one end of the box, and the ore is fed in through a slot in the top at the opposite end. The width of the box increases regularly from the feed to the end where the fan is. Arrangements are made whereby the formation of eddies is reduced to a minimum. The effect of the winnowing operation can be watched through the sides of the machine, which are of glass, and the final products are caught in a drawer, divided into a number of compartments, which fits into the bottom of the apparatus.

"Although no doubt capable of much improvement, still the machine is highly effective, and has eliminated to a large extent the uncertainty connected with the operation of winnowing by hand, which had to be practised formerly. The machine undoubtedly forms a basis upon which an apparatus working on a commercial scale could be designed."

Toronto officials of the International Nickel Company of Canada this week refused to verify the Canadian Press Despatch which stated that the company had bought the huge sulphite copper mines at Flin Flon outright for one million dollars. The despatch, which was sent out from The Pas, Manitoba, further says: "It is known that the nickel crowd have been negotiating for it since early in January and ten days ago it was reported that the deal was tied up satisfactory to both parties. A sum of nearly ten millions of dollars will have to be expended upon its development before taking out a pound of ore. This includes the construction of a railway from the Pas, the erection of a smelter and the harnessing of water power in the Churchill River, besides the usual mine equipment.

The death took place in Toronto this week of T. D. Ledyard, 74 Shuter Street, who for fifty eight years was a barrister in this city and a mining expert of some prominence. Deceased, who was eighty years of age, was educated in Toronto and the Old Country and was one of Toronto's oldest residents. He had retained his mental vigor and was at his office daily until his recent illness.

The Cassidy Colliery of the Granby Consolidated Mining & Smelting Company, Vancouver Island

A Colliery Lay-out which includes unusually complete provision for the comfort of the work people.

The Cassidy Colliery of the Granby Company is situated about eight miles from Nanaimo, on Vancouver Island. The site selected was beautiful in its original state, and care has been taken in laying out the residential district not to destroy its natural attractiveness. The residential site comprises eighty acres of an alluvial flat, or what is locally known as "bench land" overlooking the Nanaimo River to the North, Haslam Creek to the South, and is sheltered by a well forested ridge, 300 feet in height, to the East and West, which is being preserved as a park. In the distance can be seen the purple silhouettes of Mount Buttle, Tyee Mountain and other mountains. To one coming from the East, the tall trees luxuriant ferns and brilliantly tinted undergrowth are very pleasing. Close to the colliery site is a gorge of the Nanaimo River cutting through the Protection sandstones, of unusual beauty.

The seam worked at Cassidy's is the Upper Douglas Seam, which outcrops about ten feet thick, in the bed of the Nanaimo River at this point. From this seam the first coal on Vancouver Island was mined by the Hudson Bay Company in 1852. The area was thoroly tested by diamond drilling, and the first coal was hoisted from the Main Slope in June 1918.

The seam dips at about eighteen degrees, and the coal varies in thickness from 5 to 20 feet, averaging about 10 feet. As is common in this district, the seam is disturbed by rolls, which at Cassidy's are more pronounced in the shales of the pavement, the roof shales being fairly regular. The coal, as seen at the screens, is very slickensided, and does not possess the regular laminated appearance, or the cleat of bituminous coals as they are usually found.

CASSIDY COLLIERY—GENERAL VIEW.

Small Panels and Large Pillars assure Maximum Extraction.

The mine is opened on the dip of the seam, the Main Slope having been driven to a depth of approximately half a mile. It is being driven 7 ft. x 14 ft. in the clear to allow for double track and is timbered with 12" x 14" framed sets spaced 4 ft. centres. A separate railway is provided as a travelling road and employees are not allowed to use the main haulage way in passing to and fro from their working places. The mine is worked on the pillar and stall system. The mine is divided into relatively small panels, as a precaution against mine fires, and large pillars are left along all main haulage roads and permanent airways, the idea being to extract a maximum amount of coal at the least cost rather than to take out cheap coal for a few years to the final detriment of the mine, as has been done in so many of the mines on Vancouver Island and elsewhere.

Storage Battery Locomotives Used Underground.

Mining is planned so as to deliver the coal from the face to the main haulage system by gravity as far as possible. Storage battery locomotives are used on the levels underground. No horses or mules are used.

The drainage system has been carefully planned so that surface water entering the mine from the gravel will drain by gravity, and water from workings below the Drainage Level will run to a central pump.

The mine is ventilated by a Sirocco fan, capacity 150,000 cu. ft. per minute. The mine is provided with a double intake and return airway throughout the workings which are planned so that the air can be taken to the face where required with a minimum loss.

The mine cars are of wooden construction having a capacity of 1¾ tons of coal. The track gauge is 36 inches. Hadfield manganese steel, self-oiling wheels 18" diameter and 3" tread are used. The mine cars are built in the company shops at the mine and have no end doors.

The Fan House is a concrete fireproof structure and also houses the telephone exchange and motor generator set for charging storage battery locomotives. The fan is driven by 150 H. P. Westinghouse electric motor.

The main hoist is a Vulcan 18" x 36" double-drum second-motion hoist.

Tipple and Washery.

The tipple is equipped with Fairbanks scale, rotary drum, Marcus screen and loading booms. The railroad cars are handled with Fairmount car-retarders. The track scale is a Fairbanks Standard all steel and concrete, capacity 100 tons. The rock cars are handled with a special Wilson rotary dump.

The washery is equipped with two, 2-compartment jigs, having a capacity of 40 tons per hour each. The tipple and washery were designed by Roberts & Schaefer of Chicago. The washery is equipped with sludge recovery and uses the same water over and over again.

The washed slack is used in the new by-product plant at Anyox in making coke for the copper smelter and the lump, nut and some pea coal sold. The bone coal is burned under the colliery boilers.

CASSIDY COLLIERY—BANKHEAD AND WASHERY.

Special attention has been paid in the screening plant to protection of the coal against breakage. The "Marcus" screen appears to be a general feature of British Columbia and western collieries generally. A handy arrangement for raising and lowering the extension of the picking-belt that feeds the coal into the railway cars, is a small electric motor, which is used instead of the air-hoist that is generally seen in the collieries in the East.

Power and Water Supply.

The equipment for generating the motive powers used, and the arrangements of the water-works system, are all designed with a view to checking consumption by accurate measurement, and especial care has been taken to avoid radiation and condensation losses, and to effect every possible economy in fuel use. The colliery consumption at Cassidy's will no doubt show the economies which must follow such careful planning. The mechanical layout of this colliery is not by any means the least notable achievement of a really remarkable plant.

Power House.

The boiler plant at present consists of two Badenhausen water-tube boilers, 260 H.P. each, fired by Type "E" mechanical stokers. The ashes are removed by washing and fluming to the dump. The feedwater is heated with Webster feedwater and forced draft is used. The brick stack is 8 feet in diameter and 125 feet high. The boilers and steam pipes are all insulated with asbestos and magnesia to prevent loss of heat. Venturi meters are used to check quantity of water pump station and at the boilers.

The compressor is a Rand cross-compound condensing, capacity 2000 cu. ft. of air per minute. The air is used for running the underground drills, pump and hoists.

Electric power is supplied by an Allis-Chalmers 450 K. W. generator (2300 v. 3-phase 60 cycles, 360 rpm) and also an auxiliary unit 250 K .W. (2300 v. 3-phase, 60 cycles, 450 rpm) both direct connected to vertical high speed engines (Goldie & McCullough). The remainder of the electric equipment is of Westinghouse make. The power-house is equipped with the Bowser oil-handling system. A Worthington fire pump, capacity 1,000 gals. per minute, size 18" x 10 x 12", is ever in readiness for an emergency.

Exhaust-Steam Heating System.

The entire plant is equipped with an exhaust-steam heating system, the condensation being returned to the boilers.

Water Works System.

The pump station is equepped with two Morris Centrifugal pumps each having a capacity of 300 gallons per minute. These pumps elevate the water to the two 50,000 gal. storage tanks situated on top of the hill overlooking the town, from whence it flows by gravity through the water mains. The pumps are driven by 50 H.P. Westinghouse electric motors. A Venturi meter records the quantity of water leaving the station at all times. The Nanaimo River furnishes a plentiful supply of pure fresh water for domestic and power purposes.

Carpenter, Machine and Blacksmith Shops.

The shops are all thoroughly equipped, well lighted, and will be conected with the mine tracks. The carpenter shop is fitted with rip-saw, band-saw, planer, boring and mortising machine.

The machine shop is equipped with a large lathe, small lathe, planer and shaper, pipe-threading machine, drill press, emery wheel, etc. The shafting is all well guarded. The Master Mechanic's office adjoins the Machine Shop.

The Blacksmith Shop is fitted with two forges, steam hammer and swing crane. Adjoining the blacksmith shop is a special tool house where miners' picks are

kept after sharpening. All scrap iron is sorted out and stored in pockets provided for the purpose. Racks are provided for storing stock of iron and steel.

Mine Buildings.

Between the change house and the manway portal are the powder house (in which the stock of explosives is limited to one day's supply, the larger magazine being on the opposite side of the hill from the town) the timekeeper's office, lamp-house and Mine Rescue Station. The lamp house is equipped with 300 Edison storage-battery electric lamps. The Mine Rescue Station is equipped with Gibbs apparatus, lungmotor, smoke chamber, etc., and a large lecture room for holding First Aid or Mining Classes.

The above mentioned buildings are all heated with exhaust steam from the power house.

Arrangements for Comfort of Workmen.

Cassidy's is unique, in Canada at least, in the care that has been taken to provide for the well-being, the health and comfort of the employees. The climate of Vancouver Island is one that permits a great deal of open air life, and indulgence in the pleasures of gardening to an extent difficult to appreciate in the East. Full advantage has been taken of the pleasant aspect of the site and the favourable climate to create a mining village that is without a parallel, in Canada at least. The streets have been boulevarded, and planted with one variety of trees to each street, which give their name to the street alongside which they are planted. For example, one street is an avenue of pink and white flowering hawthorn. Each house is surrounded by a lawn and flower beds, and the climate permits the use of hanging flower-baskets on the verandahs, a privilege that is not confined to the dwellings but is made full use of on the large verandahs of the Mess House and Rooming House.

The water system has already been referred to, and in addition to this, a modern sewage disposal system is provided. The colliery and town are provided with a telephone system.

Some idea of the style of the dwellings provided for the workpeople can be obtained from the accompanying photographs, but these do not show the houses to best advantage, as they were taken prior to occupation and completion of the lawns and gardens.

Accomodation for Single Employees—Rooming House.

The Rooming house for the accomodation of single employees is a "gunite" structure built in the form of a double "L". It contains about 80 rooms, all of which open to the outside verandah or balcony. The rooms are steam-heated, electrically lit, and each room is provided with running hot and cold water. The floor is a patent material "Raccolith" and the rooms can be washed out with a hose when necessary. On the verandahs and balconies are window boxes of flowers. The company supplies the furniture and bedding as a preeaution to ensure cleanliness and comfort of employees.

Each man has a room to himself which compares favorably with good-class hotel accomodation. Especial care has been devoted to the lavatory provision.

Mess House.

The Mess House or Dining Room is a "gunite" structure and is equipped with every modern convenience. The men enter the building through a lobby equipped with wash basins and running hot and cold water, so that they may enjoy a refreshing wash,

CASSIDY COLLIERY. FROM LEFT TO RIGHT—TIMEKEEPER'S OFFICE, LAMPROOM AND RESCUE STATION.

hang up their hats and then proceed through a pretty vine covered pergola to the Dining Hall. At the entrance to the Dining Room a drinking fountain is provided where a stream of clear cold water is constantly available. The Dining Hall is bright and comfortable cool in summer and steam heated in winter. Each table accomodates six men. No enamel dishes are used.

The kitchen is equipped with every labor-saving and modern device, which include an electric dish washing machine, vegetable-paring machine, tables heated by steam coils to keep dishes hot and a refrigeration plant. Living accomodation is provided up stairs for the help. The completeness of the kitchen must be seen to be appreciated.

The Dining Hall is one of particularly pleasing proportions, and its decoration is in the best of taste.

In order that there may be no waste the scraps from the Mess House are fed to pigs. A vegetable garden will furnish all vegetables for the Mess House.

The Change House.

The Change House is in charge of an ex-British soldier who is an experienced First-Aid man. Here the miners can turn in their working clothes, if they are wet, and have them placed in the drying-room by the attendant so that they will be perfectly dry and comfortable when the men are ready to go to work in the morning.

The change house is equipped with steel lockers which are heated with steam coils from underneath, shower baths and large lavatories including every convenience.

The plumbing is not of the rough and ready type usually seen in colliery wash-houses, but is all shining nickel and brass and porcelain. The writer has seen colliery change-houses in many countries, including the elaborate arrangements at the Westphalian coal-mines, but has never seen anything so workmanlike, durable, clean and attractive as the arrangements at the Cassidy wash-house. It reminded one of the wash-room and lavatory appointments of a good city club.

CASSIDY COLLIERY—THE MESS HOUSE.

Hospital and First Aid.

A modern temporary hospital and first aid station has been established in one of the larger houses until the permanent hospital can be constructed. This hospital is in charge of a skilled Matron and trained nurse.

Cassidy Colliery and its residential features are an attempt by Mr. F. M. Sylvester, the Vice-President and Managing Director of the Granby Consolidated Mining & Smelting Company, to translate into actual being his conception of the duty of a large corporation towards those who serve it. The contrast between the residential conditions provided for mine workers at Cassidy's and those usually provided is so great as to come as an actual shock to those who have been accustomed to the traditional accompaniments of life in a coal-mining community of long-standing.

It is to be hoped that the actual operation of the colliery, under the ideal conditions of residence provided for the workpeople and staff, and with the aid of the extremely well-designed surface and underground equipment will reward the management of the Granby Company for its courage in blazing so wide a trail towards improved conditions of mining and mining life, a trail, unfortunately, that less wealthy companies will find it hard to follow.

The Cassidy Colliery was developed chiefly to provide a supply of coking coal for the coking plant which supplies the copper smelting at Anyox, B. C., a purpose for which it is understood the coal has been found entirely suitable. This coking plant, the first full-scale by-product plant on the Pacific Coast, has

CASSIDY COLLIERY—THE GENERAL OFFICE.

been already described in the "Journal". (See C. M. J., 26th Nov. p. 881). The output of coal from Cassidy's has now reached 700 tons daily.

The coal area tributary to the Cassidy Colliery the subject of an unfortunate dispute as to ownership. The provincial grant under which the Granby Company holds the property was given under the Vancouver Island Settlers' Rights Act of 1904, the validity of which is attacked by the Esquimalt & Nanaimo Railway Co. The Settlers' Rights Act, as amended in 1917, was disallowed by the Federal Government in 1918, but it is not considered in British Columbia that the action of Ottawa ends this matter. In any case it is hardly likely that the outcome of the pending litigation will be allowed to interfere with the further development of the Cassidy Colliery, which has made so auspicious and commendable a commencement.

Outdoor Sports.

The Colliery is provided with one of the finest athletic parks in the country. There is a baseball diamond, football ground, tennis courts, bowling green and quarter-mile track. The athletic field is so large that a baseball and football game can both be played at the same time without clashing, and the entire field is as level as a billiard table. The hillside, back of the athletic field, forms a natural grand-stand and the company has reserved this as well as the timber on the other side of the town as a natural park.

The school is to be erected close to the athletic field, and playground equipment installed so that the school children will be enabled to enjoy all the advantages of the facilities for clean healthy sport.

Amusements.

A striking feature of the company's plans in laying down ideal condition under which the men shall work is the programme of entertainment and physical and metal relaxation provided. A temporary recreation hall has been provided with gymnasium, dancehall, library reading room, billiard and pool room. Provision is made for wrestling, boxing and every other means of amusement and recreation which it is possible to give the men.

The town is within a short distance of bathing beaches, in a first-class game country where pheasants, grouse, deed, wild duck and other game are plentiful, and within a few hundred feet of the best fishing waters on Vancouver Island.

Note:

The "Journal" wishes to acknowledge in the preparation of the foregoing description the use of the information contained in a paper read by Mr. R. R. Wilson, the Resident Manager of the Cassidy Colliery, before the Vancouver Meeting of the Canadian Mining Institute in November last. The rules of the Institute forbidding prior use of papers before they appear in the publications of the Institute prevent the presentation of Mr. Wilson's paper in full. We are also indebted to Mr. Wilson for the photographs included in the description.

CASSIDY COLLIERY—TYPES OF RESIDENCES.

TEXT OF JUDGMENT IN ASSESSMENT APPEAL BY SIX GOLD-MINING COMPANIES OF PORCUPINE, ONT.

The Assessment of Concentrators.

Between:—The Schumacher Gold Mines, Limited, Appellants; and Charles B. Morgan and Charles V. Gallagher, Respondents; and

Between:—The Dome Lake Mining and Milling Company, Ltd., Appellants; and Charles B. Morgan and Charles V. Gallagher, Respondents; and

Between:—The McIntyre-Porcupine Mines Ltd., Appellants; and Charles B. Morgan and Charles V. Gallagher, Respondents; and

Between:—The Dome Mines Company, Limited, Appellants; and Charles B. Morgan and Charles V. Gallagher, Respondents; and

Between:—The Porcupine Crown Mines, Limited, Appellants; and Charles B. Morgan and Charles V. Gallagher, Respondents; and

Between:—The Davidson Gold Mines, Limited, Appellants; and Charles B. Morgan and Charles V. Gallagher, Respondents.

Opinion of the Board.

These are appeals from the judgment of the learned District Judge of the District of Temiskaming allowing an appeal from the decision of the Court of Revision of the Township of Tisdale in respect of certain several assessments of the above. Applicants for the year 1919. The appeals were by consent of all parties heard together as the facts in the several cases were either identical or so closely similar that the same question was raised in each for determination by the Board.

It appears that the Assessor for the Township of Tisdale assessed each of the Appellants in respect of "Mill Buildings," Plant and Machinery," for specified amounts. The Assessments in respect of all six Appellants appear to be irregular as not sufficiently identifying the lands assessed, in that number of the Concession, Lot etc. is not given as required by Section 22 of "The Assessment Act," nor is the valuation in each case suggested under columns appropriated to "actual value of land," and "value of buildings," as prescribed by that section. The Board directed that subject to its determination of these appeals these irregularities should be cured and the assessment in those details made to conform to the requirements of "The Assessment Act."

Upon an appeal to the Court of Revision the assessments of the several Appellants were struck off, and upon an appeal to the District Judge the several assessments were restored. The question of the propriety of the Judges' determination turns upon the interpretation of subsection (4) of Section 40, of "The Assessment Act." This subsection reads as follows:

"(4) The buildings, plant and machinery in, on or under mineral land, and used mainly for obtaining minerals from the ground, or storing the same, and concentrators and sampling plant, and, subject to subsection 8, the minerals in, on or under such land, shall not be assessable."

No question arises upon these appeals as to the assessability of the buildings, plant and machinery in, on or under mineral land, and used mainly for obtaining minerals from the ground or storing them, nor as to the assessability of the sampling point or the minerals in, on or under such land; all these are admittedly entitled to exemption from assessment. The crux is the meaning and application of the term "concentrators" and whether the mills of the several Appellants properly fall within that designation, and incidentally also what is the status in respect of taxation of certain subsidiary structures such as pump houses, power houses, carpenter, machine and blacksmith shops, assay and refinery buildings etc.

The question raised here is a question of fact, as in the case of Township of Turnberry and North Huron Telephone Company, 4 O. W. N. 598, which is to be determined as all questions of fact should be, upon evidence. By the testimony of witnesses, and by a view of the McIntyre Mill, the nature of the operations, carried on in the various mills wes made to appear as well as the instrumentalities by which those operations are affected. In the result it was clear that by whatever route it is reached the sole objective of these complex operations is the segregation of the valuable constituents from the mass.

Coming now to the instrumentalities by which this objective is reached it appeared that they are divisible into two classes, mechanical and chemical Among the mechanical agencies are the crushers, stamps and other devices used to crush, pulverize, classify and separate the ore. The Chemical agencies employed are the amalgam process and the cyanide process reinforced by zinc precipitation; admittedly the latter is a purely chemical process, but as to the amalgam tables some witnesses asserted that their action was wholly physical, and others that it was partly chemical. In view of the conclusion reached by the Board on the main question this difference of opinion of the technical witnesses is unimportant.

It may be well to note here that of the six Appellants, the Dome Mines Company, the McIntyre Porcupine Mines, and the Dome Lake Mining and Milling Company use both the amalgam and cyanide processes, while the Schumacher Gold Mines and the Porcupine Crown Mines use only the cyanide and not the amalgam process, and the Davidson Gold Mines use the amalgam and not the cyanide process. All the mills take advantage of a property inherent in gold—its high specific gravity—a physical fact and of course neither a mechanical nor chemical process.

Upon these facts the case of the Respondents cannot be better put than in the words of Mr. Gauthier in cross examination of Mr. Dowsett, p. 21 notes of evidence:

Q. If there is a chemical process used it is not concentration, it is a process of metallurgy; it is the treatment of the ore metallurgically. In other words concentration of ore is purely and simply a mechanical operation; therefore a concentrator is a building in which only a mechanical operation is carried on.

Again in argument Mr. Gauthier said as reported, pp. 337, and 338 notes of evidence:

"We have evidence that the whole process of taking the mineral from the ground and finally refining the same is in the mining world, divided into three distinct branches; the actual mining and storing of ore, then there comes the ore dressing operation, or the preparation of that ore for shipping away from the mine or for treatment on the mining property. Ore dressing is the preparation by mechanical means of these ores for shipping away from the mines or for further treatment; then there is the division of metallurgy, which takes in the actual extraction of the metal from the concentrates or from the ore. Concentration and concentrating mills are used for the purpose of the mechanical dressing of ore for the purpose of treating it, or shipping it as concentrates. The cyanide mill or amalgamation mill is for the purpose of treating the ore itself as is done here. That is the distinction between the mills of the Cobalt Camp that are known as concentrators, and the mills that we have here for the purpose of treating their ores. The amount of con-

centration that is accomplished in a concentrating mill is 60 or 75 to one. The concentration that is accomplished, if you want to use the term in that way, in one of our Porcupine Mills is from rough ore down to bullion, or from 1000 to one, showing that the output from these mills is different from the output from a concentrator."

Applied to the mills in the so called Porcupine Camp Mr. Gauthier's argument comes to this, if a mill confines itself to purely mechanical processes in ore dressing, its output—a coarse product at best with the values still heavily involved in ton of dress—is concentrate and the mill is a concentrator and as such exempt; on the other hand such a mill ceases to be exempt from assessment if the mill owner supplements his mechanical appliances with an amalgamating or cyaniding plant or both, whih may enable him to turn out bullion of a fineness varying from 950 to 995 parts gold and silver in 1000 parts to from 50 to 5 parts base. In this conclusion Mr. Gauthier is supported by the evidence of several mining engineers. For instance, Mr. Arthur Cole, Mining Engineer, for the Temiskaming and Northern Ontarion Railway Commission is reported as saying at p. 302 notes of evidence:

"In looking over these different definitions (of concentrator) the best one that seemed to cover the case in point to my understanding best was, that concentrator is a machine that concentrates mineral by mechanical means without changing its chemical character."

Again at p. 302 notes of evidence; "It (Concentration) is to a certain extent the art of enriching ores by mechanical means."

Q. You would differentiate that term (concentrating mill or concentrator) from a cyanide mill or an amalgamating mill?

A. Yes, when the concentration is the essential part of it; When the cyanide part become the essential part of the mill then I would call it a cyanide mill.

Q. And an amalgamating mill?

A. In the same way, as soon as amalgamating becomes the essential part of the mill, I would call it an amalgamating mill.

Asked at p. 303 notes of evidence how he would describe the mills in the Porcupine Camp, his answer was: "I would call them all mills, I would call none of them concentrators."

While holding so strong an opinion Mr. Cole when asked (p. 309 notes of evidence) could give no reason why mills producing bullion should be taxed and the concentrating mills be exempt.

While aware that enactments conferring a special privilege such as this should be construed strictly the Board is of the opinion that to give effect to the intention of the Legislature in this case a broader meaning must be given the term "concentrators," one adaptable to the developments from time to time of a progressive art. For didactic purposes or purposes of exposition it may be convenient to portion out into separate compartments the complex successive processes observed by the Board at the McIntyre Mill, but in practice there is no such arbitrary subdivision. On the contrary the various processes are dovetailed into one another, at one stage mechanical process following chemical, but all contributing in some measure to the consummation sought; the segregation of the valuable and the expulsion of the worthless constituents.

As Professor Haultain when called as a witness for the Respondents says at p. 38 notes of evidence, speaking of the three divisions of ore dressing—mechanical—physical and chemical—referred to by Henry Louis in his work on Ore Dressing;

Q. Are these used in combination or how?

A. Always in combination.

Q. Various mines that have made and developed these processes have done so to what end?

A. To reduce the cost and increase the efficiency of the plant, and also to increase the capacity of the plant. These are the three ends.

Q. One would produce a finer product, something nearer the pure article?

A. Get rid of waste, I should have said.

Q. The more of that you do, the more of a concentrator you have?

A. Yes.

Again p. 93, notes of evidence:

Q. Paragraph 28, page 27 (Independence Correspondence School) states "The object of concentrating works is clearly to get the values in an ore into smaller bulk in order to diminish the trouble and expense of further treatment, and not for the immediate actual extraction of the metals in the ore?

A. That is a pretty good general statement.

Q. Is that a proper statement, if so, how can you make it coincide with your statement that the cyanide process carried on in the McIntyre mine or mill is concentration?

A. I think I had the McIntyre mill in mind when you were reading it; I think that applies to the McIntyre entirely.

Q. Don't they get it in the form of bullion?

A. Bullion is only one stage purer than the other. It is not the final product any more than coarse concentration. It is a matter of degree only.

Q. Bullion is an article of commerce.

A. So are concentrates. I have sold hundred of tons of concentrates.

Again on page 94, notes of evidence.

Q. Do you mean to say that the object of the McIntyre Mill is not for the immediate extraction of the metals in the ore?

A. I take that as an ordinary, common sense every day expression. That fits the McIntyre, both first part and second part. You can extract the value of the ore in the form of concentrates—dirty concentrates—clean concentrates— dirty bullion—clean bullion; there is only a difference in degree between any of them. You are extracting values in every case. They are not extracting pure gold or pure silver here; even if they were it would not make it any less a concentrating plant.

Q. Is the object of the work to produce concentrates?

A. It is to produce just what they say in the first part of that definition.

Q. Concentrates?

A. To reduce the bulk, and that is what the McIntyre does beautifully.

It seems to the Board that the solution of the controversy is to be found in certain statements made by Professor Haultain in the course of his testimony; for example—at page 35 notes of evidence:

Q. Dealing with the concentration of ores, is the term "concentration of ores" a scientific term, or what would you say it is?

A. It is not a scientific term, it is a colloquial term, it is a term describing a practice, an art rather than a science. I should think it is a term attached to a very varied practice and very varied art.

Again at p. 40:

Q. What do you say as to the cyanide process as to whether or not it is a method of concentration?

A. It is an ideal method of concentration.

Q. The amalgamation process that is in use at the McIntyre and at the Dome and some other mines, are you familiar with that?

A. Yes.

Q. Do you say that is a method of concentration?

A. Decidedly.

Again at p. 41:

Q. Is the term "concentrator" a term of fixed definite scientific meaning any more than concentration?

A. No, it is like so many of our other engineering terms. It is used loosely and has a variety of applications.

Q. What do you say is a concentrator as applied to a plant?

A. A concentrator as applied to a plant, that is more or less of a colloquialism.

A significant confirmation of Professor Haultain's testimony is this regard is to be found in the Report for the year, 1910 of Mr. Cole, Mining Engineer of the Temiskaming and Northern Ontario Railway

Commission. At page 19 the flow sheet of the Buffalo Plant using the cyanide process is labelled a "concentrator" and so at page 27 he designates "concentrator" the Nova Scotia Plant turning out bullion by the amalgam process. It is true Mr. Cole stated or the stand that his characterization of these plants was erroneous, and that he had corrected it in later reports, but the fact of the so called error seems to establish that the term "Concentrator" had not then at all events taken on a definite scientific meaning which excluded from that category a mill using chemical processes. In the Report of the Bureau of Mines for Ontario for the year 1910 in the division headed, "Mines of Ontario" contributed by Mr. E. T. Corkhill, Inspector of Mines, the Buffalo Plant and the Nova Scotia Plant are each designated a concentrator.

From this Board concludes as a fact that the term "concentrator" is a term loosely applied by technical men to various kinds of mills in various localities. and is not a rigid term of act having a strctly defined signification, and that a mill of the kind in question on these appeals s not disentitled to be termed a "concentrator" by reason of its combining chemical processes—the amalgamating or cyaniding or both—with mechanical apparatus is separating values from mineral bearing ore. It follows in the opinion of the Board the mills of the Appellants are not assessable. Mr. Cole concedes (p.324 notes of evidence) that the assay office and equipment and the refinery building and equipment go with the mill and should be exempt if the mill is exempt, and with this conclusion the Board agrees.

Two other classes of buildings with their equipment so far as the latter consists of fixtures, remain to be dealt with.

The first is the class of buildings with their fixed equipment, which are by their accessories physically connected with the several mines or mills such as pump house, power house, transformer house, boiler house. These are necessary to the proper functioning of mine and mill, driving lighting, heating, and watering them. "Machine includes the "engine that works it" (Stroud's Jud. Dict., Title "Machine.")

These, so vitally essential to the efficient working of a modern mine or mill, share the character of the latter and are entitled to the same exemption from assessment to the extent to which they serve mine or mill. To the extent that they are used for purposes other than to serve mine or mill the buildings are assessable, but the fixed equipment in its entirety, as fixed machinery used for manufacturing purposes, is exempt under Sections 5, subsection (17) of "The Assessment Act." It may be that the fixed equipment in the pump house cannot be regarded as fixed machinery used for manufacturing purposes, and that it is therefore, assessable but only to the extent that it is used for purposes other than to serve mine or mill. This proportion of the whole value of the pumping plant is however negligible. The telephone equipment of the several Appellants, while no doubt fixed machinery can scarcely be regarded as used for manufacturing purposes. It is however, physically annexed to mill and mine and is indispensable to the efficient working of both under modern conditions. Besides it exists and is used solely in and about the mines and mills of the several Appellants, the installation of certain instruments in the dwelling houses of officials and employees is quite consistent with such sole user. In the view of the Board this equipment is exempt, none of these companies being companies "carrying on business," under Section 14 of "The Assessment Act," and assessable as such.

The second class of buildings are those which do not form an integral part of mine or mill by reason of physical annexation as do those in the first class, and these are in the opinion of the Board assessable. This class includes such buildings as stables, blacksmith, machine and carpenter shops, store houses for other than ore, bunk houses, oil houses, dry and change houses, ice houses and offices. It is to be noted that while subsection (4) of Section 40 opens with an enumeration in general terms of things—buildings, plant and machinery—used for two specified purposes, it closes with an enumeration of specific things—"concentrators" and "Sampling plants." The class of buildings under consideration cannot fall under any of the things in the general enumeration in view of the limited purposes set out. If the Legislature had intended to exempt this class of building it would have enumerated them specifically along with "concentrators and sampling plant," but this it has not done. The fixed equipment in blacksmith, carpenter and machine shops may perhaps, though near the line, be regarded as fixed machinery used for manufacturing purposes, and as such exempt in toto, while the fixed equipment, if any, in the other buildings of this class is assessable as partaking of the nature of land as land is defined in "The Assessment Act." In the foregoing when the term "mine" is used, the reference is to the "buildings," plant and machinery in, on or under mineral land and used solely for obtaining minerals from the ground."

Where an apportionment of valuations requires to be made in accordance with the findings of the Board, the parties indicated that such apportionment could be made by agreement. Before adopting the valuations appearing in the statements furnished the municipality by the several companies the provisions of subsection(2) and (3) of Section 40 of "The Assessment Act," should be considered. The Board understands that the valuations appearing in these statements are the cost values of the several structures as carried on the books of the companies. It may be well that in many cases the cost at which a structure is carried on the books of the Company is quite different from the "amount by which the value of the land is increased" by the erection of the structure.

The appeals will be allowed and the several assessment rolls amended in accordance with the foregoing. There will be no costs to either party. There will be a fee of $10.00 in Law Stamps on each order payable by the Appellant, the Appellant in each case being recouped $5.00 by the Respondent.

(Signed) D. M. McINTYRE,
Chairman.

The Sudbury "Star" reports the death of Mr. Geo. Behenna, of Creighton mine, one of the pioneer miners of the nickel district. Mr. Behenna was captain of Stobie and Murray Mines when they were flourishing and Creighton just beginning. Stobie has been abandoned, and Murray is just opening up after 20 years inactivity. Mr. Behenna was born at Redruth, Cornwall, coming to the United States at the age of 24. After holding the position of captain of a copper mine at Champion, Michigan, for several years he came to the Stobie Mine.

Our Northern Ontario Letter

THE SILVER MINES.

At the time of writing, the New York quotations for commercial bar silver have receded to a fraction above $1.29 an ounce. This is approximately the point around which quotations may be expected to hover just as long as the white metal remains in a position where it is virtually standard, that is to say on a parity with gold on a basis of 16 to 1.

Detailed figures issued this week by the United States Bureau of Mines shows a further decline in the silver production of that country in 1919. This is pointed to as evidence that the less intensified development of the base metal mines of the U. S. from which a large amount of silver is mined annually as a by-product, is bound to bring the silver mines themselves into greater favor.

As an illustration of the favorable affect this situation is having in Northern Ontario where a large number of mines are operated exclusively for the silver they contain, is this week's announcement that the Keeley mine in South Lorraine will be re-opened, and that immediately following an aggressive development program an effort will be made to place the mine on a steady producing basis. In former years this mine was worked intermittently, but without commercial success. In the first place, it was never equipped with milling facilities. The cost of shipping the ore by truck and steamer to the railway was expensive and made it possible to deal only with the high grade ore. Now, however, with the price of silver having jumped to such high levels, and the operation company having decided to install a 20-stamp mill on the property, the indications appear to be that before the end of the current year the mine will be producing silver at a substantial rate. Work will commence on March 9th and will consist of de-watering the underground workings and the commencement of a comprehensive development scheme. In the meantime, the plans for the new mill have been completed, and the purchase of the equipment has already commenced. By the time the mill is on the ground the amount of development work accomplished is expected to have placed sufficient ore in sight to keep it running at full capacity.

The directors of the McKinley-Durragh Mines have declared a regular quarterly dividend of 3 p. c. payable April 1st to shareholders of record March 6th. The disbursement will amount to $67,428, and is the second to be paid so far this year. The total paid to date by this company amounts to 259 per cent., or some $5,754,163.

The Buffalo Mines has gone into voluntary liquidation, a winding up order having been issued for Mach 14th. The mine and its assets all pass to the Mining Corporation of Canada.

Development work on the Temiskaming Mine continues to add more ore to that already in sight. As yet, however, there is a tendency to regard the current developments as being somewhat similar to those of 1919 at which time the number of comparatively small shoots of ore were encountered from time to time.

It is stated that the proposal to merge the Adenac with the Victory Silver Mines, as outlined in last week's Canadian Mining Journal is meeting with considerable favor among the shareholders of both companies. Provided the consolidation goes through on the present basis of 1,000,000 of the new issue to the Adenac, 1,000,000 shares to the Victory shareholders and 500,000 shares to the treasury, it is believed possible that work may be commenced on the Victory part of the merger in the early spring.

Up to the present, Henry Cecil, holder of an option on tailings pile on the Chambers-Ferland mine has failed to consumate a deal. The option was for $55,000 and it had been planned to erect an oil flotation plant for treating the tailings.

From the outlying districts there is every evidence that the coming summer will bring increasing activity. The Gowganda district promises to be the leading prospective field, while interest in the Elk Lake and in the old South Lorraine district is steadily growing.

The Silver Bullion Mines, at Leroy Lake in the Gowganda district, having completed the purchase of the Dodds property, now announces that a $30,000 mining plant has been purchased from a Nova Scotia mining concern and is already in course of transportation to Elk Lake. Also, the contract for hauling the equipment from the railway to the property has been let, and it is expected that the mining plant will be in operation before the break-up.

In the South Lorraine district, the announcement that the Associated Gold Mines of Western Australia, operators of the Keeley Mine, will erect a new mill, has caused more than ordinary interest, and the indications appear to be that it may be the commencement of a general revival of activity in that promising silver district. On a number of properties in the neighborhood of the Keeley there are encouraging silver bearing veins, the development of which is now given added incentive due to the high quotations for silver and, also, on account of the more abundant supply of labor.

The Cobalt branch of the G. W. V. A. continues to press its request for three free mining claims to all returned soldiers who were "bona fide" prospectors prior to enlistment. While it has as yet been impossible to secure definite figures, it would appear as though 10,000 would be a conservative estimate of holders of Miners Licenses who enlisted for service from Ontario. Provided this estimate is correct, the request presented to the government is for the surrender of approximately 30,000 mining claims, of 40 acres each, or a total of about 1,200,000 acres. This area would be equal to 52 townships of the size of Teck in which is situated the mines of the Kirkland Lake district or of Tisdale in which is located all the proven mines of the Porcupine field. It is believed that the government will not acede to the request, but, instead, will endeavor to find some other way in which to satisfy the request of the veterans without placing the entire mining industry of the province in jeopardy by adding to the already enormous area tied up and idle.

According to official advice from Thos. W Gibson, Deputy Minister of Mines, to the New Ontario Pros-

pectors' Association, it has been suggested that the following townships shall be transferred from the Temiskaming Mining division and added to the Larder Lake Mining Division:—Catherine, Pacaud, Marquis, Otto, Eby, burt, Black, Tolstoi, McEvay, Nordica, Terry, Lee, Sheba, Dunmore and Bombas. As regards this, the general feeling appears to be that such a transfer would be reasonable with the exception of the transfer of the townships of Catherine and Pacaud. These two townships, or that part staked for mining property, are largely held by prospectors and mining men resident in Cobalt, Haileybury and New Liskeard. For that reason it is believed that they should remain a part of the Temiskaming Mining Division the recording office for which is located at Haileybury. Concerning the request from the New Ontario Prospectors' Association, it is pointed out, the Department should keep in mind that such a request represents a total membership of less than one score.

During the week ended Feb. 28th, four Cobalt companies shipped a total of four cars containing 309,593 pounds of ore.

Following is a summary:—

Shipper	Cars	Pounds
McKinley-Darragh	1	106,850
La Rose	1	78,057
O'Brien	1	64,040
Hudson Bay	1	60,646
Totals	4	309,593

During the corresponding period, no bullion was shipped.

THE GOLD MINES.

For the first time for the past two years, some of the gold mining districts of Northern Ontario report a surplus of men. In some instances, according to official advice of your correspondent, men are applying for work faster than jobs can be found. While this does not show that the labor supply is favorable in all parts of the country, yet, when such a condition is found in some of the smaller camps, the belief is expressed that it will be a matter of but a very short time when the same will be true of the larger camps. In fact, all of the mining centers of Northern Ontario, the Porcupine field appears to be the only one where a shortage of men is being felt.

On former occasions, the remark has frequently been made: Give the gold mines of Northern Ontario adequate men and they will establish records which will totally eclipse all former achievements. From present indications, the next few months may see this actually being realized. Even now, the rate of the gold output will amount to more than $12,000,000 for the current year.

A statement issued near the close of February states that the annual report of the Hollinger Mine will be in the mails almost immediately, but that the annual meeting will not be held for some few weeks. As regards progress at the mine, the number of men is now stated to be upwards of 1,100, and with about three score machines in operation. Concerning the experiments in connection with mechanical muckers, it is yet too soon to pass judgment, but the impression appears to be that they will not be able to take the place of manual labor. However, in view of the improved labor supply, it will perhaps not greatly matter whether or not the mechanical muckers can be brought into general use.

The directors of the Dome Mines Company and the Dome Extension Company have sent a report to the shareholders outlining the progress made during the past year in developing the Dome Extension property on which the Dome Mines Company holds an option. The latter company has asked for a six month's extension of time, as forecasted in last weeks issue of the "Journal". Accordingly, the shareholders of the Dome Extension have decided to hold a meeting on March 10th for the purpose of considering and, if approved, ratifying such an extension. The statement shows that the cross-cue at the 10th level of the Dome has already passed onto the Dome Extension and is now about 150 feet, and advancing at the rate of 5 feet a day. It also states that exploration and development work will continue at the 6th level. At this point a lense of ore measuring about 14,000 square feet was developed and which contains average gold values of $4.62 a ton. Some 4,878 tons of ore were sent to the mill and averaged $4.39 a ton. It is estimated that up to the present not far under 1000 feet of underground work has been done on the Dome Extension.

Concerning the Clifton-Porcupine, the acting secretary Ernest H. Bridger, has sent out the following statement to the shareholders, under date of February 19th:—

Since our last report was mailed, bearing date of December 1st, 1919, development of your property has proceeded without interruption.

During that interval the main shaft has been continued to a depth of 225 feet. A station has been cut at 200 feet and all timbering, etc., has been completed in preparation for lateral work at that level. This work has included the cutting of an ore pocket and pumping station below the level, and the installation of a skip in the shaft for the more economical handling of ore and waste.

Crosscutting both east and west is now in progress to open up the veins, the development of which gave such satisfactory results on the first level. All of these veins should be encountered within the next thirty days.

The sinking of the shaft on Number 7 has proven that there is no change in conditions in the depth so far reached. Only a small amount of drifting has as yet been carried out on this vein, but this work has proven that values are fully equal to those opened up in this same vein on the surface and on the first level. It accordingly seems reasonable to expect good results from the opening up of November 6 the Boulder and other veins on this new level.

The scale of our operations is being enlarged and from now on it is expected that even more rapid progress can be made. The results of the work so far carried out have been entirely favorable. The attentions of the management will continue to be directed toward demonstrating the possibilities of the property with the least possible expenditure of time and money.

According to an official statemnt just issued by R. C. Coffey, general manager of the Lake Shore mine, the production for January was the highest so far in the company's history, amounting to $45,428.31. The average gold recovery per ton of ore treated was $25.80. Having thus regained its normal standing, the Lake Shore is expected to produce around $600,000 during the current calendar year.

Within the week the Miller Independence will switch on electric power. This is looked upon as of utmost economic importance owing to the increasing difficutly of securing coal. Also, within the week the mine will be connected up with outside points by telephone. The main shaft having been completed to the 510-ft. level, and a large working station having been cut, a contract for several hundred feet of lateral work is to be let. The "D" or inclined shaft has been de-watered to a depth of 100 feet and the work of de-

veloping ore will be carried on at the same time the deeper developments are being conducted.

Sinking operations are now under way at the Mondeau property of the Peerless company and the shaft, beginning with the former depth of 130 feet, is going down at the rate of from 4 to 5 feet daily.

British Columbia Letter

METAL MINES

Stewart, B. C.—A shipment of 250 tons of ore from the Premier Mine, Salmon River District, Portland Canal, B. C., recently was brought over the winter trail to Stewart where it was loaded on the G. T. P. Steamer, Prince John, en route to the smelter at Tacoma, Wn.

R. K. Neill, one of the owners of the property, is reported as saying that a cyanide plant is likely to be installed after development has advanced to the point that a steady supply of ore is assured.

Statements from those in a position to know indicate that the management of the Premier is experiencing some difficulty through the activity of agitators among the workmen. Confidence is expressed, however, that this will not seriously interfere with the plans in mind for development and operation.

Preparations are in hand for the commencement of work on the Spider Group, which consists of three claims lying north of Long Lake in the Salmon River section. This property is under bond to the Algunican Syndicate of Belgium, represented by W. A. Meloche, a mining engineer who was through the district last summer.

Fifty tons of supplies have arrived for the Spider Camp. It is planned to take them over the trail immediately by means of packhorses equipped with snowshoes. Some machinery required for initial development is expected to arrive shortly.

Sandon, B. C.—The annual report of the Silversmith Mines, Ltd., operators of the Old Slocan Star Mine, gives an account of 1919 activities. Ore mined amounted to 14,558 tons, of which all but 325 tons went through the Mill at the Mine. Concentrates were marketed on both sides of the line, the smelter at Trail receiving 19 cars of silver concentrates, 17 going south, and all but 3 of 24 cars of zinc concentrates shipped went to the United States. It is estimated the report asserts, that the ore in sight totals 90,000 tons.

Nelson, B. C.—At the recently held Annual Convention of the Associated Boards of Trade of Eastern British Columbia several resolutions affecting the mining interests of the Province were passed. One protested against the "Engineers Profession Act," a measure being presented to the Legislative Assembly which, it is alleged against it, would exclude all foreign engineers except those who are duly qualified members of the Association or have a temporary license from its Council. This, the Convention declared, is undesirable, if on no other ground, on that that its effect would be to bar engineers and others coming into the Province as the representatives of outside capital seeking investment. Another resolution dealt with the taxing of "so-called" profits from Mines, the opinion being expressed that an allowance should be made for the depletion of mines in assessing the Income Tax. The concluding two paragraphs read as follows:

"Whereas the United States Government and the Canadian Government both have granted such allowance and an eminent expert engaged by the British Columbia Government has reported favourably to such allowances;

"Both precedent and justice are in favour of granting an allowance for mine depletion and the Taxation Act should be amended accordingly."

Alice Arm, B. C.—The railway from Alice Arm to the Dolly Varden Mine is to be extended from its present interior terminal to the Wolf Group of Mineral Claims, a distance of about two and one half miles. That this work is to be undertaken this year, and that as little time as possible will be lost, is officially announced by the managemeint of the Taylor Engineering Co. This additional mileage involves some heavy canyon work and the Kitsault River will have to be bridged. The benefit to the district, and particularly its mining industry, will be substantial. Not only will it mean the development to a shipping point of the Wolf property, which together with the Dolly Varden passed from possession of the Dolly Varden Mining Co. to the Taylor Engineering Co., but it will give transportation facilities to several other promising prospects.

A. J. T. Taylor, managing director of the operating Company, confirms the report that workmen already have been dispatched to open up a camp at the Wolf, that a water power compressor is to be installed there, that some new plant is to be added to the equipment at the Dolly Varden, that a quantity of new equipment is to be provided for the railway, and that work will be commenced as soon as practicable on new ore bunkers at tidewater at Alice Arm.

The North Star Mine is one of those which, with the completion of the railway extension, will become a shipper. Already there is a considerable quantity of ore ready to be taken out. Others affected are the Toric, Tiger and Muskateer, now under development. With these, as well as the Wolf, waiting for the steel it would appear that before long now the Dolly Varden will have a number of rival shippers in the district.

The Last Chance, belonging to A. McPhail, is reported to be under bond to Messrs. Price and Keith, of New York. It now is being explored by diamond drill. The David Copperfield claims situated near the Dolly Varden, are said to have been bonded to Messrs. Watt and Watt, of Toronto, Ont., for the sum of $200,000, with a cash payment of $2,000. R. F. McGinnis, Wm. McLean and A. E. Wright are the original locators. The La Rose Group, situated about two miles from the Dolly Varden Ry. and about eight miles from Alice Arm, is to be developed extensively this year according to a recent announcement. A 450 foot crosscut tunnel and considerable diamond drilling are planned. For the past three years the property has been worked on a small scale, several shipments of high grade ore having been made.

D. J. Hancock, an operator of the Alice Arm District, has returned from Eastern Canada and the United States and asserts that he has been successful in exacting a promise from Major General Sir John Carson, president of the Crown Reserve and the Porcupine Crown, well-known properties of the Crown Reserve and the Porcupine areas to visit British Columbia accompanied by two engineers for the purpose of looking over the Alice Arm section with a view to investment.

Trail. B. C.—Ore receipts in gross tons at the Trail Smelter, Consolidated Mining and Smelting Co., of Canada, from the 31st January to the 7th of February, inclusive, were 8,057 tons, making a total for the year of 34,278 tons.

The management of the Consolidated Mining and Smelting Co. has announced an advance of 50 cents a day in the wages of their employees in all their camps to take effect on and from the 16th of Febrnary.

Authoritative announcement was made recently of some additions to plant and improvements in contemplation by the Consolidated Mining and Smelting Co., of Canada. One, of which brief mention already has been made, in the enlargement of the Copper Refinery Plant at the Trail Smelter. The purpose of this is to increase the output to 50 tons of refined copper a day the present capacity being 29 tons. This is rendered necessary by reason of a contract with the Canada Copper Company for the handling of about 130 tons of concentrates a day, with an estimated copper content of 25 per cent; the anticipated greater production of the Rossland mines: and the general mining development of the country. The cost of this is placed at $250,000. A Rod Mill, for which plans are complete, represents an entirely new line of industrial activity for the Company. Heretofore copper has been exported to the United States, rods produced and the material re-shipped to Canada for convertion into copper wire. Prior to 1916 all the copper production of Canada with the exception of a small amount of copper sulphate, was exported in the form or ore, concentrate, matte, or blister. A slight change but an important step forward, took place three years ago when some refined copper, from the plant of the Consolidated Co., Trail, was produced. And now the decision of the same company to put in a plant for the manufacture of copper rods at an expenditure of approximately $200,000 is a further advance in the independence of Canada, at least as far as the commercial perfection of this particular metal is concerned. A minor improvement, comparatively speaking, is the construction and equipment of a large machine shop, the functions of which will include some foundry work which formerly went elesewhere for attention, and which will be more efficient and modern in every respect. Draughtsmen are engaged preparing plans for the concentrator designed to treat the ores of Rossland and a definite statement as to its site, Rossland or Trail, is looked for soon. The installation complete is expected to cost $1,000,000.

Windermere, B. C.—The Ptarmigan, Sitting Bull, and the Bald Eagle, the former situated on Horse Thief Creek and the latter on Slade Creek, are properties on which development gives promise of good results. W. S. Watson is operating the Ptarmigan under lease and bond. While the owners of the Sitting Bull have been devoting most of their attention to the Trojan Mine, the ore of which contains copper values, and for the development of which a compressor run by gasoline power has been installed, they plan to extend the wagon road to the first mentioned property this pear. Operation on a considerable scale are expected then to be initiated. The Sitting Bull ore is a steel galena of a fairly good grade. On the Bald Eagle a crosscut is being driven to tap the vein. The Paradise, is a well-known mine of this district, and work is continuing shipments being made regularly.

Vancouver, B. C.—That the discoveries made in the Mayo District, close to Stewart River and about 200 miles southeast of Dawson Y. T., are as rich as reports have given them credit for is stated by J. E. Binet, a miner who went to the Yukon in 1895 and who arrived at Vancouver recently. He compares the ore with that of some of the richest pockets which twenty years ago made famous the Payne and Slocan Star and other well-known mines of the Slocan District of the Kootenays B. C. Assays, he states, give returns running from $150 to 1500 a ton in silver. Surface indication and development as far as it has gone appear to assure large reserves. The finds have been made above the timber line. Last summer, Mr. Binet says, the Yukon Gold Company bought the most promising claims, paying about $45.000, and one of the Company's representatives spent the season in camp. They are working all winter. At present the ore is being sent out by sleds to the bank of the Stewart River, 40 miles away, and from there will be shipped by steamer to White Horse and probably to the Anyox smelter in the spring. The Silver King, which was staked in the Mayor District two years ago, is reported to have yielded its owner. Thomas Aitken, who has shipped 3500 tons of picked ore, a modest fortune. The Guggenheims are expected to install a concentrating plant. It is estimated that there are about 165 miners in the district and work is in progress on claims situated on Kino Hill, Haldane, Patterson and Cameron Mountains.

Claiming that he has a legal claim to a one-fifth interest in the Engineer Mine, of the Atlin District, W. Pollard Grant, a barrister of Vancouver, B. C. has brought action against J. A. Fraser, gold commissioner and mining recorder. The latter is made defendant in his capacity as administrator of the estate of the late Capt. James Alexander and also of the estate of the late Allan I. Smith, of Philadelphia, the latter being named in Capt. Alexander's will as his sole legatee. Interest in this suit is keen because Mr. Grant is well-known on the Coast and because the Alexander Mine, admittedly a very rich property has been strong corporation and is likely to be sold for a considerable figure.

W. Porteous Sloan, of the Drum Lummon Mine, Skeena District, has returned from the North. He asserts that a new body of promising ore has been uncovered on the Drum Lummon and that it is expected that the Mill will be operating by next month .

Victoria, B. C.—The possibility of large deposits of alunite, situated near Kyuquot, West Coast of Vancouver Island, containing potash in commercial quantities is to be thoroughly investigated by Wm. M. Brewer and P. B. Freeland, Government Mining Engineers. They have been instructed to inspect the property as soon as possible, to obtain large samples and to undertake to see that the latter are so assayed as to leave no doubt as to the content of the mineral. If the claims of the owners of the deposits are substantiated there is no doubt that the establishment of an important industry will result. There is some difference of opinion, however, on this point and it is to set at rest all questions of this character that the government engineers have been sent to investigate.

(*Continued on Page* 186.)

RESIGNATIONS FROM THE GEOLOGICAL SURVEY.

Copies of Letters and Resolutions of Protest from the Council and Branches of the Canadian Mining Institute.

February 21, 1920.

Sir George Foster,
Acting Prime Minister of Canada,
Ottawa, Ont.

Sir:—

I have been instructed by the Council of the Canadian Mining Institute to forward to you the enclosed copy of a letter sent to the Minister of Mines, with reference to the harm which the mining industry of Canada is suffering by the resignation of technical officers from the Geological Survey and the Mines Branch.

I am, Sir,
Yours faithfully,
(Sgd.) R. R. Rose
Assistant Secretary.
February 21, 1920.

The Honourable Arthur Meighen,
Minister of Mines,
Ottawa, Ontario.

Sir:—

The Council of the Canadian Mining Institute has noted with regret and alarm the large number of resignations from the staff of the Geological Survey. It is understood that the cause of these resignations includes the following:

a. Inadequacy of the salaries in actual amount, these being insufficient to meet the ordinary living expenses in Canadian cities.

b. Entire inadequacy of the salaries in comparison to those paid by private employees.

c. Unfair classification of the members of the Survey in view of the experience of the men who have resigned, their length of service and technical attainments, which has caused grave dissatisfaction and actually brought about the resignations.

While the council fully appreciate the reasons that have compelled the resignations, and sympathise with the geologists affected by the above-mentioned causes, it is chiefly concerned at the harm which the loss of these geologists will occasion to the progress of the mining industry in Canada. A number of letters and telegrams of protest have been received from the provincial branches of the Institute, copies of which are appended hereto. These protests represent accurately the feeling of the mining industry throughout Canada, and the Council desires to respectfully emphasise the extreme unwisdom of allowing the most capable and experienced men among the younger geologists of Canada to leave the country because of such an entirely indefensible scale of salaries as is provided by the classification.

The members of the Survey who have resigned are all men who have unique experience in certain phases of Canadian geology, and have become especially fitted by long service in the Survey to advise on the problems of our economic geology. On certain phases of the mineral industry in Canada, including oil occurrences, coal, copper and precious metal deposits, the men who have resigned can give the most competent and expert advice obtainable. Such advice may mean millions of dollars to Canada, and this fact is well recognized by private corporations. The Council does not suggest that the scale of government salaries can compete with those offered by private companies, but it does most emphatically believe that the existing absurd and indefensible disproportion should be lessened, and that the members of the Geological Survey should be remunerated in keeping with their training, their professional attainments, their social status and their value to the mining industry, and through this to the country as a whole.

The Council would for these reasons respectfully suggest that the salaries of the members of the Geological Survey and Mines Branch should be reviewed, and that the obvious injustices of the existing classification should be removed.

I am, Sir,
Yours faithfully,
(Sgd.) R. R. Rose,
Assistant Secretary.

The Northern Alberta Branch, Canadian Mining Institute.

Edmonton, Alta.
Feb. 7, 1920.

Dear Sir:—

At the meeting of the above Branch the executive were instructed to draft up and forward to you a resolution with reference to the resignation of Dr. J. S. Stewart from the Geological Survey of Canada, protesting against the possibility of the local office being closed.

A meeting of the executive was held on Friday the 6th inst. when the following resolution was drawn up and I was instructed to send same to you with the request that you forward it to the proper authorities.

"That the Northern Alberta Branch look with anxiety upon the recent resignation of Dr. J. S. Stewart of the Geological Sulvey, whose work in the Alberta Branch has been most valuable and thoroughly appreciated.

This source of information has been taken advantage of and proved of great benefit to the Mining Industry, Boards of Trade and other individuals throughout the Province.

We hope and sincerely trust that adequate steps will be taken immediately to carry on the work of Dr. Stewart."

Kindly give this matter your very best attention in the interests of the Mining Industry.

Yours truly,
(Signed) JAS. A. RICHARDS
Secretary.

R. R. Rose, Esq.,
503-4 Drummond Bldg.,
Montreal, Que.

Night Letter.

SYDNEY, N. S.
Feb. 10/20.

R. R. Rose,
Asst. Secy., Canadian Mining Institute,
Drummond Bldg.,
Montreal.

It has come to the notice of the Council of the Mining Society of Nova Scotia that, owing to inadequate salaries paid by the Survey and Mines Branch of the Geological Department, some of the staff have been forced to resign. In the interest of the mining in-

dustry we wish to protest against the scale of salaries now being paid to such highly trained technical men, whose services to the country are of such value. We would urge that steps be taken immediately to make the salaries paid sufficient to attract and retain for the service a class of men of the standard formerly associated with the work of the Department.

E. C. HANRAHAN,
SECRETARY.

CANADIAN MINING INSTITUTE.
Hastings District Branch.
Deloro, 9th Feb. 1920.

Council of the C. M. I.,
Montreal, Que.

Gentlemen:—

Hastings District Branch views with alarm the wholesale resignation of the Geological Staff, and consider it necessary that energetic action be taken by the Institute to bring the matter forcibly to the attention of the Government.

Yours truly,
(Signed) R. A. ELLIOTT.
SECRETARY, HASTINGS
DISTRICT BRANCH.

The Northern Alberta Branch Canadian Mining Institute.

EDMONTON, ALTA.
Feb. 7, 1920.

Dear Sir:—

I am in receipt of your telegram of the 5th inst. which reads as follows:—

"Reference resignations of Geologists from Geological Survey, please forward protest by the Branch against the Government allowing resignations to continue."

This matter was brought up at a special meeting of the Executive of the Northern Alberta Branch when the following resolution was unanimously carried.

"That the Executive of the Northern Alberta Branch regret to hear that it has been necessary for a considerable percentage of the regular staff of the Geological Survey to resign particularly as it will greatly hamper the progress of the Geological Survey throughout the Dominion, especially as it is required for the industrial progress of the country. The Executive therefore trust that immediate steps will be taken to restore to its former strength this valuable Branch of the Government service."

Yours truly,
(Signed) JAS. A. RICHARDS,
SECRETARY.

R. R. Rose, Esp.,
503-504 Drummond Bldg.,
Montreal, Que.

WANTED.

Assay laboratory outfit:—muffle and crucible furnaces, gasoline preferred; crusher, pulveriser, balances, etc. Must be in good condition.

Address: P. O. Box 117, Crosby, Minn., U. S. A.

MATERIAL FOR SALE

RAILS—7,800 lin. ft. of 56 lb. rail with fastenings. 4,400 lbs. plates.
STEEL TRESTLE—59,450 lbs. structural steel.
WOOD TRESTLES—About 205,000 F. B. M. of heavy lumber.
CABLES—About 12,000 feet of one-inch and one and a quarter inch steel wire cable.
CARS—Four.
BUILDINGS—Park Ave. Station. Centre Station and Engine House. Upper Station and Engine House
COVERED PAVILION—Including structural steel frame (about 18,000 lbs.)

Equipment at Upper Engine House

ENGINE—one 14 in. x 24 in. simple twin reversing link motion horizontal engine connected by gears to a double drum hoist.
HOIST—Double drum twin hoist. Drums 100 in. diam. x 60 in. face. Lagging on drums 9 in. oak blocks bolted to drums. Driving pinion 32 in. diam. x 8 in. face. Driving gear, 12 in. diam. x 8 in. face. Drum shaft, 7 in. diam. in hearings. Bearings, 3-7 in. Cast-iron babbitted. Brake bands on both drums.
BOILER—Horizontal return tubular. 60 in. x 14 ft.—72-3 in. tubes. Grate surface 36 in. deep x 60 in. wide. Stack 30 in. diam. x 35 in. high approx. Boiler designed for 125 lbs. working pressure. Boiler fed by injector.
STEAM PIPING—6 in. wrought iron pipe from boiler to engine.
EXHAUST—5 in spiral revitted from engine up through the roof of engine house.

Equipment at Lower Engine House

ENGINE—One 8 in. x 16 in. simple twin reversing link motion horizontal engine connected by gears to a single drum hoist.
HOIST—Single drum endless cable type, with the necessary gears shieves and idler shieves and cable tightening device for taking up slack by means of idlers. Brake hand in drum.
"NEW" BOILER—Horizontal return tubular. 60 in. x 14 ft.—72-3½ in. tubes. Grate surface 36 in. deep x 60 in. wide. Stack 24 in. diam. 50 ft. long approx. Boiler designed for 125 lbs. working pressure. Boiler fed by injector.
"OLD" BOILER—Horizontal return tubular. 52 in. x 12 ft.—60-3 in. tube. Grate surface 30 in. deep x 50 in. wide. No stack. Boiler designed for 125 lbs. working pressure
STEAM PIPING—4 in. wrought iron pipe from boiler to engine.
EXHAUST—3 in wrought iron pipe from engine up through roof of engine house.

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Night Letter.

COBALT, ONT.

R. R. Rose,
Asst. Secy., Canadian Mining Institute,
Montreal, Que.

The Cobalt Branch of the Canadian Mining Institute protests most emphatically against the Government allowing resignations of trained geologists from the Dominion Geological Survey on account of inadequate remuneration and suggests the immediate consideration of the reclassification of such men so as to allow them salaries more in keeping with their training and ability and showing less disparity with the salaries being offered by private concerns.

ARTHUR A. COLE.
SECRETARY.

MINING CORPORATION DIVIDEND.

The Mining Corporation of Canada, Limited, have declared a quarterly dividend of twelve and a half per share for the three months ending March 31st, payable March 15th to all shareholders of record March 1st.

MINING BROKER DEAD.

The death took place this week in Toronto of H. Acton Fleming of the Standard Exchange firm of Fleming & Martin. Death resulted from pneumonia following an attack of scarlet fever. He was among the best-known members of the exchange. Mr. Fleming is survived by a wife and two children.

A SAN FRANCISCO OPINION ON GEOLOGICAL SURVEY SALARIES

Canadian geologists are like American geologists in expecting their government to give them a living wage. We referred recently to the loss suffered by the personnel of the U. S. Geological Survey on account of resignations caused by the inadequacy of the salary paid to members of the staff. The same blight has fallen upon the Canadian Geological Survey. Out of a field staff of 25, no less than 13 have resigned since last October. As an example of the lack of appreciation for scientific service shown by the Government, and back of it, of course ,the Parliament of the Dominion, we may instance a graduate of McGill university who was receiving $2100 per annum after having been on the Survey for ten years. He was offered, and accepted, $5600 per annum from Pearson & Son. All the younger men are leaving the Survey, and we do not blame them. One may love the rocks, but one cannot live on them.—Editor, Mining and Scientific Press.

METAL QUOTATIONS.

Fair prices for ingot at Montreal March 3rd 1920.

	Cents per lb.
Electro Copper	24½
Casting Copper	24
Lead	11¾
Tin	78
Zinc	12
Antimony	14
Aluminum	34

BRITISH COLUMBIA LETTER

(*Continued from Page* 183.)

A bill has been placed before the Legislative Assembly of British Columbia providing for the amendment of the Mineral Act in such fashion that power will be given the Lieut-Governor-in-Council (the Government) to reserve from location and mining for iron any lands containing iron ores which are not at the time of reservation included in any mineral properties held under the existing or other statutes and to dispose of such reserved lands on such terms as to royalty per ton of ore removed as may be deemed advisable. This authority is to extend over a period of three years. Under the Act the term "Iron Ore" means any mineral deposit containing in itself or in the concentrates made therefrom not less than 40 per cent of metallic iron capable of being melted on a commercial basis.

Indian reservations of British Columbia are to be thrown open for the location and mining of gold and silver as and from the 1st of April of this year. This announcement is contained in a Provincial Gazette issued recently and with it is published the regulations, drawn by the Dominion Government under which mining on such lands will be governed.

THE COLLIERIES

The coal output of the British Columbia Collieries for the month of January, 1920, follows:

Nicola-Princeton Field.

	Tons
Princeton Coal and Land Co.	2485
Middlesboro Collieries Ltd.	9306
Fleming Coal Co., Ltd.	4100
Calmont Collieries	340
	16,231

Crow's Nest Pass Field

	tons
Crow's Nest Pass Coal Co.	66,254
Corbin Coal & Coal Co.	11,287
	77,541

Vancouver Island Field

	tons
Granby Consolidated Mng., Smltg. & Power Co., Ltd.	16,510
Vancouver-Nanaimo Coal Co.	4,881
Nanoose Wellington Collieries Ltd.	2,480
Canadian Western Fuel Co.	61,062
Canadian Collieries (D) Ltd.	70,394
Pacific Coast Coal Mines, Ltd.	7,665
	162,992
	tons
Twelka Collieries	350
Total for month	257,114

PERSONAL

Samuel W. Cohen, General Manager of the Bluestone Mining & Smelting Company, Mason, Nevada, has returned to Montreal, after an examination of the Company's property.

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This shows one of our Electric Mine Hoists. We make many other types. Send for our catalogue of Mine Hoists, Cars, Cages, Buckets, etc., and see what we offer you. It will repay you.

From the little 10 Horse Power size for prospectors or small mines to the massive 50 Horse Power size, one of our 7 sizes should be just right for your mine.

We are specialists in the building of Hoisting Machinery of all sorts. For nearly a quarter of a century we have been designing and building Hoists, and have developed a Hoist that we are really proud of—proud because of the record of good work they have done, and are doing in mines, quarries, and other classes of work from one end of Canada to the other.

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BRITISH COLUMBIA

The Mineral Province of Western Canada

Has produced Minerals valued as follows: Placer Gold, $75,436,103; Lode Gold, $97,121,786; Silver, $46,839,631; Lead, $42,294,251; Copper, $145,741,069; Other Metals (Zinc, Iron, etc.), $13,278,058; Coal and Coke, $187,147,652; Building Stone, Brick, Cement, etc., $28,843,272; Miscellaneous Minerals, $651,759; making its mineral production to the end of 1918 show an

Aggregate Value of $637,353,581

The substantial progress of the Mining Industry of this Province is strikingly exhibited in the following figures, which show the value of production for successive five-year periods: For all years to 1895, inclusive, $94,547,241; for five years, 1896-1900, $57,605,967; for five years, 1901-1905, $96,509,968; for five years, 1906-1910, $125,534,474; for five years, 1911-1915, $142,072,603; for the year 1916, $42,290,462; for the year 1917, $37,010,392; for the year 1918, $41,782,474.

Production During last ten years, $313,976,022

Lode-mining has only been in progress for about twenty years, and not 20 per cent. of the Province has been even prospected; 300,000 square miles of unexplored mineral bearing land are open for prospecting.

The Mining Laws of this Province are more liberal and the fees lower than those of any other Province in the Dominion, or any Colony in the British Empire.

Mineral locations are granted to discoverers for nominal fees.

Absolute Titles are obtained by developing such properties, the security of which is guaranteed by Crown Grants.

Full information, together with Mining Reports and Maps, may be obtained gratis by addressing

THE HON. THE MINISTER OF MINES
VICTORIA, British Columbia

The Minerals of Nova Scotia

THE MINERAL PROVINCE OF EASTERN CANADA

COAL, IRON, COPPER, GOLD, LEAD, SILVER, MANGANESE, GYPSUM, BARYTES, TUNGSTEN, ANTIMONY, GRAPHITE, ARSENIC, MINERAL PIGMENTS, DIATOMACEOUS EARTH.

Nova Scotia possesses extensive areas of mineral lands and offers a great field for those desirous of investment.

Coal Over six million tons of coal were produced in the province during 1916, making Nova Scotia by far the leader among the coal producing provinces of the Dominion.

Iron The province contains numerous districts in which occur various varieties of iron ore, practically at tide water and in touch with vast bodies of fluxes. Deposits of particularly high grade manganese ore occur at a number of different locations.

Gold Marked development has taken place in this industry the past several years. The gold fields of the province cover an area approximately 3,500 square miles. The gold is free milling and is from 870 to 970 fine.

Gypsum Enormous beds of gypsum of a very pure quality and frequently 100 feet thickness, are situated at the water's edge.

High grade cement making materials have been discovered in favorable situations for shipping.

Government core-drills can be had from the department for boring operations.

The available streams of Nova Scotia can supply at least 500,000 h.p. for industrial purposes.

Prospecting and Mining Rights are granted direct from the Crown on very favorable terms.

Copies of the Mining Law, Mines Reports, Maps and other Literature may be had free on application to

HON. E. H. ARMSTRONG, - HALIFAX, N.S.

Commissioner of Public Works and Mines

PROVINCE OF QUEBEC

MINES BRANCH

Department of Colonization, Mines and Fisheries

The chief minerals of the Province of Quebec are Asbestos, Chromite, Copper, Iron, Gold, Molybdenite, Phosphate, Mica, Graphite, Ornamental and Building Stone, Clays, etc.

The Mining Law gives absolute security of Title and is very favourable to the Prospector.

MINERS' CERTIFICATES. First of all, obtain a miner's certificate, from the Department in Quebec or from the nearest agent. The price of this certificate is $10.00, and it is valid until the first of January following. This certificate gives the right to prospect on public lands and on private lands, on which the mineral rights belong to the Crown.

The holder of the certificate may stake mining claims to the extent of 200 acres.

WORKING CONDITIONS. During the first six months following the staking of the claim, work on it must be performed to the extent of at least twenty-five days of eight hours.

SIX MONTHS AFTER STAKING. At the expiration of six months from the date of the staking, the prospector, to retain his rights, must take out a mining license.

MINING LICENSE. The mining license may cover 40 to 200 acres in unsurveyed territory. The price of this license is Fifty Cents an acre per year, and a fee of $10.00 on issue. It is valid for one year and is renewable on the same terms, on producing an affidavit that during the year work has been performed to the extent of at least twenty-five days labour on each forty acres.

MINING CONCESSION. Notwithstanding the above, a mining concession may be acquired at any time at the rate of $5 an acre for SUPERIOR METALS, and $3 an acre for INFERIOR MINERALS

The attention of prospectors is specially called to the territory in the North-Western part of the Province of Quebec, north of the height of land, where important mineralized belts are known to exist.

PROVINCIAL LABORATORY. Special arrangements have been made with POLYTECHNIC SCHOOL of LAVAL UNIVERSITY, 228 ST. DENIS STREET, MONTREAL, for the determination, assays and analysis of minerals at very reduced rates for the benefit of miners and prospectors in the Province of Quebec. The well equipped laboratories of this institution and its trained chemists ensure results of undoubted integrity and reliability.

The Bureau of Mines at Quebec will give all the information desired in connection with the mines and mineral resources of the Province, on application addressed to

HONOURABLE J. E. PERRAULT,

MINISTER OF COLONIZATION, MINES AND FISHERIES, QUEBEC.

:-: EDITORIAL :-:

The Safeguarding of Investors in Mines

Mr. R. E. Hore, in this issue, argues for recognition and protection of the "speculator" in mining enterprises, and refers to an article contributed to the "Engineering and Mining Journal" by Mr. J. B. Tyrell, which, if we may be pardoned for stating the fact, this journal would have been pleased to have had for its own circle of readers. Both writers urge the necessity to protect the small investor against fraud by safeguarding public stock issues through provisions requiring disclosure of pertinent facts. This much will be very generally conceded, and Ontario by requiring the filing of certain statutory information regarding mining flotations, has provided one effective safeguard. We cannot quite agree with Mr. Hore in his plea for the "speculator", for the term is practically synonymous with that of "gambler". The French word "entrepreneur" more exactly defines the person who imparts the initial impulse to mining flotations, and this function is a proper and useful one. It is not one, however, that should be attempted by the "small investor", and we do not believe that any useful purpose has ever been served by mining flotations offering stocks, or "certificates of a taken chance" at so many cents a share. Legislation to protect such persons is probably necessary, but it is nevertheless an attempt to protect a fool against his folly. A recent stock offering in a Montreal newspaper frankly admitted that its proposition was a gamble, inasmuch as the advertisement stated that the winnings would be larger in proportion to the amount "you ante up".

It may be regarded as unfair to the "small investor" to suggest that the only proper way to devedop mining prospects into producing and profitable mines is through wealthy development companies advised by competent engineers but such is undoubtedly the teaching of experience. Such organizations offer solid inducements to the prospector, and provide the bridge between him and capital that is so necessary.

Mr. Tyrell, with good reason, deplores the fact that in Ontario, "anyone, no matter how incompetent, un-"trained, or reckless, is allowed to manage or mismanage a mine, to handle or disburse large sums of money "intrusted to him by confiding people for purposes of "development and equipment, and, by bad manage-"ment to risk the ruin of what might have been, under "proper management, an excellent property." There is some danger of confusing some issues here. The government is, or should be, charged with the duty of seeing that only competent persons are allowed to superintend mining operations insofar as these are concerned with prevention of accident and safety of life and real property. The principle of requiring certificates of competency from mine managers is a well-recognised one. It should also be within the powers of government to require that no persons should practise as a mining engineer, professing certain qualifications, unless his profession of such essential qualifications can be certified, either by examination, or by endorsation from some organization of engineers, in the same manner that other professions are regulated. But, as those who pay the piper call the tune, it will never be possible to regulate in any statutory manner, the expenditure of money on mine development. The best manner in which to safeguard the expenditure of monies invested in a mining company is for shareholders to insist upon the employment of competent engineers, and to give a wide berth to mining ventures that do not employ competent mining engineers and give publicity to the reports of these men.

It cannot, moreover, be denied that technical attainments and business acumen do not always go together, another fact in favor of the handling of mining prospects through large development companies, in which there will usually be found the necessary admixture of the spirit of the scientific engineer and the financial "entrepreneur".

One statement of Mr. Tyrrell's will be generally acceded to, no matter what personal opinions may be held as to the fitness of the new government in Ontario to oversee the mining development of the Province, namely, that no better men could be found to advise the Ministers than the present Deputy Minister of Mines and the Provincial Geologist, and their respective staffs.

Gold and Credit

Credit being based largely on gold, the present situation has an unusual interest for gold producers. During the war it was realized in Canada that the maintenance of a high rate of production of gold was desirable, but the pressing need of men for the battlefields and for munitions manufacture made increased production impossible. The restoration of peace would have brought about a rapid expansion of the gold mining industry if the selling price had increased as has the cost of mining. The future expansion depends largely on the faith of the public in the soundness of the credit structure. If there comes a demand for maintenance of the normal ratio between gold and credit, conditions favorable to the gold producer will exist.

Some indication of the trend of events is to be found in the opinion expressed recently by James S. Alexander, President of the National Bank of Commerce in New York. He says:

"The strain under which the credit resources of the country are now laboring is evidenced by the high money rates in all classes of loans. An analysis of the fundamental factors in the situation clearly reveals that the chief cause of the strain is that the volume of credit has expanded until the gold basis is becoming inadequate in view of conditions affecting the liquidity of credit. One index of the basic situation is found in the seriously altered ratio between the total stock of gold coin and bullion in the United States and the total volume of other money and bank deposits subjected to check. Both of these latter items are efficient instruments of business because of the unshaken and unexpressed faith of the public that underlying them is enough gold for the redemption of all obligations incurred in either of them which might be required in the course of business. As long as this faith is unshaken there is a relatively small call for the gold, so that a comparatively small ratio of the metal normally suffices. Thus, in the last analysis, the soundness of the business situation requires that the ratio of the gold base to the credit structure be such that all practical needs will be easily met, maintaining unwavering public faith. I in no sense mean to imply that the gold ratio is now down to a point that should unsettle public confidence or that any fixed ratio is advisable, but nevertheless it is approaching a point that is lower than experience shows best serves the credit requirements of the nation."

When one considers that Mr. Alexander is speaking of conditions in the United States, where there was a great importation of gold during the greater part of the war in part payment of goods purchased by the Allies, it is not surprising that that country does not pay a high price for the paper money of other countries. Americans may still have faith that there is sufficient gold behind their own paper, but they have expressed in no uncertain way their preference for gold when trading with other countries. In the United States the gold ratio was well maintained until the year 1918. During 1919 it fell off rapidly, and is still falling off. Is it mere coincidence that exchange rates have risen so sharply during recent months?

It is generally believed that the British Columbia Legislature will re-enact the twice disallowed Vancouver Island Settlers' Rights Act. The Victoria "Daily Colonist" writes: "Were it not for the fact "that the principle involved in the measure, which con- "tinues to cause Ottawa so much official displeasure, "has stood the test of the highest court in the Empire, "the Legislature might have some reason to proceed "more cautiously." This reference is to the decision of the Privy Council, which decided that the Act in question was one within the powers of the provincial legislature.

WELL KNOWN CARIBOO PROSPECTOR THINKS P. G. E. ROUTE SHOULD BE CHANGED

Joe Wendell, who has mined, prospected and hunted the hills of the Cariboo for thirty years is now in Vancouver.

He says that the route of the P. G. E. should be changed from the Fraser River to the Willow or the Bowron River. The railway would then pass through the fine agricultural and big timber areas of the Horsefly. It would take in the big River where there is a wonderful supply of water power capable of electrifying the Railway and many industries and also Barkerville where mining is rapidly developing. Down the Bowron River there are great areas of pulp spruce and coal measures. Following the present route there will be 150 miles south of Prince George which will produce practically no traffic.

Mr. Wendell's suggested route would require considerable more grading than the present one but would prove cheaper in the long run because it would eliminate the many branch lines which will eventually be necessary if the present is followed. The government has been asked to investigate thoroughly before continuing construction.

There is some talk of the G. T. P. building a line of railway to the coal deposits of the Bowron River. This coal is similar in character to Vancouver Island coal and would be very valuable for smelting purposes.

Mr. Wendell says the country is large and full of untouched mineral areas of many kinds and he would not be surprised if a placer camp equal to any of the old time diggings should some day be found.

A private company under the name of Sudbury Alloys Securities Company, Limited, has been formed with head office at Toronto, the provisional directors being William Bain, John Henry and James S. Lovell.

Digest of the Preliminary Report of the Mineral Production of Canada 1919 Compiled from the Statistics of the Department of Mines

A Year of Transition.

By the courtesy of Mr. John McLeish, Chief of the Division of Mineral Resources and Statistics, and with the permission of the Deputy Minister of Mines, the "Journal" s enabled to publish the following digest of the Preliminary Report on Mineral Production for 1919. The Report states that:

Estimates of the total probable value of the mineral production of Canada during 1919 made on the first of January last were short about 3.6 per cent of the preliminary figures now available. Sufficient allowance had not been made for the increased production and increased value of cement, clay, quarry and other similar structural material products. The coal mining industry too, during the last three months of the year responded quickly and extensively, particularly in the Province of Alberta to the heavy demand for fuel.

In reviewing the industry as a whole it is customary to express the total mineral production and to make comparisons of production of different years or districts in terms of dollars or total values. The wide range of prices through which many metals and mineral products have passed during the past five years and the continuation of high prices for many products have of course resulted in greatly increasing the total value of the mineral production, even when the actual quantities of metals or minerals obtained might be decreasing. It is evident that less importance should be given to comparisons in values and that more stress should be laid upon quantity comparisons. This may be readily done with individual products, but appears less feasible when dealing with totals of a great variety of products.

The total estimated value (1) of the metal and mineral production in 1919 was $173,075,913 which is less than the total value reached during each of the three preceding years. Compared with the production in 1918 valued at $211,301,897 a decrease of $38,225,984 or 18 per cent is shown.

Just as the declaration of war in 1914 was followed by a short period of industrial dislocation before the activity necessitated by the war's requirements became fully launched so following the cessation of hostilities there has been an interregnum, or transition period, during which the war's demands are being replaced by the legitimate requirements of peace industries and the demands of reconstruction.

The difficulties of making these readjustments have been aggravated by social upheavals and strikes.

The net falling off in mineral production in 1919 has been a means between a large decrease in the production of metals, coal and many "war minerals" such as chromite, graphite, magnesite, pyrites, etc., on the one hand and large increases in the production of structural materials such as cement, clay products, lime and building stone and also of asbestos, gypsum and salt.

The metallic production in 1918 was valued at $14,549,152, which fell in 1919 to $72,401,829 a decreasc of $42,147,323 or 36.8 per cent. Gold is the only metal of which there was an increased production. The falling off in the quantities of other metals varied from 9.5 per cent in zinc to nearly 52 per cent in nickel.

The total value of the non-metallic production including clay and quarry products in 1919 was $100,674,084 as compared with $96,752,745 in 1918 showing an increase of $3,921,339 or 4.1 per cent. The cement clay and stone products alone were valued at $25,754,692, as against $19,130,799 in 1918 an increase of $6,623,893, or over 34 per cent. The total value of nonmetallic products other than structural materials was $74,919,392 as against $77,621,946 a decrease of $2,702,554 or 3.4 per cent.

In the decline and recovery of the production of structural materials, in the increased value of nonmetallics (which are chiefly composed of fuels), and in the astonishing rise of the production and values of metallics during the war period, and the much smaller figures of 1919, may be traced the chronology and effect of the War.

Copper.—The 1918 production of copper was highest recorded in Canada. That of 1919 is the lowest since 1911. Compared with 1918, copper production shows a decline of 36.7 per cent in quantity and 52 per cent in value. Manitoba produced three million pounds of copper, compared with two million pounds in 1918, all from the Mandy Mine.

Gold.—The total production of gold in 1919 amounted to 767,167 ozs. against 699,681 ozs in 1918. Nova Scotian production was only 940 ozs against 1,176 ozs in 1918. This is the smallest production obtained in any one year in this province, the records of which have been published for 58 years. The largest production was 112,226 ozs. in 1899. Production in Manitoba, derived from the gold and copper ores of Le Pas District, was only 611 ozs. as compared with 1,926 ozs. in 1918.

Lead.—Production in 1919 was 43,895,888 pounds compared with 51,398,002 pounds in 1918, a decrease of 14.6 per cent.

A comparison of the value of the production in Canadian mines and quarries, in the three main divisions used in the statistics of the Mines Department, durng the period 1913 to 1919 inclusive, is as follows:

	Structural Materials and Clay Products	Non-Metallics	Metallics	Total
1913	30,809,752	48,463,709	66,361,351	145,634,812
1914	26,009,227	43,476,229	59,386,619	128,863,075
1915	17,920,759	43,373,571	75,814,841	137,109,171
1916	17,467,186	53,414,983	106,319,365	177,201,534
1917	19,837,311	63, 354,363	106,455,147	189,646,821
1918	19,130,799	77,621,946	114,549,152	211,301,897
1919	25,754,692	74,919,392	72,401,829	173,075,913

Nickel.—The production and also the value of this metal show heavy declines, 1919 production being 44,452,953 lbs. against 92,507,293 lbs. in 1918. The quantity of nickel ore refined in Canada showed a gratifying increase, amounting to 5,063 tons as against 1,204 tons in 1918.

The British-American Nickel Company practically completed in 1919 the construction of a new smelter at Murray Mine and of a refinery at Deschenes, Que. The smelter started operations in January 1919, and the refinery will, it is anticipated soon be in full operation. It is expected to have a capacity of 7,000 tons of nickel and 3,500 tons of copper per year. There has also been erected a refinery for precious metals; and refined platinum, palladium, iridium, gold and silver will be produced. The International Nickel Company's plant at Port Colborne has reported for 1919 a production of platinum, palladium, gold and silver.

Platinum.—About 25 ozs. of platinum and 62 ozs. of palladium, in an impure state, together with some gold and silver are reported as having been recovered by the International Nickel Company during 1919 from Surbury nickel ores. A substantial recovery of platinum group metals is expected in the new refinery of the British-America Nickel Co. which will employ the electrolytic method.

Silver.—Production in 1919 was 15,675,134 ozs. against 21,383,979 ozs. in 1918, a decrease of 26.7 per cent.

The contribution of Ontario to silver production was 76.1 per cent of the total, compared with the maximum figure of 93.8 per cent in 1911, when the Cobalt mines were producing at their highest rate. Manitoba produced in 1919, silver totalling 20,760 ozs against 13,316 ozs. in 1918. British Columbia showed a decrease of 9.4 per cent in quantity, but an increase in value of 4.1 per cent. Yukon production fell from 71,915 ozs. to 24,671 ozs.

Zinc.—Zinc showed little change, production for 1919 being 15,869 tons against 17,541 tons in 1918. Both imports and exports of zinc showed a decline.

Iron Ore.—Next to the coal production, the output of iron ore is the most disappointing feature of the mineral record of Canada in 1919. Shipments from Canadian Mines were the lowest recorded in 19 years, amounting only to 195,970 tons.

The quantity of iron-ore charged to blast furnaces in 1919 was 1,752,585 tons, of which 78,391 tons were of domestic origin, or 4.4 per cent. Of the imported ore 519,722 tons came from Wabana, Newfoundland, and the remainder, 1,154,473 tons from the United States.

Asbestos.—The asbestos industry continues to thrive amazingly. Under the conditions of 1919 a **production of 153,069 tons of crude and milled fibre** compared with 143,456 tons in 1918, is a noteworthy performance. Values of asbestos and asbestic increased so that the monetary return from 1919 production was $10,723,033 against $8,870,707 in 1918.

Coal and Coke.—The production of coal in Canada during the historical period 1913-1919 inclusive has been as follows:

	Short Tons
1913	15,012,178
1914	13,637,529
1915	13,267,023
1916	14,483,395
1917	14,046,759
1918	14,977,926
1919	13,586,300

This is indeed a lamentable record. No country can hope to progress, either commercially or culturally, which allows its coal production to slide downhill in this fashion.

The obverse of the picture is seen in the following comparison:

	Canadian Coal Consumption	Coal Mined in Canada	Annual Deficit
1913	31,582,545	15,012,178	16,570,367
1914	26,852,323	13,637,529	13,214,794
1915	23,906,692	13,267,023	10,639,669
1916	29,865,856	14,483,395	15,382,461
1917	33,123,735	14,046,769	19,076,976
1918	34,771,832	14,977,925	19,793,917
1919	28,768,099	13,586,300	15,181,799

The only province in Canada to show an increase in 1919 was Saskatchewan, where 382,684 tons was raised an improvement of ten per cent on 1918 figures.

The production of Nova Scotia had been exceeded in twelve out of the thirteen previous years, and that of British Columbia had been exceeded seven times in the past ten years. The case of Alberta was peculiar, as production in that province has been interrupted by strikes. The output for 1919 was 4,990,726 tons, or 1,079,086 tons less than 1918, but nevertheless the largest production of any year, except 1918 only. The production in Alberta in the month of December 1919 reached 742,482 tons, from which it may be deduced that the mines of Alberta could produce 10,000,000 tons annually without great effort. The production of Nova Scotia is at least 3,000,000 tons annually below what it might be, so that if one adds to these deficiencies the decline in British Columbia, and New Brunswick it is within the mark to say that the coal output of Canada is 10,000,000 tons annually below what it should be.

The progress of the by-product coke-oven industry in 1919 makes interesting reading. During that year there were completed 60 Koppers Ovens at Sydney, 25 Willputte ovens at Sault Ste. Marie, and 30 Lomax ovens at Anyox, B. C. The imports of coke fell from 1,165,590 tons in 1919 to 383,374 tons in 1919. This not displeasing reversal is not altogether due to the larger coking capacity of Canada, some of it being of course due to the slackness in steel production during the first half of 1919, but the additions to Canada's plants have a good deal to do with it, and from now on, it is hoped that importations of coke will lessen in quantity. It will be still more gratifyng when Canadan coke is made from Canadian coal. An illuminating statement in Mr. McLeish's Report is that the quantity of coke-oven gas recovered in 1919 was 9,340 million c. ft., or the equivalent of one-third of the total production of natural gas in Canada.

Structural Materials.—While the full result of the resumption of building activity, which must follow its practical cessation during the war period was not felt in 1919, a decided recovery is recorded in the production of cement, clay products, lime, sand-lime brick, and building stones. For the first time, the value of cement exports has greatly exceeded the imports. The increase in values in building materials almost overshadows the increase in quantities, but this is still a material one.

Salt.—Salt production in Canada continues to increase with fair regularity, 1919 production being the equivalent of 148,302 tons compared with 131,727 tons in 1918 During 1919 there was an experimental production of salt from brines flowing from springs near Senlac, Sask. A small quantity of salt was ob-

tained by solar evaporation and disposed of locally. Development continued on the salt deposit at Malagash, 175 tons being shipped during 1919. The discovery of potash minerals associated with this deposit is attracting much interest. The Brunner-Mond (Canada) Co. completed and placed in operation at Amherstburg, Ont., a chemical plant for the manufacture of soda-ash from brine.

Petroleum.—Production of crude oil in 1919 was 240,970 barrels of 35 Imp. galls. compared with 304,741 barrels in 1918. Over 90 per cent of the crude petroleum still comes from the old oil-fields of southern Ontario. The recorded production in the West is all from the Turner Valley Field, about 35 miles from Calgary. Approximate production in 1919 was 16,891 barrels. New Brunswick production was 4,275 barrels.

The tremendous extent of the oilrefining industry in Canada is shown by the fact that in 1918 ten oil refineries in Canada used 262,641,155 gallons of crude oil of which only 12,258,190 gallons came from Canadian wells. The total imports into Canada during 1919 of petroleum oils, crude and refined, was 451,211,270 galons or some thirty million gallons more than in 1918. The desire to find additional oil-wells in Canada is therefore very understandable.

War Minerals.—Pyrites, molybdenum, graphite, chromite and magnesite all show large declines, The records of 1919 can hardly be considered as representative of the ability of Canadian Mines to produce these minerals profitably in peace time, but the outlook for all of these minerals, particularly for those which are used in alloying steel, is not by any means dark.

As a measure of the importance and stability of Canadian mining, the year 1920 will be more accurate than the figures of 1919. The most reassuring feature that we can hope to see recorded is an increase in the production of coal in Canada, and conversely, if such an increase is not recorded, there will be adequate ground for grave anxiety.

MINING VENTURES AND THE PUBLIC.

With the resumption of more normal trade and industrial conditions will probably come the re-appearance of the professional promoter of more or less avowable enterprises, issuing beautifully engraved stock certificates and brilliant prospectuses.

Although such activities are not limited to mining, is must be owned that the lure of returns of one thousand to one on the money invested in mining ventures, as usually inferred by the promoting literature, often attracts and entraps men otherwise same and of keen business acumen. These last three years have been very prosperous and a great deal of savings have been accumulated, both in rural and urban communities as demonstrated by the success of the various war-loans issued by the Government. This may prove an incentive to shady and questionable promoters to launch new efforts to make victims, especially in rural communities, and among urban people of small means.

Many warnings have been issued through the annual reports of the Quebec Bureau of Mines, guarding the public against the insidious literature and glowing statements of agents, offering mining shares and beautifully engraved certificates in ventures which have never had a chance of success.

Therefore before putting their hard-earned savings into mining or other ventures, of which they personally know little or nothing, the investing public should enquire from reliable and disinterested sources as to the value and chances of success of such enterprises. The statements and promises of agents, whose sole interest is to sell shares, should not be taken without thoroughly investigating them.

The investing public should discriminate between "mines" and "prospects." Some producing mines, or mines well developed, constitute as safe an investment as any other commercial and industrial enterprise, but these rarely yield more than a fair return. On the other hand, "prospecting" and "developing," be it for ores, for natural gas, for oil, are naturally hazardous ventures. When successful, the returns from such investments are large, but failures are infinitely more numerous than successes. Such investments are not for the small savings, for it should always be remembered that the risk is proportionate to the returns. If the investor expects large returns he has to take risks of losses. And before buying shares in companies searching for, or developing, deposits of gold, lead, zinc or other minerals, or carrying on boring operations for gas and oil, the public should investigate the statements made by the peddlers of stock certificates, enquire from reliable sources as to the possibilities of the enterprises, so as to be able to discriminate between (1) "safe mining investments," (2) "legitimate and reasonable mining speculation," and (3) "mining frauds." In the first the returns are not high but are reasonably sure; in the second, the money contributed by the buyers of shares is really expended in intelligent seach and development on the mineral deposits, which may or may not answer the hopes which were founded on them; and the third class comprises the ventures of shady adventures who spend the money obtained from the sale of shares on full page advertisements, in printing, alluring and tempting prospectuses for the purpose of obtaining more money, of which the smallest possible fraction is expended in actual work—usually on hopeless mining claims.

The Bureau of Mines is entirely at the disposal of the public for technical information regarding the mines and mineral resources of the Province of Quebec. An enquiry on such subjects, addressed to the Department of Colonization, Mines and Fisheries, Quebec, will always bring to the writer information from which he usually can judge of the merits of mining ventures in the Province and this will enable him to go into it with a better knowledge of the facts.

Babine, B. C.

The Taltapin Mine, Anderson Creek in the Babine country, is being developed with very satisfactory results, rich ore having been opened up, some of which is being sacked for shipment. The government is assisting in the construction of a road to open up the property.

John D. Galloway, who some months ago resigned his position as Resident Mining Engineer for Mineral Survey District No. 2, British Columbia, to accept a position with a well-known New York concern, has found the climate of Mexico, where his new duties have taken him, too much for his health. Therefore he has asked for and received appointment to his old place in northeastern British Columbia with headquarters at Hazelton.

Protection For Speculators

R. E. HORE.

In a recent issue of the Engineering and Mining Journal, Mr. J. B. Lyrrell makes some interesting comments on "New Mining Control in Ontario." He outlines the system of Government in Ontario and tells of the recent success of the Farmers' party at the recent general election. He call attention to the fact that the Department of Mines has now at its head a Minister who was elected to the Legislature by supporters of the Labor party and selected by a Premier who was chosen as leader by the Farmers' party. The little knowledge that the present government has of the mining industry might seriously react on the industry of the Province; but some consolation is found in the fact that the staff of the Department of Mines remains as it was. The Minister of Mines will have able advisers and Mr. Tyrrell expresses the hope that he will take their advice. He then makes some suggestion as to policies which will insure the growth of the mining industry and provide security for those who engage in it. The government should encourage people to invest in sane and honest mining enterprises, and money so invested should be as safe from confiscatory legislation as money invested in any other business. Mr. Tyrrell also claims that the government should protect the small investor from professional swindlers and incapable management.

The term "investor" seems to be rather unfortunately used by Mr. Tyrrell in referring to attempts to make mines.

The protection of the public against loss in mining enterprises is an obvious impossibilty. The very nature of the enterprise makes return of capital doubtful and the making of profits very doubtful. Our present mining industry has resulted from the early work done by men who took big risks in the hope of making big profits. The expansion of the industry still depends not so much on the "investor" as on the "speculator." The making of a mine in Ontario is a speculative enterprise and anyone who looks on it otherwise should not be invited to take part in the development of mineral deposits.

We have in Canada a comparatively few important profitable producing mines which have considerable ore reserves and good prospects of finding more ore. These enterprises have already passed the hazardous stage. They have in most cases reached independence of outside capital. The companies operating them have no stock for sale. Investors who realize that mining ore means liquidation of assets can properly be advised to buy shares on the market from other shareholders and put them in their strong boxes, but it makes no difference to operations at the Hollinger, Nipissing or Creighton mine whether the comparatively small block of stock changes hands or not. The so called "investor" is in such cases not helping to provide funds for development. That was done by the "speculators". The investor must be given governmental assurance that the shares he thus purchases will not depreciate in value owing to unfavorable legislation; but the credit for development of the properties remains with the speculator.

Those who wish to see the mining industry expand therefore must recognize that investing in mining enterprises is of comparatively little importance as compared with speculation in mining enterprises. Protection for the speculator will properly include any measure of protection that is provided for the investor; but it should also include other important features. Failure is often due to legitimate causes, but the speculator finds that many failures are due to deceit or mismanagement. It is in the interests of the mining industry that the risks of the speculator should be confined as far as is humanly possible to the risks of mining. Legislation concerning mining corporations should therefore command attention and suggestions should be made by the mining fraternity with a view to protecting speculators. The problem of providing protection against incapable management should also be discussed.

With regard to speculation in mining enterprises, it should be clearly pointed out that the protection that is needed is for those who provide funds for the company's treasury. If, after the company has disposed of its stock at a certain price, the stock is resold several times at varying prices these sales cannot be regarded as of equal importance to the mining industry with the first sale. The stock exchanges serve a useful purpose in making share certificates negotiable; but the transactions on the exchanges do not provide money for the development of mines. In some cases the exchanges are made to serve as a medium between the original purchasers who have large blocks of stock and the purchasers of small blocks, but such transactions are obviously in the interests of the purchasers of the shares and not in the interests of the mining company whose shares are being dealt in. Those who trade in shares on the stock exchanges, sell or buy mining securities in just the same way as they sell or buy ather securities and for the same purposes. It is quite unlikely that any trader is under the delusion that his money goes into the treasury of a mining company when he purchases stock on the exchanges.

The transactions between the original purchaser of mining stock and the public should become of interest to the government when the first purchaser acts in the capacity of a broker who sells the stock to the public. When a mining corporation deals with the public through agents it retains control of the sale and is in a position to see that the prospective buyer of shares gets reliable information concerning the company's affairs and property. When the purchaser of a large block of shares undertakes to dispose of the stock in a similar way, however, the company has no longer control.

Ontario's new Government has in the problem of protecting the speculator and investor a task worthy of close attention. A sale of shares bill that will give protection without hampering honest enterprise is much to be desired; but admittedly difficult to draft. There are many who believe that more to be desired than new legislation is enforcement of the provisions of the present statutes.

Mr. Tyrrell's suggestions inreference to mine management bring up the question of licenses and certificates for those in charge of operations. So long as this remains debatable ground with those interested in the industry, we can hardly call upon the Farmers'

government to take action in the matter. There is considerable difference of opinion as to whether any but the employer should decide on the qualifications of the man he wishes to employ as manager or superintendent of a mine. Under the present Act there are rules and regulations governing the operation of mines which the operators must comply with. The position of manager is not however restricted to any specially trained or favored group of persons. Ability to do the work satisfactorily to his employers is the present basis of employment. There are some who would like to place restrictions around the employer by the granting of governmental authority to a corporation of engineers who would decide on the qualifications of other engineers and of others in charge of mining operations. It can hardly be said, however, that there is a great demand for such action, though a few engineers are industriously working to that end. "Equal opportunity for all" is a pretty good slogan just now and the Farmers' party will not be loudly praised if it grants special privileges to a certain class of workers. Application of science is a necessity in good mine management; but it does not follow that specialists in applied science are the only capable operators.

The new government of Ontario will do well to give some attention to protection of speculators and investors. In the sale of shares under the preesnt Act there is much that is objectionable. In the management of mines there is also room for improvement. What should be done is, however, not easily determinable.

LETTER TO THE EDITOR

Editor, Canadian Mining Journal:

Sir: For some time past, the writer of your Northern Ontario letter, has referred to the Gowganda Railway problem, stating that the war was entirely responsible for this work being held in abeyance, and quotes Premier Drury's failure to give a definite statement.

Regarding the first claim, anyone who has followed and noted as we have, the statements and proceedings by the late Conservative Government during the last nine years admit that there is no evidence to justify the assumption that the Government ever intended to build this railway, but there is evidence to show that they did not. It is quite true that the Legislation passed an appropriation of $275,000 for the purpose of beginning construction of this railway. That the Cabinet had other intentions is evident by the beginning last summer of the building of a macadam road which at last year's rate of progress, would take fourteen years to complete, and seems to be intended principally as a source of income for their political friends, who, when the Government were swept out of power, recognised their loss and became the leading figures in a secession movement, by which they hoped to retrieve their lost position. At this very same time it required the united efforts and organized protests of the people interested in Kirkland Lake to prevent the construction of a railway in that camp.

In view of the aforementioned facts is it any wonder that Premier E. C. Drury fails to make a definite decision.

During the administration of the late Government the Cabinet had a following in the Legislature sufficiently large to carry any measure proposed by the Government. The present government however, does not occupy that position and a direct promise by the Premier at this time, to extend the Elk Lake branch of the T. and N. O. Railway, might be used by the combined opposition as a united action to defeat the Government, when the matter of appropriation of money for this particular work is asked for.

Some time ago I read in the "Toronto Star" a statement attributed to Premier Drury, that the bulk of legislation proposed for consideration at the next session of Parliament would be introduced as private bills, in order to allow of a free discussion.

Such being thte case, why should not the member for this district introduce a Bill asking for the necessary appropriation for the immediate construction of this extension of the Elk Lake branch of the T. and N. O. Railway. By doing so he would be only redeeming his pre-war, pre-nomination promises and we would also have the opportunity, when the Bill came up for discussion to separate our friends from our foes Who is not for us is against us, was considered to be a correct definition during the war. If correct then it must also be so now.

As regards the Canadian Light Railway Company, ia is quite clear that they can not definitely decide until they have secured a Charter by act of Parliament and without race-track tactics are resorted to, this Bill could be disposed of before the application for this Charter came up for final action.

The abnormal exchange rates, the high price of silver and the world-wide demand for both gold and silver, coupled with the imperative need of the monetary metals, by both Canada and the British Empire, brings the opening up by a railway of the country west of Elk Lake and through to the C. N. R. a work, that might be termed of national importance, from the fact that it is known to contain producing mines and prospects sufficiently promising to give reasonable assurance that other mines will be developed, along the entire length of such a railway. Cobalt has produced millions of dollars to the shareholders, to the manufacturers and farmers of Old Ontario as well as large revenue to the Province. Cobalt, however, is apparently on the decline and Gowganda is the only presently known district as yet undeveloped that possesses native silver—Cobalt veins, occuring in the same geological formations, at at Cobalt, extending over an area several times as large as the productive area at Cobalt.

Given direct railway connection and with the aid derived from the experiments conducted at the mines at Cobalt in the matter of treating low-grade ores, Gowganda may in a few years attain a yearly production even higher than Cobalt in its palmiest days.

The first serious attempt by the people of this district to secure a railway connection was made in 1911. The stand taken by the Government is described on page 171 of your journal for March 15th, 1911, and is as follows:—"The Minister of Mines candidly told the delegation that the policy of the Government was to protect its timber resources on the Temagami Forest Reserve, rather than to encourage further encroachment by prospectors, miners or railroads."

This is a policy that has in a few years converted large areas of green forest into black stumps and charred dead timber in which even the moose cannot find shelter during the winter months.

As the present Government in Ontario came into power entirely as a result of the mistaken policy of the Conservative Government, it is fair to assume that the Drury Government are not likely to persist in a policy that has proven so damaging to the interest of the Province and its forests.

Gowganda.

February 27th, 1920. L. O. HEDLUND.

NOVA SCOTIA NOTES.

Dominion Coal Outputs.

The production of the Dominion Coal Company's Glace Bay Collieries during January and February compares with last year as follows:

	1920	1919
January (tons)	275,129	276,036
February tons)	248,338	262,876
	523,467	538,912

The inability of this Company to increase its production, notwithstanding the brisk demand for coal, is due to the continued shortage of coal producers, and the Company announces vacancies for 400 "shooters and loaders". Permission has been granted by the Department of Immigration for the admission of miners from abroad, but so far it has been found possible to secure only a limited number.

The amount of coal stored in bank at the end of February is stated to be about 60,000 tons, which is an unusually small stock for this time of year. The demand during the past two months has been in excess of the production of the collieries, and it has been necessary to fill coal from bank to mee t current orders. Coal has been exported during the winter months from the Company's piers to Holland, Italy, Norway and Portland, Maine, in addition to usual winter shipments to Newfoundland and the Nova Scotia ports.

It is anticipated that the requirement of the Steel Works during 1920 will take at least one million tons of coal, and that if the hopes of the officials for increased production in the remaining months of 1920 are realized, about one and a half million tons of coal will be available for export to points outside Nova Scotia.

The change that has taken place in the distribution of the Dominion Coal Company's output of coal during the war period may be gauged from the following approximate figures.

In 1913 the coal was distributed about as follows:

	Tons
Used in the manufacture of cake and for steel-making	1,550,000 or 21%
Sold to workmen, and used at Collieries and railways	726,000 or 10%
Sold commercially	4,987,000 or 69%

In 1918, the distribution was, approximately:

Used in the manufacture of coke and for steel-making	1,7500,000 or 34%
Sold to workmen, and used at collieries and colliery railways	570,000 or 11%
Sold commercially	2,855,000 or 55%

The difference of 2,132,000 tons of coal sold through ordinary commercial channels, as between 1918 and the last pre-war year is almost entirely represented by the amount of coal sent to St. Lawrence ports during 1913.

A partial recovery of the Montreal market was made last year, and no doubt in 1920 more strenuous efforts will be made to enlarge shipments to St. Lawrence ports. Allowing for the per capita increase in coal consumption, which is always growing in Canada, and the very large additions to manufacturing establishments that have in recent years been made in the Montreal district and along the whole valley of the St. Lawrence, there ought to be a potential market for Nova Scotian coal of at least three million tons annually in the market of which Montreal is the business metropolis.

Indications of a fire were detected in the Drummond Colliery of the Intercolonial Coal Mining Co. at Westville at the end of February. The district has been walled off, and a temporary loss of about 200 tons of daily output will be occasioned. Other sections of the mine are working as usual.

The session of the Nova Scotia Legislature which opened on March 4th is expected to deal with a number of important matters connected with the coal mining industry, and some action is anticipated in pursuance of the powers granted to the Government at the last session to re-adjust the submarine coal leases so as to ensure their more certain and speedy operation. The Speech from the Throne dealt with the anticipated recovery of the coal production, a matter of very considerable importance to the Province of Nova Scotia, which in recent years has found its royalty revenues much decreased through the lessened coal outputs.

The opening ceremonies of the 1920 Session were saddened by the absense of the venerable President of the Legislative Council, the Hon. Monson H. Goudge, who died just previous to the opening of the Houses of Assembly at almost 91 years of age. Mr. Goudge has been a member of the Legislature since 1873, with a short break between 1987 and 1884, and since 1903 has been President of the Upper House. Mr. Goudge's birth was exactly contemporaneous with the real beginnings of the coal trade in Nova Scotia, the General Mining Association haveing been formed in 1825 to take over the Duke of York's Lease. Men whose lifetimes span the whole of the Victorian era, and who have lived to see the new heaven and the new earth of these days and the ebb of the greatest conflict of history, are necessarily rare, but to his venerable and distinguished age, Mr. Goudge added many lovable qualities. To see the late President of the Council with his venerable aspect, seated in the Chair that has in its time been occupied by royal and distinguished visitors to Nova Scotia, and flanked by ancient oil paintings and mural tablets of as great, if not greater antiquity than can be seen elsewhere in America, was an impressive sight to which use had accustomed the Haligonians, but which always appealed to visitors from those provinces of Canada and the States of the Union that have shorter traditions than Nova Scotia.

Rossland, B. C.

A strike has meen called at the Rossland Mines of the Consolidated Mining & Smelting Co., because the Company last Saturday (February 28th) laid off approximately 125 men, it being the intention to cease shipment of ore for a time. The company, it is explained, plans concentrating on development work. How the action of the men will affect the situation in the camp cannot be said at the time of writing.

Mineral Products of Canada as a Factor in Export Trade

The products of the mine exported from Canada in 1918 totalled $75,668,875 out of the total of exports valued at $1,586,169,792, which, considered in the light of these figures alone, would seem to indicate that the mineral production of Canada was not an important factor in exports. No correct estimation of the part played by the mineral industry is, however, possible on these figures alone, because under the general head of manufacturers is included exports totalling in value $660,840,430 which are very largely the assembled and finished product of the mine, and more particularly of the motive power furnished by coal. For example, the production of steel in Canada during 1918 totalled 1,893,000 tons, all of which was the combined product of the mine, in the form of iron ores, fluxes and coal. This steel, in various forms, was used in Canada, together with the greater proportion of the production of Canadian coal, in making manufactures possible, and in transporting the manufactured goods to their export destination.

It is, therefore, not too much to say that without the product of the mine, in particular coal and iron, no exports of manufactures could be made by Canada.

World's Greatest Nickel Miner.

Canada has a great advantage economically and strategically, in possessing almost the exclusive world supply of nickel, which was exported in 1918 to the value of $9,029,535. Canada is exceptionally well equipped to produce alloy materials, as our country possesses not only a preponderating quantity of nickel ores, but is also well provided with such materials as chromium, cobalt, manganese, titanium, and molybdenum, and has also the advantage of large and cheap supplies of electric current, generated from waterpowers, a combination that favours the manufacture of ferro-alloys. The possession of these materials by Canada is important, not only as they may help to foster the growth of specialized metallurgy in Canada, but because they will ensure preferential treatment for Canada in export markets, if our advantage is safeguarded and wisely used.

Asbestos is also a mineral with which Canada is well supplied. As a producer of asbestos Canada now holds first place in the world, and there are very great possibilities in the possible industries connected with the fabrication and uses of asbestos in the arts. This wonderful mineral is now so much used in electrical appliances, and in manufacturing processes employing heat, that in its possession of large supplies Canada holds a strategic advantage similar, but not quite so great, as in the case of nickel.

Exports of Gold and Silver.

The production of gold and silver is a matter that enters into export business in a good many ways. Canada is becoming increasingly important as aproducer of gold.

The actual production of gold has declined in recent years, because of the fixed selling price of gold, combined with a rising cost of all labor and materials, but the potential yield of gold from Canadian sources is steadily increasing by reason of a constant succession of new discoveries of gold-bearing areas, not the least important in which is Northern Manitoba.

The position of silver is not quite so certain, but at the present time the increased value of the white metal has had the effect of increasing the known silver resources of Canada by making it profitable to work ore bodies that were too lean to be profitable when silver was selling at about one-third of its present value. There is every likelihood that the increased value of silver will be maintained for a number of years to come —at least until the value of the gold standard is restored to whatever may turn out to be the after-war scale of monetary values.

Our silver and gold production will prove of great assistance in maintaining Canada's exchange credit in foreign markets, and in this connection it would advantage Canadian business men as a whole if they would support the plea of the gold-miners that the Government should assist in some financial manner as increasing the production of gold, either by bonusing the gold mines, or by relieving them of all possible burdens of taxation. The increase of gold production is one way in which Canada's credit can be most effectively buttressed, and incidentally it would assist in the restoration of British exchange.

Importation of Coal.

The weakest spot in Canada's import and export trade balances, and in her internal prosperity and financial soundness, is the declining production of coal from Canadian Mines and the rapid and unparalleled increase in the tonnage of coal imported into Canada from the United States. Canada could produce quite easily, and could with greater ease consume within her own borders at least ten million tons more of soft coal from our own domestic collieries. The unnecessary, and indeed, inexcusable purchase of coal in the United States that could be mined in Canada has the effect of creating an adverse trade balance (so far as coal alone is concerned) of not less than $100,000,000 annually. If this lopsided and humiliating arrangement were corrected we should not see Canadian funds at a ten per cent, discount in New York, for not only would our exchange credit benefit, but the increased employment and general impetus that would be given to our internal trade would be of even greater benefit than a correction of exchange values.

Summarizing the foregoing, it would appear that, except in some notable cases like nickel and asbestos, the mineral exports of Canada will not bulk largely in the general total of values, but, in proportion as the products of the mine are produced and utilized within Canada, so will our exports of manufactured goods increase in bulk and value; and, further, our possibilities in the export of the products of agriculture, of the forest and the fisheries, will increase just in proportion to the tonnage of coal that is mined, and the tonnage of steel that is manufactured to provide new avenues of transportation, by land and by sea.

It is not certain, moreover, whether it is desirable that Canada should unthinkingly and greatly increase the quantity of its mineral exports—merely as such. It is, however, most desirable, that Canada should so utilize her mineral resources as to provide the maximum of employment and the maximum of revenue within her own borders; and that, with regard to such "key" minerals as nickel, asbestos and coal, that we should use whatever strategic advantages they give us to make the best possible bargain for our exporters, and to secure that preferential treatment in foreign markets we are entitled to ask if we give of our best. —By the Editor in the "Grain Growers' Guide."

Our Northern Ontario Letter

THE SILVER MINES.

With the approach of spring it is evident that the coming summer promises to see realized the expected favorable influence upon the silver mining industry of Northern Ontario as a result of the continued heavy demand and high quotations for commercial bar silver.

One result of the present situation has been the complete depletion of any stock of bullion that may have been held in store at the mines. The high quotations for the metal, taken together with an additional 15 p. c. on New York exchange has caused the bullion vaults to give up every available ounce. A like condition is said to exist in other countries, with the result that the demand of the nations must be met entirely by production of new silver. That this cannot be done for some years appears to be certain. With no new silver producing area looming up, and with the mining industry of Mexico still more or less uncertain, the belief is expressed by metal experts as well as the operators of silver mines that the demand is likely to continue greater that the supply for many years.

The influence of the strong position of silver has been decidedly favorable on the mines of Cobalt. Not only has it encouraged the operators to intensify their efforts, but it has also added thousands of tons of ore to known reserves by lending to it the added value necessary to make it of commercial grade instead of waste rock. As a consequence the annual yield is greatly increased as well as the lives of the mines materialy lengthened.

Another favorable influence, and one which seemed slow to materialize, but it nevertheless now a fact, is a general rejuvenation of interest in the outlying silver districts. These include, not only the outlying properties in the Gowganda district, but also affects the Elk Lake, South Lorraine and Casey Township silver areas.

In the Gowganda district, while production continues unremittingly at the Miller Lake-O'Brien, and another shipment is being assembled at the Castle property of the Thetheway Company, a number of other properties are getting under way. Among the properties to recently commence work is that known as the Big Four.

The Silver Bullion Company, with property at Leroy Lake has purchased a partly used $30,000 mining plant from a Nova Scotia Mining Company. The equipment is now in course of transportation to the property.

February production from the Kerr Lake mine approximated 100,000 ounces, and with silver quoted at around $1.31 an ounce plus 15 p. c. on New York exchange the value of the output is estimated at about $150,000. Basing estimates on achievements during 1919 the net profit on the month's operation amounted to at least $100,000. It is unofficially reported that the ore bodies on the Kerr Lake are being found to extend well beyond their previously known limits.

The proposed consolidation of the Adenac and the Victory properties is not making very satisfactory progress. It is learned that some doubt now exists as to the liklihood of the merger being carried out. In the meantime, the Adenac having practically exhausted its chances of developing anything other than more or less small patches of ore, is closed down and partly dismantled.

At the McKinley-Durragh current net earnings continue to cover current dividend disbursements at the rate of 3 p. c. quarterly. On April 1st the company will pay its regular 3 p. c. dividend, amounting to $67,430. It is understood a financial statement will accompany the dividend checks and that a surplus of approximately $500,000 will be shown. Total disbursements to date amount to 259 p. c. or $5,754,163.

The Coniagas Mines has sold twenty-stamps together with some other equipment to the operators of the Keeley mine in South Lorain. The stamps and equipment are a part of that contained in the mill on the Tretheway property recently purchased by the Coniagas from the Trethewey Company. During the course of carrying on extensive development work on the Keeley mine, the mill will be transported to the property and installed. Work will be commenced today on the Keeley and for the time being will consist of dewatering the underground workings. By late summer the mine is expected to be turning out silver concentrates.

According to official advice, a syndicate composed of shareholders in the Casey Mountain Mining Company has subscribed $30,000 to be spent within the next six months in further development work on the company's property situated in Casey Township. The proposed extension of the Nipissing Central Railway from New Liskeard to North Temiskaming is expected to encourage further work in that district. Such a line would pass along the southern boundary of the township of Casey. This, together with the encouragement offered by the big production record of the Casey-Cobalt mine as well as the present program of the Casey Mountain Syndicate is expected to attract considerable attention.

Hon. Harry Mills, Minister of Mines for Ontario, has submitted a favorable reply to the Cobalt branch of the G. W. V. A. in regard to their recent resolution in which they recommend the selection of a returned soldier to fill the vacancy on the staff of Ontario Mining Inspectors caused by the death last fall of A. H. Brown. The Minister states that the appointment will be based on merit, and that he is desirous of assisting the returned men to become re-established in civilian occupations. This being the case, it is thought that no difficulty will be experienced in appointing a returned man, for the reason that there are a large number who have had previous practical mining experience as well as a knowledge of engineering.

With Cobalt, the metal, valued around $2 a pound, not a few mining men are investigating the possibilities of operating some of the outlying properties on which large veins occur. In the boom-days of Cobalt some of these properties were worked with the object in view of getting silver values. Very little attention was paid to the cobalt content of the veins other than in so much as it might indicate silver possibilities. It is now thought with the increased use of cobalt metal and the consequent higher quotations, some of these veins could be turned to profitable account.

The Coniagas Mines is still negotiating for the purchase of the Gamble-Thompson group of claims in the

Gowganda district. The deal has been under way for several weeks, and the prospects appear to be that it will shortly be closed. The group of claims are situated in the Miller Lake section of the camp and are regarded as being excellent prospects.

The annual meeting of the Right of Way Mines will be held on March 15th.

During the week ended March 5th two Cobalt companies shipped 148,274 pounds of ore. Following is a summary:—

Shipper	Cars	Pounds
Northern Customs	1	86,274
Dominion Reduction	1	62,000
Total	2	148,274

During the corresponding period no shipments of bullion were made.

THE GOLD MINES.

A feature of the week with the gold mining industry of Northern Ontario is the ninth annual report of the Hollinger Consolidated Gold Mines. The report shows a total income of $7,063,099.21, and is couched in the usual conservative terms. Working expenses absorbed $3,222,617.11. Municipal, Provincial and Dominion of Canada taxes for 1918 and reserve for Dominion of Canada for 1919 taxes $286,372.65, and depreciation and donations $1,232,819.40, in all $4,741,809.14, which leaves a net profit of $2,321,280.07, out of which was paid $1,722,000 in dividends, and added $599,290.07 to surplus account.

It is interesting to note that during the year some $600,000 was written off for depreciation. This compares with $375,000 in 1918, $100,000 in 1917 and $150,000 in 1916. It will be observed that the 1919 figure is almost equal to the total for the three preceding years. Costs of operation average $4.52 per ton, plus the amount spent on plant construction, bringing the total up to about $4.77.

Ore reserves at the Hollinger are estimated to contain $39,928,430 made up of 4,392,680 tons of ore containing an average of $9.09 per ton. Of this immense reserve, some 1,921,640 tons containing $17,350,100 is above the 425-foot level. Some 1,950,020 tons containing $18,033,410 is between the 425-foot and the 800-foot level, while the small remainder is estimated in the ore bodies opened up below the 800-foot level and where but a limited amount of work has been done, and also includes a small estimate in veins as yet undeveloped below the 100-ft. level. Of these latter veins, and which in due time may become an enormous source of production, there are no less than 39, ranging in width from 3½ feet to 25 feet in width and containing values ranging from $4 to $20.10 per ton.

The work of completing the equipment in connection with the remaining 20 of the total of 200 stamps in the mill is nearing completion, and provided the desired number of men can be secured, the management hopes to get up to full capacity of 3,200 daily this year.

Following are interesting extracts from the annual statement:—

Average tons per day	1,950
P. C. of possible running time	70.5
Tons per 24 hrs. running time	2,766
Stamp duty per 24 hours	14.95
Mining Costs per ton	$2.88
Mill costs per ton	$1.21
General operating charges	.42

Another interesting feature is that the Hollinger Company during 1919 invested $115,195.20 in oil and gas leases in Dickenson and Morris Counties, near Harrington, Kansas.

A meeting of the shareholders of the Dome Extension Company is being held March 10th for the purpose of considering, and, if approved, ratifying an agreement previously entered into by the directors authorizing the extension of an option on the property to the Dome Mines Company for six months. It is generally believed the extension will be ratified.

Before the end of the current month, according to progress already made, the Porcupine Crown Mine will once more be producing gold bullion. The requisite material and supplies are being rushed to the mine, and the desired force of men has been engaged. It is now thought that production may be continued without interruption. Prior to closing down in July 1918, the Porcupine Crown was a heavy producer and was disbursing dividends at the rate of 3 p. c. quarterly. Ore reserves are now estimated at around $500,000 and the present surplus amounts to approximately $200,000. The mill is in a first class state of repair.

Some of the leading interests involved in the Porcupine V.T.N. have commenced a movement calculated to bring about a more satisfactory degree of co-operation between the British and American interests involved in the Company, and between whom there has been a more or less pronounced degree of lack of cohesion. It is believed that favorable results may follow. While the financial position of the Porcupine V.T.N. is not very strong, yet the mine is equipped with a mill adequate to treat about 100 tons of ore daily, and by use of which the mine can be quickly made self-supporting. In addition to this is some 750,000 shares of unissued stock on which additional finances could be raised if necessary to do so. Provided the plan materializes it is proposed to continue operations from the present depth of 600 feet to the 1000-ft. level.

In the Kirkland Lake district, there is greater activity than ever before in the history of that district. The mines in the proven zone are not only increasing the scope of operations, but in all direction on outlying properties there is a steady increase reported in the amount of work being done, and the favorable results achieved. This is true, both of the Southern part of the camp where the Ontario-Kirkland appears to be developing into a probable mine, and where the result of work on the Canadian-Kirkland property is reported to be favorable, and in an Easterly direction in Label township where new incorporations comprise more than two thousand acres of promising mining territory, and where, as in the case of the Bidgood property, commercial ore has been found at outcrop. On the Bidgood, in the numerous veins opened up and which range from a few feet to 25 feet in width, while some of the veins have not yet been found to contain commercial ore yet according to official figures as much as 5½ feet in width of one of the most important veins has been found to contain average values of $13.50 per ton at surface. It is also true, that West from Kirkland Lake in the direction of the McIvor property, as well as the Baldwin, and the township of Grenfell, considerable activity is in evidence, and the coming summer promises interesting developments in

that direction. The success so far achieved in the proven section, and with the visible prospective merit of the territory lying both East and West, the mining men and prospectors interested in the Kirkland Lake district appears to have every reason to be decidedly optimistic.

At Boston Creek, what is true of the Kirkland Lake district is true of this district, although as yet on a lesser degree. Taking the Miller Independence as the center of activity and in all direction operations of more or less important proportions are being carried on. At the Miller Independence itself, a contract for some 300 feet of cross-cutting at the 500-ft. level is soon to be let, while in the inclined shaft the work of developing ore is to be carried on.

On the Mondeau property, of the Peerless Mining Company a rich vein measuring over four feet in width was encountered at a depth of about 150 feet and which is said to be working satisfactorily and shaft sinking is preceeding at the rate of about five feet per day.

On the Boston Kennedy property, after completing the shaft to a depth of 100 feet it has been decided to spend another $10,000 in continuing the shaft to a depth of 150 feet at which point it is proposed to carry out lateral work. A small sawmill has been purchased and shipped to the property where it will be installed for the purpose of cutting lumber and timber required in connection with further buildings and mining.

In Skead township a good deal of activity is reported. The Wisconsin-Skead and the Crawford-Skead are both being worked. The Minneapolis and St. Paul property is also to resume work soon, as also will the Allied Gold Mines on claims held in that district.

The outlook for the gold mining industry in this country is exceedingly bright, that is when measured by the results so far achieved and the extent of activity promised within the next few months. As to the economic conditions, the future alone will contain the verdict.

B. C. CORRESPONDENCE

Victoria, B. C.—That the many resignations received recently from members of the Geological Survey of Canada constitutes a serious situation in-so-far as the Province of British Columbia is concerned because some of those who have been engaged in geological work in the Province for years have left the service without completing their important work, is recognized by the Provincial Government. The matter is to be brought before the Legislative Assembly, now in session, by Hon. Wm. Sloan, Minister of Mines, who has given notive of his intention to move the following resolution:

Whereas under the Terms of Union of this Province with the Dominion of Canada it is incumbent on the Dominion Government to maintain in British Columbia the Geological Survey:

And whereas from the pioneer work of Dawson to the present day the services of the Geological Survey have been of inestimable value to the mineral industry of this Province;

And whereas recent advices show that, out of a total number of twenty-one geologists available for field-work throughout the Dominion, eight already have tendered their resignations, and others are likely to do so, thus leaving very few fieldmen for the whole Dominion:

And whereas during the six years prior to 1914 the Geological Survey maintained an average of nearly twelve geological and topographical field-parties in British Columbia alone, it becomes evident that it will be impossible for the survey to provide for work in British Columbia trained geologists from the remaining staff to continue the geological work so necessary to the mineral development of this Province.

Be it Resolved, That this Legislative Assembly of the Province of British Columbia expresses its appreciation of the great value of the work of the Geological Survey of Canada as assisting the mineral development of this province, and views with apprehension the depletion of the survey staff, especially at this time, when, with the world entering upon a period of reconstruction, it is most important to our mining industry that all possible knowledge of British Columbia geology shall be made available.

And be it further Resolved, That this Legislative Assembly of the Province of British Columbia does strongly urge the Dominion Government:—

(1.) To take some immediate action to prevent further depletion of this most valuable branch of the Civil Service:

(2.) To offer adequate inducements to engineering and scientific students of Canadian universities to undertake training with a view to employment on the Geological Survey of Canada, in order to provide trained men for the future:

(3.) To complete and publish the results of the geology of such districts as have been topographically mapped:

(4.) To adopt a policy assuring the maintenance on an adequate basis of the work of the Geological Survey of Canada in British Columbia, to the end that the letter and spirit of the terms of the "British North America Act" may be implemented and the development of British Columbia expedited.

And be it further Resolved That an humble Address be presented to His Honour the Lieutenant-Governor, praying that a copy of the preambles and Resolutions hereinbefore set out be transmitted to the Honourable Secretary of State (or other proper person) at Ottawa.

The developments which have given rise to the foregoing must have an unfortunate effect on this season's geological work in British Columbia. C. Camsell, in charge of the western branch of the Canadian Geological Survey, has left for Ottawa for the purpose, it is understood, of discussing the 1920 programme in Western Canada. Lack of competent men probably, in fact indubitably will necessitate a reduction of the number of field parties to the minimum.

J. W. Mulholland, President of the Prospectors' Protective Association of British Columbia, came from the Northwest Mining Convention at Spokane, Wn. to Victoria, B.C., in order to bring to the attention of the Minister of Mines a number of resolutions endorsed by the organization with which he is officially connected. The prospectors, he states, are banding themeselves together throughout the Province. They are going to bring all the pressure of which they are capable to bear on the authorities to obtain the concessions set out in the resolutions which already have been reviewed in detail. Chief among

the desires of the prospectors are powder at cost, winter schools, district engineers' reports made public the subjecting of those caught despoiling miners' cabins and property to a severe penalty, and the shelving of the B. C. Engineers Bill. This latter is being vigorously fought by the prospectors as "class legislation," likely to interfere with the investment of foreign capital (with that of the United States in mind) in local mining proprietors. The Canadian Mining Institute also has taken a stand against the measnre. Mortimer Lamb, the secretary, appearing before the Private Bills Committee of the Legislature and asking that it be laid over for a year, as the Institute did not consider the bill, as at present drafted, in the interests of the mining industry. This proposed legislation has not yet reached the House.

G. Lewis Casey, President of the Smelters Steel Co. Seattle, Wn., has undertaken to make a proposition to the British Columbia Government, through the Minister of Mines, for the establishment of an iron industry in the Province. This Company has acquired extensive iron ore deposits, together with a ten acre tract of land, at Dean Channel, a northerly arm of Burke Channel on which the town of Bella Coola is situated. Conditions for the extraction of ore, which assays 52½ per cent metallic iron with very small percentages of impurities, are ideal, it being possible to bunker the mineral at tidewater by gravity.

With the aid of the "Iron Bounties Act," assuring $3 a ton on pig iron produced, and with the possibility of further assistance under the "Iron Ore Supply Act," Mr. Casey thinks the prospects of arranging for the installation of a plant in British Columbia are good. Two of the Company's chief problems in connection with operations in Seattle would be satisfactorily overcome, after the necessarily heavy initial outlay, by construction at Dean Channel. One was that of power. In Seattle this cost was high and only the high prices received counter-acted it. On Dean Channel there was water power ready for harness and there was timber for the production of charcoal. In Seattle coke, from the local gas works, had to be substituted for the latter and, as would be readily understood, the high ash content of this material very substantially increased the cost of production.

A quantity of British Columbia ore already has been shipped to the Company's plant at Seattle where by means of the electro-thermic method, it has been converted, in one operation into the highest grade of grey iron castings. The characteristic fine texture and close grain of the product for which there is a good market, there being unfilled orders on hand at $65 a ton, is sufficient comment on the quality of the ore and the efficacy of the electrical form of treatment adopted.

Starting in a conservative way the Company has carried forward the problem of the treatment of the Magnetite Ores of the Coast to a point that appears to assure economic success. With one single-phased arc furnace they have produced 30 tons of the quality of grey iron described. Work now is proceeding on the completion of a four furnace unit, each furnace of a 440 K. V. A. capacity, which will be capable of a daily output of 15 tons. All the electrical equipment has been installed The furnaces all are being provided with automatic regulators and recording pyrometers, so that the Plant, when finished, will be modern in every respect and designed along lines which experiments have indicated as necessary in the satisfactory handling of the ores of British Columbia.

Under the Mineral Survey and Development Act of British Columbia the Minister of Mines has power to check up mining concerns placing stock on the market in respect to prospectus statements or other representations as to the value and prospects of their properties. At present, however, such companies are not required to file a prospectus with any official, the result being that there is no sure way for watching the activities of such enterprises. This condition has resulted in an amendment, now before the Legislative Assembly, requiring all joint stock companies, other than a private company operating under the Companies Act, which acquire mining properties or engage in mining to notify the resident engineer of the district in which the property is held, filing full particulars of the property and the work done and also as soon as issued a copy of every prospectus or statement in lieu of prospectus.

Dual control of the minerals within considerable areas of British Columbia has been a vexatious problem from an administrative standpoint for years. The Provincial Government is anxious that all the mineral zones affected should come under its sole jurisdiction. Prospectors and mining men have expressed their dissatisfaction most emphatically with respect to the mineral properties in the E. and N. Land Belt, a Vancouver Island section approximating 2,110,054 acres. At present the Province owns the precious metals and the E. and N. Ry. Co. the base metals. While the mine operator must conform, generally speaking, with the Provincial laws in taking up claims within this section the Company is in a position to impose any condition in connection with the extraction of minerals, other than gold and silver, that may seem good to it Royalties have been exacted in some cases. Throughout the past year the Minister of Mines has been in negotiation with the railway officials in an endeavor to reach an agreement whereby the minerals of the belt aforesaid may be brought entirely under the control of the Department of Mines and the progress made in this direction will be discussed in the Legislative Assembly during the present Session. A somewhat similar condition, although not altogether parallel, is found within the limits of what is known as the Dominion Railway Belt, an area along the line of the C. P. R. on the provincial mainland about 17,050,000 acres in extent, and also in the Peace River Block of about 3,500,000 acres. An arrangement now subsists under which the prospector or miner may obtain title to both precious and base metals, and the surface rights necessary to operate, within the Dominion Belt, the prelude to this involving compliance with both Dominion and Provincial regulations. Although there is more red tape attached to this procedure than would be if the control were solely vested in the Province the conditions are not particularly onerous. However, Hon, T. D. Pattullo, Minister of Lands, is asking the Provincial Legislature to pass a resolution asking the Dominion Government to turn over its rights in these two latter areas to the Province. His argument is that the dual control of these lands makes satisfactory administration extremely difficult and that the development of the Province as a result, is being retarded.

Vancouver, B. C.

There is to be an international mining convention at Seattle, Wn., next month and an effort is being made to have Canadian currency accepted at par in that City for the convenience of delegates from north of the line. The Canadian Mining Institute, the Mining Bureau of the Board of Trade and the Vancouver Chamber of Mines are co-operating with a view to assembling a thoroughly representative delegation from British Columbia.

Nelson, B. C.

An international mining convention is to be held at Nelson, B. C. during the week of June 7th and 12th. The Kirby Gronp of five claims at Riondel is said to be showing up well with development, a 50 foot crosscut having exposed a stringer of six inches of galena carrying ruby silver, widening to eighteen inches of spathic zinc and galena. This property is interesting old timers because it appears to contradict all theories respecting one of the oldest silver-lead camps of the Kootenays. The Blue Bell, which dates back to 1865 and the old Hudson's Bay Co. workings have produced old grade ores. The Yankee Girl Mine, near Ymir, has been inspected by A. W. Newmerry, of New York, who has returned to report to his principals. This property was a steady producer of gold-silver ore for many years, and has about $400,000 worth of ore to its credit. The Highland Mine at Ainsworth has been closed down, owing to shortage of water necessary for its compressor. Some months ago the Mill had its last run and during the winter has been overhauled. This work still is in progress. The property was acquired some years ago by the Consolidated Mining and Smelting Co. of Canada. The Slocan Silver Mines Ltd. are proceeding with the development of their property near Nelson. A 50-ton Mill is to be installed as well as a Hydro-Electric Plant. A San Francisco firm is understood to have received the contract for much of the proposed installation. The recent strike reported on the property of the Nugget Gold Mines Ltd., Sheep Creek, which is said to be improving with development, has been followed by the announcement of the uncovering of a promising vein on the Tango Group, situated nearby in the same section. Seven feet of high grade ore is said to have been located at a depth of 210 feet below the surface outcropping.

Greenwood, B. C.

As a result of the operation of the British Columbia Taxation Act, 1916, many mining properties held without development and presumably for speculative purposes have reverted to the Crown. Some forty of these have been leased by officials of the government in the course of the last few months and as most of the applicants are mining men of Greenwood, it is expected that active development will be started. Confidence is felt that some will prove to be mines and that Greenwood is destined to again take a place among the leading mining centres of the Province. Among the active mines and prospects of the Greenwood district are the Providence, which has produced $400,000 worth of mineral and from which about $50,000 was taken last year; the Last Chance, Skylark, and Silver Cloud, the Bell, the Castor Fraction, the Bounty, the Rambler, Wellington and the Wallace Mountain Group.

Trail, B. C.

Ore receipts in gross tons at the Trail Smelter of the Consolidated Mining & Smelting Co. of Canada for the week from February 8 to 14, inclusive, were 7,872. For the week ending February 21st the receipts were 5,692 tons. This brings the total for the year to 47,842 tons, of which 2,139 tons were concentrates and 45,703 ore.

Barkerville, B. C.

The Lightning Creek Gold Gravels & Drainage Co. has a crew of forty men employed in sinking a shaft to develop the deep gravels of this creek which drilling has shown to be rich. Hitherto similar efforts have been unsuccessful owing to the tremendous water pressure. With a large capacity pumping plant, and all other modern equipment, this company is looking forward to achieving where others have failed. John S. Horgan, a well qualified engineer, is in charge of the work.—A. D. Whittier, having taken up 25 miles of dredging ground starting at the mouth of the Quesnel River, is reported to plan the installation of a dredge this season.—Keystone drill prospecting by the Lightning Creek Hydraulic Mining Co. and preparations for a busy year by the Stouts' Gulch Hyraulic, owned by the Cariboo Gold Field Ltd., are among other activities in the district.

Victoria, B. C.

That the Settlers' Rights Act, 1919, which has been disallowed by the Dominion Government, will be re-enacted at the present session of the Provincial Legislature has been announced by Premier Oliver. The settlers within the E. & N. Ry. Belt, Vancouver Island, will be given a further extension of time, in which to make application for title to the coal rights in connection with ther lands. This assurance was given a delegation, representative of a large body of the claimants, which waited on members of the Government and the Legislature at the Capital City. It is to be expected that, in conformity with the policy of the Dominion Government, such legislation, if again placed on the statute books of British Columbia, will be disallowed again. However the Provincial Government express a determination to maintain the right of the settlers to a fair deal, and it seems likely that the question of jurisdiction between the two Administrations will come to a definite issue before long.

Discussing the coal development prospects in the northern part of the Province of Alberta Georeg Macdonald, general manger of the Pacific Great Eastern Ry., said: "Imagine, if you can, a mountain of coal extending nearly two miles, with only a depth of three feet of earth to strip. It isn't a mine—it's a quarry. Coal can be loaded on cars as cheaply as gravel can be loaded in a ballast pit. No expenditure will be required for tunnels or shafts, no timbering, no skilled labor; and there are upwards of thirty million tons of the very best bituminous in sight."

Mr. Macdonald was referring to the Blackstone Coal Mine, near Jasper Park, about fifty miles southwest of Edison and some 700 miles from Vancouver. It is about 800 miles from Prince Rupert and 400 miles from Fort George.

"With the extraordinary and increasing demand for cars for lumber on the Pacific Coast the government railways can afford to give a rate of one-half a cent a ton per mile and make money. At present, coal at Prince George and Quesnel (both interior British

Columbia centres) stands about $20 a ton. This coal should be laid down at Prince George for $5 a ton, and when the Pacific Great Eastern Ry. is completed to that point it can be laid down at Quesnel at $6 a ton. One cannot conceive of what this means to mining development in the north. Northern British Columbia and Northen Alberta are the future hope of Canada and cheap Alberta coal will be the medium bringing about such a condition.

"There has been nothing," he continued, "happen in western Canada since the Klondyke rush that is fraught with so much importance as this wonderful coal deposit.

"Now that the government has taken over the Grand Trunk Pacific Ry. it is confidently expected that low rates will be placed on coal from the mine to all western points. The president and chief owner of the property is Stuart Cameron, of the Pacific Construction Co. There already is a small town at Blackstone and a large number of men employed building dwellings, stores, offices, etc. Even at its present limited capacity the mine is capable of shipping 1,000 tons of coal a day, and this can be increased with ease to 5,000 tons."

A fatal accident occurred recently in No. 1 East Mine, Coal Creek, Crow's Nest Pass Collieries, when Frank Rigosta, a young Italian coal miner, was caught beneath a fall of top coal and instantly killed.

The Kettle Valley Ry. Co. has definitely announced its intention to construct a spur to Granite Creek, thus furnishing the Coalmouth Collieres with transportation facilities which were badly needed. At present the output of this mine is hauled by motor truck to the railway. With cars practically at the tipple it will be possible to develop the property with a view to the increasing of the output.

Trout Lake, B. C.

The Netty L., near Ferguson; the True Fissure, on Great Northern Mountain; and the Gold Bug, at Eight Miles, above Ferguson, are properties under development in this section. A promising vein has been struck on the Netty L. and tunnelling on the True Fissure has disclosed a body of concentrating ore carrying values in gold and silver. A rich strike was made some months ago on the Gold Bug and continuous development with satisfactory results has been in progress since that time.

Pendicton, B. C.

At a recent meeting of the directors of the Pendicton Development Co. it was decided to proceed with the development of the Company's property, the Torpedo Group, situated close to Okanagan Lake. A car load of ore was shipped last summer with satisfactory results and it is proposed installing a concentrator.

Lardeau, B. C.

The Mobbs and the Beaver Mineral Claims are among those of the district which are under development. The former is reported to have been bonded to a Vancouver syndicate for $35,000 and the new operators propose letting a contract for 250 feet of tunnel work. It is planned that the tunnel shall reach a depth of 30 feet below the shaft, which is down 80 feet and at the bottom of which is a foot of silver-lead ore, averaging 250 ounces of silver and some gold. On the Beaver, the tunnel, which has been driven 150 feet, is reported to be in eight feet of mixed ore, containing two feet of clean ore.

Vancouver, B. C.

C. F. Caldwell, a British Columbia operator of prominence, is pursuing with determination the project of a railway from Hyder into the Salmon River section of the Portland Canal District, northern British Columbia. Returning recently from a visit to Seattle he stated that he would accompany Governor Riggs, of Alaska, to Washington to forward the enterprise. The money, he said, was in sight and the proposed road would be an inestimable boon to the camp. Discussing the proposal of the Vancouver Board of Trade that a government ore dressing plant should be established on the Coast Mr. Caldwell disapproved of anything in the nature of a government operated smelter for the mines of British Columbia. What was wanted was some means of proving and remedying "the extortions that the octupus of the smelting interests." He advocated either a royal commission with wide powers of investigations or the appointment of an investigator, nominated by the mine owners but backed with powers by the government, who would be able to investigate results obtained at other smelters all over the country and compare their results and their charges with the figures we obtain in this Province.

J. T. Hillis, one of the best known of British Columbia's mining men, died recently. He came to the Province in 1900 from the State of Montana. With his partner he was one of the first interested in what now is the Britannia Mine property, Howe Sound. They did the preliminary development work, persevering in the face of much difficulty, until the possibilities were proved and capital was interested. Subsequently he became identified with a group of claims at Hidden Creek which later were to develop into the Hidden Creek Mines operated on a large scale by the Granby Consolidated Mining and Smelting Company.

THE SILVER ISLET MINE, LAKE SUPERIOR.

By J. J. O'CONNOR.

The prospective opening up of the famous Silver Islet silver mine, by Messrs. Jamison and Peacock, and their associates of Duluth, Minn. who have secured an option on the Wood Location which includes Silver Islet, naturally suggests the question; will Silver Islet come back? Will more of the rich bonanzas be encountered, that were met with in the former operations, and will it again take the place in the mining world that it formerly held, as one of the great mining enterprises of its period?

Jamison and Peacock are well known and successful explorers. Among other properties, they discovered the Croft Iron Mine, on the Cuyuna range, a high grade Bessemer producer.

The first steps to be taken will be to unwater the mine. This will likely be carried down, to at least the third level.

The main shaft was sunk to a depth of 1265 feet, with several thousands of feet of drifting. Good milling ore only, was found to any extent in the drifting. The two great bonanzas encountered at moderate depth, in the old operations encourages the belief that further rich bodies of ore will be met with in that zone, rather at greater depth.

It is not expected that any great difficulty will be encountered in keeping the mine free, while the rich **silver known to** be in the roof of the mine, is being extracted. The free use of concrete, should make this a comparatively simple matter. The foundations of the old cofferdams are still intact, a short way below the surface of Lake Superior, and may easily be brought back to their old form, and give ample protection to the contemplated operations.

When Nature got through with the Islet, it was about 90 x 90 feet, and the highest point on it was 9 feet above the Lake. It lies 3700 feet from the mainland, six miles east of Thunder Cape, Lake Superior and is therefore exposed to all the fury of its waters in time of storm.

Incredible as it may seem, Silver Islet, though only a small speck of rock, 90 x 90 feet, on the world's greatest body of fresh water, is richer in romance and has furnished more interesting mining history than many mining districts of the same size in miles.

The first deposit was discovered at the surface. It was pear shaped, very rich and produced a large amount of silver. The second deposit was met with on the third level. It was in the form of an inverted cone with a base of about fifty feet an the third level, and the apex down at the fifth level. This latter deposit was remarkable in its structure, a winze in the middle of it, for a depth of 60 feet was sunk literally through native silver, the metal sticking out in masses from the four sides of the winze.

In the breast of the drift it stood out in great arborescent masses, in the shape of hooks and spikes, in gnarled, drawn out and twisted bunches, with bands of animikite, and huntilite. This deposit was at the junction of the two veins on the Islet. The hanging wall is described as smooth, and as polished as a mirror.

The company that formerly operated Silver Islet was headed by Major A. H. Sibley, of New York, with Captain W. B. Frue, of Detroit, Mich. as superintendent Captain Frue was the inventor of the Frue Vanner, well known to the mining fraternity. The invention was made at Silver Islet, the working models were set up in a building on the main land and the vanner was first used in the Silver Islet Stamp Mill, in 1874.

One of the principal shareholders at this time,was Captain Eber B. Ward, a well known vessel-owner of Detroit, Mich. History, tradition, or both, have it that his profits from Silver Islet went far to enable his daughter Clara Ward to purchase the title of Princess Chimay.

From where the vein outcrops on the Islet, 3700 feet from the main land, it is traceable a total distance of 9000 feet, or 6300 feet on the main land.

The gangue of the Silver Islet vein consists of calcite quartz and dolomite, the latter varying in colour from cream to pink, according to the amount of carbonate of manganese (rhodochrosite) it contained. The metallic minerals are native silver, (argentite) galena, blende, copper and iron pyrites, with marcasite, according to W. M. Courtice, Consulting Engineer for the Company. Thomas Macfarlane, also mentions tetrahedrite, domekite, niccolite and cobalt bloom. According to Prof. Ingall, the two latter are probably oxidation products of a peculiar mineral called Macfarlane, and containing arsenic, cobalt nickle and silver. Two new forms of silver were discovered in the ore, by Dr. Wurtz, and named huntilite, and animikite. The two latter are almost solid silver. Graphite also occurs in considerable quantity and seems to be connected in some way, with the occurrence of the silver. It has been observed, according to Richard Tretheway, Superintendent, that they never had silver without graphite, although they sometimes had graphite without silver.

The present Board of Commerce is but history repeating itself. Under the old management at Silver Islet, all kinds of goods and supplies were sold in their well appointed store. They were very conscientious with their employees, a form of temperance was enacted and carried out, under which an employee could only obtain two or three drinks per day, these on credit, if he wished. Boarding houses were not permitted to charge more than a certain price, and in a general way, the best interests of the employees were carefully guarded.

MINISTER OF MINES OF BRITISH COLUMBIA PRESENTS RESOLUTION TO LEGISLATURE URGING ADEQUATE MAINTENANCE OF WORK OF GEOLOGICAL SURVEY.

Hon Wm. Sloan, Minister of Mines for British Columbia recently laid before the Legislature the following Resolution:

"Whereas, under the terms of union of this province with the Dominion of Canada, it is incumbent on the Dominion Government to maintain in British Columbia the geological survey;

"And whereas from the pioneer work of Dawson to the present day the services of the geological survey have been of inestimable value to the mineral industry of this province;

"And whereas recent advices show that, out of a total number of twenty-one geologists available for field work throughout the Dominion, eight already have tendered their resignations, and others are likely to do so, thus leaving very few fieldmen for the whole Dominion; .

"And whereas during the six years prior to 1914 the geological survey maintained an average of nearly twelve geological and topographical field parties in British Columbia alone, it becomes evident that it will be impossible for the survey to provide for work in British Columbia trained geologists from the remaining staff to continue the geological work so necessary to the mineral development of this province.

"Be it resolved, that this Legislative Assembly of the Province of British Columbia expresses its appreciation of the great value of the work of the geological survey of Canada as assisting the mineral development of this province, and views with apprehension the depletion of the survey staff, especially at this time, when, with the world entering upon a period of reconstruction, it is most important to our mining industry that all possible knowledge of British Columbia geology shall be made available.

"And be it further resolved, that this Legislative Assembly of the Province of British Columbia does strongly urge the Dominion Government:

"(1) To take some immediate action to prevent further depletion of this most valuable branch of the civil service.

"(2) To offer adequate inducements to engineering and scientific students of Canadian universities to undertake training with a view to employment on the geological survey of Canada, in order to provide trained men for the future;

"(3) To complete and publish the results of the geology of such districts as have been topographically mapped.

"(4) To adopt a policy assuring the maintenance on an adequate basis of the work of the geological survey of Canada in British Columbia, to the end that the letter and spirit of the terms of the 'British North America Act' may be implemented and the development of British Columbia expedited.

"And be it further resolved, than an humble address be presented to His Honor the Lieutenant-Governor, praying that a copy of the preambles and resolutions hereinbefore set out be transmitted to the honorable secretary of state (or other person' at Ottawa."

Ottawa, Ontario.

Dr. James S. Stewart, who has been in charge of the Edmonton Office of the Geological Survey Branch, Dominion Mines Department, has tendered his resignation, after ten years service. Dr. Stewart has been specializing in geological investigation of the gas and oil of the great plains of the Province of Alberta and the Canadian Northwest.

ANNUAL REPORTS OF MINING COMPANIES.

Hillcrest Collieries.

Net profits and amount available for common stock dividend after deduction of bond interests and preferred dividends in 1919 compare with previous years as follows:

	1917	1918	1919
Profits	$91,211	$110,295	$112,641
Available for common stock dividend	25,562	60,288	72,581
Percent earned on common	2.55%	6.02%	7.25%

As 1919 was marked by a number of serious recurrent labor troubles, resulting in long periods of idleness the showing is regarded as highly satisfactory.

Internation Coal Mining Co., Westville, N. S.

Profits for 1919 totalled $152,449, being very slightly in excess of those of 1918 and about $30,000 less than the profits of 1917. After deducting depreciation—for which increased allowance was made—provision for income tax and preferred dividends, there remained for application to common stock dividend $58,464 against $77,280 in 1918. The sum of $10,644 was carried forward to profit and loss, bringing the total surplus to $254,831.

Canadian Salt Co.

Gross and net profits compared with 1918 as follows:

	1919	1918
Gross operating Profits	$226,881	$223,342
Net Profits	136,286	136,565

After paying bond interest, and making provision for depreciation, sinking fund and interest on overdraft, the sum of $72,286 was added to surplus making a total to credit of this item $595,858. During the year great difficulty was experienced in obtaining fuel, and interruptions occurred in operation due to failure of the hydro-electric supply.

Hollinger Consolidated Gold Mines, Ltd.

Comparisons with 1918 are as follows:

	1919	1918
Tons of ore milled	711,822	578,755
Average value per ton	$9.73	$10.24
Net value of gold recovered	$ 6,722,000	$ 5,752,000
Ore Reserves (tons)	4,392,000	4,439,000
Computed Value	$39,928,000	$41,080,000
Average number of men employed	1,207	1,061
	1919	1918
	$	$
Total income	7,063,000	5,908,000
Working expenses	3,222,000	2,857,000
Depreciation taxes and donations	1,232,000	462,000
Net profit	2,321,000	2,588,000
Dividends paid	1,722,000	1,230,000
Addition to surplus	599,000	1,358,000
Balance carried forward	2,670,000	2,071,000
Total assets	27,644,000	26,821,000
Current assets	3,602,000	2,296,000
Bullion shipped	6,979,000	5,720,000

Ore Reserves.

General Manager A. F. Brigham, dealing with the matter of ore reserves, says that ore of a value in excess of $10 to the ton has been depleted about $1,500,000, while ore of $80 to $10 tenor has increased by more than $2,000,000. Ore below $8 a ton shows a decrease of $1,850,000. He remarks: "It will be seen that our development efforts have been principally directed towards the maintenance of reserves approximating the value of the tonnage milled during the year. We find it very difficult to determine a definite program while labor conditions are so unsettled, and mining supplies and machinery rising from levels already abnormally high. The lower grade veins could be profitably developed and exploited if a tolerably sure combination of stable conditions obtains, but it is useless to exhaust our resources upon such, unless we can be assured of a fair return from them."

Mr. Brigham, dealing with the company's efforts to sell foodstuffs, clothing and other necessaries to employes at net cost, makes the interesting announcement that the reduction at present is 15 per cent. below the price obtained on August 1, 1919.

Other statements made by the general manager are: "The net value, $9.40 per ton milled, was determined by the selection of such ore as would yield a close approximation to the average value of the ore reserves. Should labor become more plentiful and mining supplies fall to a rational level, this figure can be further reduced. The wisdom of this latter course is obvious.

"The mine is ready to supply the mill to maximum capacity, namely, 3,200 tons per day, when a sufficient number of miners can be secured to break the ore. Remodeling the last four tanks in the continuous decantation plant and some minor details connected with the remaining twenty stamps are rapidly nearing completion.

"Mining machinery and supplies continue to advance, and any advantage which we secured in the small reduction in the price of cyanite and explosives has been more than absorbed by the advance in timber alone. Only the most drastic economy will prevent an increase under this head during the coming year.

Mr. Timmins says pre-war labor efficiency has not been attained, and that there is still a serious shortage of labor. Relations with employes continue satisfactory. He goes on to make this significant comment:

"The demand for gold, to provide an adequate backing for the highly inflated issues of paper money now outstanding, already great, becomes daily more insistent. We are ready to supply this demand, and to add to the gold reserves of Canada to the fullest extent of our ability and the capacity of the mine, but before we do so the disadvantages from which the gold mining industry has suffered since the commencement of the war must be improved or entirely removed. There must also be a more abundant supply of efficient labor and an appreciable reduction in the cost of all materials and supplies used by us, otherwise it will not be possible to greatly increase our output along sound economic lines, which is the only policy we would feel justified in attempting to carry out."

Northland Gold Mines, Limited, has been granted Ontario incorporation with a capital stock of two million dollars and head office at Haileybury. The company is empowered to carry on a general mining business and the provisional directors are W. A. Gordon, P. C. Montgomery, E. M. Ferguson, Pearl Hunton, and A. M. McLean.

MINING NOTES FROM TORONTO.

Frank C. Loring M. E. on the mining situation in England—Death of an aged mining expert—An interesting mining case in the courts.

(From Our Toronto Correspondent).

That England is ripe for a big educational campaign and propaganda in the interests of Canada's mineral resources, is the opinion of Frank C. Loring, Mining Engineer, Sun Life Building, Toronto, who has just returned from a business trip to the Old Land. "Canada received a rather bad reputation through the failure of one or two of its mines," said Mr. Loring to the "Canadian Mining Journal", "and unfortunately they appear to know rather more about these than they do about the many good mines. What is needed in London is a first class mining exhibit, with maps and data showing the wonderful mineral resources of this country and particularly Ontario. Particularly is this needed now when the country is showing a great speculative spirit in industrials and is also greatly interested in gold and silver mining. This is evidenced by the fact that the five million pound exploration company recently formed in London had its stock over-subscribed almost before it was thoroughly organized. General Sims, Canada's representative in Great Britain, is doing good work, and it is not his fault that the Canadian trade office in London does not compare sufficiently with the trade offices of the other British colonies. In my opinion the same attention that is being paid to the agricultural resources of Canada inthe London office should be devoted to educating the British public to our wonderful mineral resources with a view to enlisting British capital for Canadian mining enterprises. There is no doubt that there is a large amount of money in England ready for investment in Canada and with effective propaganda work much of this can be diverted to Canada. Already several companies are being formed to exploit Canada, and real exploration and development will take the place of the cursory work done in the past. Now that the South African production is falling off and gold and silver is in such great demand there is a great opportunity for Canada to place her wonderful resources before the investing public of Great Britain."

Mr. Loring returns to England shortly on business connected with various mining enterprises. Since his return he visited the Dome, Hollinger and other mining properties in the north country. He is the consulting engineer for the Hughes McElroy mine.

BOOK REVIEW

The Kent Coalfield, its Evolution and Development, by A. E. Ritchie. Published by the "Iron and Coal Trades Review" London, England. 5 by 7½ Cloth, 302 pp. map and index.

This little volume is collected from a series of articles which appeared in the "Iron and Coal Trades Review."

Except to Englishmen, Mr. Ritchie's recital of the long story of the evolution of the Kent Coalfield from a shadowy scientific hypothesis to a producing coalfield is not absorbingly interesting, but the proved existence of numerous seams of workable coal of good quality in the south-east of England will exert a far-reaching influence on the future of England, and in importance is only approached, but not exceeded, by the proved extension of the Midlands coalfield south and east of what were supposed to be its extreme limits of workability and persistence.

To non-English readers the chief interest in the Kent Coalfield resides in the testimony it bears to the value of geological speculation and deduction. The first suggestion of a buried coalfield in the south-east of England came from Sir Henry de la Beche, head of the Geological Survey in 1846, and in the same year similar conjectures as to an extension of the French coalfield of the Nord into the Pas de Calais district were confirmed by the accidental discovery of coal in an artesian well.

In 1855 Godwin-Austen read before the Geological Society a paper that made history on "The Possible Extension of the Coal Measures beneath the South-Eastern part of England." Godwin-Austen's reasoning was chiefly based on his belief that the axis of the Ardennes was continued into England and represented by the Mendip Hills. Unfortunately, Godwin Austen's theories were opposed by other geologists, particularly by Sir Roderick Murchison, then head of the Geological Survey. The borings which were later put down are stated by Mr. Ritchie to have been useful chiefly in proving where coal was not, and he remarks that if Godwin-Austen's recommendation of 1858 had been acted on the evolution of the coalfield to a producing stage would have been advanced by fifty years.

Mr. Ritchie's volume is one long record of a process of trial and error, chiefly error, and periodically he compares the lack of progress and clashing of opinions which delayed the finding of coal in Kent, with the business-like manner in which the French engineers opened up the deep mines of the Pas de Calais field, making incidentally many persons very rich. It would be profitless to review this record, but it should be proper to point out that if in so old a country as England, a country in which the science of geology was born, it is possible to discover hidden coalfields in these latter days the possibilities of study of our own coal measures are very great. Even in England, the full implications of the finding of coal in Kent have not been realised, and in years to come the prolongation of the coal measures of Kent, under the Thames Valley in the direction of the Somerset coalfield may prove to be more than a mere hypothesis.

The seams in the Kent Coalfield have not been correlated, but a study of the aggregate thickness of coal seams over three feet in thickness already, proved in numerous boreholes, and actually yielding coal from six collieries , will reveal the tremendous importance of the field. The analyses are surprisingly good. For example, in the Ripple boring of the Kent Coal Concession, Ltd., ten feet of coal is proved having the following analysis; Volatile, 10.71%, Fixed Carbon, 84.24, Sulphur 0.63%, Ash 4.40%.

The volume is prefaced by a quotation from George Stephenson, which was never more opposite than today. "The strength of Great Britain lies in her iron and coal beds; the Lord Chancellor now sits upon a bag of wool, but wool has long since ceased to be emblematical of the staple commodity of England. He ought to sit upon a bag of COALS."

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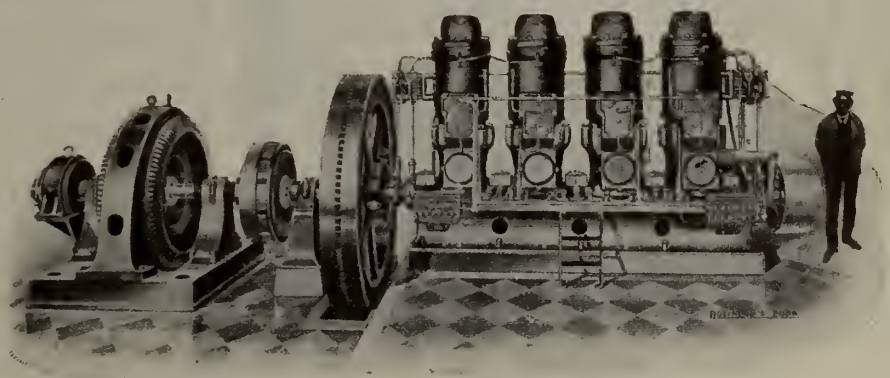

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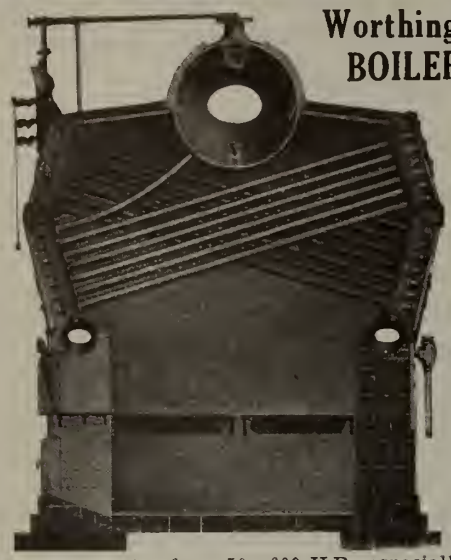

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"OLD" BOILER—Horizontal return tubular. 52 in. x 12 ft.—60-3 in. tube. Grate surface 30 in. deep x 50 in. wide. No stack. Boiler designed for 125 lbs. working pressure.
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EDITORIAL

THE SAFEGUARDING OF INVESTORS IN MINES

Mr. Alexander Gray in his comments in this issue, which we welcome, views the protection of the investor and the simultaneous encouragement of the prospector from a point of wide experience in mining matters, and he touches a vital point in suggesting that reputable newspapers should censor the mining flotation literature which now forms so large a part of the advertising columns of Canadian dailies. Some of the newspaper propaganda is so subtle that it would deceive the very elect. Recently we pointed out the apparent character of the investment afforded by the stock offering of the Little Gem Mining Company of Anchorage, Alaska, which had appeared in the Montreal "Star," and the very frank manner in which those who offered this stock admitted its speculative character. The writer was amused, when attending the Annual Meeting in Toronto, to note that the advertisement of this Company was appearing in the Toronto "Globe," but, either from an astute psychological insight into the Torontonian mind, or perhaps to conform to the code of morals professed by the "Globe" the suggestions to "ante up" and take a chance on winning a "big pot" were deleted. Instead, a statement was made as to the amount of stock that had been sold in Montreal. Now that is not bad, because no matter how Toronto may regard Montreal's moral character, it has a most wholesome respect for the business acumen of its civic rival.

As one example of the other little gems that stud our newspapers, we have had brought to our attention a despatch from the "correspondent in the mining field" of the Montreal "Standard" written from Dane, Ont., which refers to the Argonaut Mine. This gentleman, having summoned up sufficient courage to explore the vasty deeps of a gold mine found himself on the 200 ft. level, where, he writes, "one had great difficulty in getting about to see anything owing to the number of men at work. We are plaintively informed also that "one is allowed to understand that interruptions are not appreciated." We wonder what they did to the poor man. Perhaps they ran a mine car into him? It is very evident that our friend was out of his element. Yet, notwithstanding his obvious unfamiliarity with underground conditions, he proceeds to make this oracular statement, to wit, "It is estimated that the development work now in progress and to be continued for the next few months will add five million dollars to the known ore reserves in the mine." The gentleman can apparently see as far into the ground as the next man, and he finishes his letter by stating: "It is the general opinion up here that the Argonaut is fast developing into the richest gold mine in the country." What we like about these gentry is their lack of ambiguity.

It is quite possible that the Argonaut may be a rich mine, but this kind of thing is not playing the game squarely.

Those who really know mines are not deceived by the fake technical gibberish that disfigures so many of the financial pages of our most reputable newspapers, but those who do not know mines are greedy and credulous readers of it all. The Editor has on his desk a letter from such an investor, who says that through one of his real friends his attention was called to Canada. He says, truly enough, "I have been unfortunate in my investments so far. It was never any fault of mine, but invariably the dishonesty of the promoter."

The problem of protecting the "investor" against fraudulent mine flotations is, as Mr. Gray says, somewhat of an abstract science, but there is nothing abstract about the cash-down payments that our newspapers ask before they will print these dubious advertisements, nor is it making an unfair statement to declare that in allowing such advertisements to appear in their columns, our newspapers are inflicting upon their readers a deliberate dis-service, and are not playing cricket.

FLIN FLON DEPOSIT WILL BE DEVELOPED THIS YEAR.

It is announced that arrangements have been completed between the owners of the Flin Flon property and men associated with W. B. Thompson of New York that will insure vigorous development of the property this year. It is understood that the plant at the Mandy mine has been purchased for the work at Flin Flon mine and will be immediately moved. It is reported from The Pas that a number of men have already been engaged for the work of transporting and installing the machinery and putting the camp in shape for action.

It is common knowledge that the Flin Flon deposit is a very big one. The work that has been done has given information which makes it appear probable

that a very big mining industry will be founded on this deposit. Diamond drill exploration has indicated the presence of several million tons of sulphide ore that may reasonably be expected to be mined at a profit, if suitable transportation facilities are provided.

The surface stripping and 25,664 feet of diamond drilling has permitted sampling and assaying, from the results of which an estimate of 20,000,000 tons of ore has been made. This ore contains, according to the information now available, 1.69% copper and 3.49 per cent zinc as well as small but appreciable amounts of silver and gold. During the present summer shafts will be sunk and underground exploration carried on. It is said that the option is for one year and it may be expected therefore that work will be pushed ahead rapidly this summer.

The development of the Flin Flon property will have an important effect on mining explorations in Northern Manitoba. The work done this year will itself give an impetus to other operations in the district. If the results are satisfactory to the holders of the option and the bigger undertaking of mining and smelting of the ore follows closely on this year's development Flin Flon will soon be the centre of a flourishing mining industry—R.E.H.

WORK FOR THE CANADIAN MINING INSTITUTE

In the address of Mr. J. A. Campbell, M.P.P., before the Canadian Mining Institute, attention was directed to the attitude of Governments towards the mining industry. He particularly referred to conditions which are delaying development of the mineral resources of Manitoba. He pointed out that there is in Manitoba a peculiar situation; the Province does not own its mineral resources, but has a mining law; the Dominion owns the mineral resources of Manitoba, but has no mining law. The Dominion administers the mineral lands through the Department of the Interior, Properties are taken up and operated under regulations instead of under statutory enactments. The Minister of the Interior is empowered to enact royalties and the amount is not fixed.

There is good reason to believe that the Province of Manitoba wants its mineral resources developed and that the present government will do what it can to encourage capital to undertake exploration of properties. There is also good reason to believe that the Dominion Government, and particularly the Minister of the Interior, will be pleased if Manitoba should become an important producer of metals as well as of agricultural products. The prospective investor can be well advised not to overlook Manitoba in spite of the unsatisfactory conditions. There remains, however, a duty which those interested in the mining industry should not overlook. Unsatisfactory conditions are unnecessary and could be removed by united effort. To advise governments in such matters is obviously the duty of the organization which represents the mining industry of Canada. The Canadian Mining Institute is not functioning fully while it neglects to use its weight in removing obstructions which the pioneers in new districts find in their path.

A few years ago an unusually important discovery of copper-zinc ore was made at Flin Flon lake. Preliminary exploration has proven the deposit to be of great size. It has recently been announced that development of it will be carried on vigorously this year.

It may be taken for granted that the men who have undertaken the work have received ample assurance that they will get a fair deal from the governments concerned, if they proceed with mining and smelting operations and the big expenditure of money which the project will involve. That these men are going ahead with the venture should of itself be encouraging to others, for it is an indication that they feel reasonably certain of fair treatment. There remains, however, the fact that regulations and governments are subject to frequent changes. Statutory laws governing mining in this new district are much to be desired.

That the development of the Flin Flon deposit should prove a success is a matter of interest to the country generally, as well as to the present and prospective owners. If the establishment of a mining industry at Flin Flon is recognized as highly desirable, the respective governments will be supported by the public if they encourage the projects. Does it not seem to be a duty of the Canadian Mining Institute to use its influence towards obtaining recognition of the national and local advantages which a big metal mining industry in the prairie provinces would bring?—R.E.H.

It was intimated by one speaker at the Wednesday morning session of the Institute, that more resignations from the Geological Survey are likely to come soon, if provision for more adequate salaries for geologists is not made. It would be very unfortunate if disorganization should continue so rapidly as during recent months and it is to be hoped that action will be taken to hold together what remains of the Survey staff. Mr. Campbell in his address held out the hope that the revision of the classification, now being considered, may result in better salaries for the staff.

The question as to whether the Dominion Government should retain control of mining lands in the Prairie Provinces was not debated at the meeting. There seemed general approval of the statement made that mining will proceed under either control, provided that a definite understanding and proper protection for capital is obtainable.

Annual Meeting of the Canadian Mining Institute

Twenty-Second Annual General Meeting, Toronto, March 8th—10th, 1920

(Reported by the Editor.)

A Joyous Meeting.

Three things helped to make the Toronto Meeting a happy one, namely; the efficient spade-work of the Local Committee in preparation for the meeting and the entertainments; the presence and active participation in the meeting of a large number of members returned from the war; and the special care taken to ensure the presence and comfort of the ladies. The combination of these circumstances, with others that might be named, gave to the meeting from the first a keenness and elation that redeemed it from stodginess, and sustained the interest throughout an unusually full programme of work.

The reception of the Institute by the City of Toronto was most courteous and hospitable. The Institute was invited to luncheon by the Mayor and Civic Corporation, a mark of honour that has rarely, if ever before, been shown to it, and one which the retiring President, in thanking the Mayor and the City, accepted on behalf of the mining industry of the country as a recognition of the influential and representative position now generally accorded to the Canadian Mining Institute. The compliment paid to the Institute was not less marked than the appreciation it evoked from the members in attendance.

The Government of Ontario also, by the presence of Lieutenant-Governor at the Annual Dinner, and by the attendance of the Minister of Mines both at the opening session, and at the dinner, conferred distinction upon the Toronto meeting.

In addition, the most generous assistance was given by the Mines Department of the Province both before and throughout the course of the Meeting.

The sessions were so full, and the various events of the Meeting followed in such quick succession that the visitors did not see much of the city itself, but in no place has the Institute been more signally honored at its Annual Meeting than in Toronto.

OPENING SESSION, MONDAY 8th.

Address of the Minister of Mines.

The Minister of Mines, the Hon. H. Mills. welcomed the members as coming from the West and the East and as representing every province of Canada, and said he appreciated the honor conferred upon him by the Toronto Branch in recently electing him as an honorary member of the Institute. During the few weeks he had held office, Mr. Mills said he had been filled up with advice, so varied and extensive that he had decided it was safer during the coming session of the House to follow certain narrow trails. He had hoped to make changes in the Mines Act. The Act was, he believed, a good one, but not so good that it could not be bettered, and in detailing briefly what he hoped to accomplish during the Session, Mr. Mills said:

The prospector is responsible for the pioneer work of mining development. He is to the mining industry what the settler is to the farming industry, and should be encouraged in every possible way. The prospector does not know all about the game yet. He has a lot to learn.

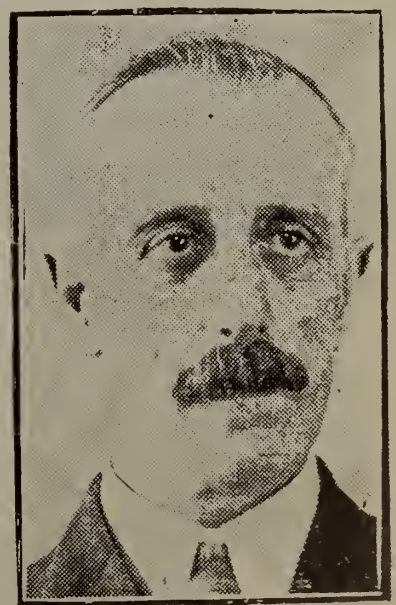
Valuable claims have been passed over by prospectors in the past because of the lack of proper information on the part of the prospector. The education of the prospector would be a step in the right direction, and the Government proposed to institute evening classes for prospectors in the various camps next winter. The provision of up-to-date geological maps and blue-prints of districts and mineral zones would be undertaken, and an office was to be opened at North Bay, for the preparation and issuance of such information to prospectors at cost.

The Government intended to assist in making trails and opening roads, and had included ten thousand dollars in the estimates for opening streams and trails and anticipated a large return on this investment.

Assistance would also be given to the prospector by reducing the license fee from $10.00 to $5.00. Requests had been made for even greater reductions, and a fee as low as $1.50 had been suggested. It was possible that some people would accept a free license. Staking would be limited to three claims per man and three claims for two other parties, that is nine claims in all. Some persons may consider this limitation objectionable, but in the past too much land had been given away. One claim covered 6,400 acres, and another 9,300 acres. Would venture to say that not more than one per cent of the claims are developed. It is the development and not the granting of claims that is of interest to the Government.

The Government proposed to assist by granting free assays, for which two coupons would be issued to each person, covering gold, lead, silver and copper. The Department was considering enlargement of the Toronto Assay Office and extending operations to Cobalt. Two assays would be allowed for each recorded claim. In the matter of licenses, the Government hoped to encourage the small prospector, and make things more equitable without reducing its own revenue by charging a $5.00 license fee to the actual prospector, and $15.00 for the licenses taken out by proxy.

Requests had been received from the Great War Veterans Association. in its various centres, for **everything.** Fifteen



HON. H. MILLS.
Minister of Mines, Ontario.

hundred returned men claimed to hold claims before enlistment, and the Government had been asked to forgive all assessment work arrears, but this might run into a sum as large as four million dollars, and caution was necessary. The Government purposed to allow the non-payment of the statutory fee of three dollars par acre for unsurveyed claims and $2.50 for surveyed claims, which would cost the Government from $300,000 to $500,000.

Iron Ore Bounties.

The Government had not committed itself to a policy of granting iron-ore bounties, and did not feel disposed to do this. In British Columbia, three dollars per ton had been offered as a bounty for pig-iron made from local ores. This offer has not been taken up as it should be and I believe that in the case of our own ores, the time will come when they will be of the utmost importance, if it is really necessary they should be developed. The electro-thermic process of reduction of iron-ores is stated by competent authorities to be a feasible one, but our drawback is lack of electric power. We have not, however developed more than one-sixth of our own water-powers in Canada, and it is most important that we should do this if we are to develop our iron-ores.

In regard to our place in Ontario as a producer of minerals, in regard to gold output we lead any province or state in America, except California. In silver production we have fallen down, owing to the decreasing yield of the Cobalt mines, a fact that is not either surprising or alarming, as all mines commence to die at birth. We have promising prospects elsewhere, and from the confidential information at our disposal, I believe we have other and undiscovered Porcupines, Cobalts, Sudburys and Kirkland Lakes.

Address of Mayor Church.

The Mayor of Toronto stressed the necessity to develop our water-powers, and referred to the enormous importance of the Chippewa scheme. The deepening of the St. Lawrence waterway, and the utilisation of the powers that can be obtained from its long and falling course to the Atlantic was worthy of all help.

Mr. Church asked the mining executives to assist in every possible way the education of university students, and particularly mentioned employment in the long vacation.

PRESIDENTIAL ADDRESS.

The retiring President, Mr. D. H. Mc. Dougall read the address, which follows:

It is the custom for a retiring President either to review the year's events, as they affect the business of the Institute, or to speak with particular reference to some phase of Canadian mining.

I propose at the dinner to say a word on Institute affairs, but today would ask your consideration of some circumstances connected with the economic utilization of our national resources.

First of all, I would propound two statements, as the text of my remarks, which, made from this Chair, may strike you as unusual, and possibly heretical. The statements that I would make are that the natural resources of Canada are:

a. Very specialized.

b. Not inexhaustible.

I am aware that it has been the custom for many years to refer to our national resources by such terms as "illimitable," "immense" and "boundless," and, while these phrases may have been warranted when our people numbered a few millions, is it not perhaps time to take stock of our national assets in the light of future population, which may within the lifetime of those present here be doubled, or maybe trebled?

Canadian views have possibly been colored by reflection of those of our friends in the United States, whose prodigal natural resources have been a revealed phenomena of modern times. The World has not been before, and cannot see again, such a treasure house as the territory now known as the United States of America was when the white man first commenced to mine those resources, without much thought of the future.

In coal, iron, gold, silver, copper, zinc and lead; in the great forests of oak, pine, cypress and walnut that formerly existed, in agricultural possibilities and variety of climate, there never was so fortunate a land seen by white men, nor ever can be seen again in its unspoiled and intact pristine wealth.

But, in Canada, have we so great an accumulation of potential wealth? It is much to be doubted. Our wealth is truly vast, but relatively, we have certain distinct limitations, which, if we will admit them now, and proceed in that wise and prudent manner which has become a proverb, to "cut our coat according to our cloth," we may to a large extent offset.

Three basic requirements of our national life are, in their natural order of importance, coal, iron and wood, and, if we enquire carefully into the extent of our national resources of these three essential materials, their limitations, so far of course as our prospecting and the progress of scientific research today have led us, will be disclosed.

To deal in order, and very briefly, with these three basic materials:

Coal

Our coal deposits do not include anthracite, barring some anthracitic coals of small tonnage quantity in the West.

Our bituminous coals are concentrated in widely scattered localities—not, as yet, the most populous parts of Canada—and the gap between is wide and important.

With the exception of the great coalfield of Alberta and eastern British Columbia, which is of course essentially one deposit, we have remaining only the coal deposits of Vancouver Island, New Brunswick and Nova Scotia.

The great reserve of the two coalfields of Vancouver and Cape Breton Islands is under the sea, and, in regard to both these widely separated localities, the extent of the coal reserve depends on the progress that science will make in providing the means to transport light, air and motive-power over long tracts of underground passages.

The limits to the mining of coal imposed by great depth of cover, and by distance from shore, are not known, because they have not been tested, but it may be confidently presumed that these limits will be widened as human knowledge is increased by experience, and I merely wish to emphasize that the limitation exists.

In the same manner the removal of the present obstacles to the utilization of the low-grade lignites of the West rests with the advances of applied science, as does also the means of making Canada independent—as far as may be—of importations of anthracite from the United States.

Iron.

Canada's position in regard to iron ore is deducible from the definition of commercial iron ore which is contained in the Encyclopedia Brittanica article on "Iron and Steel" by Dr. Henry Marion Howe, of Columbia University, who writes:

> "Whether a ferruginous rock is or is not ore is purely "a question of current demand and supply. That is ore "from which there is a hope that metal can be extracted "with profit, if not today, then within a reasonable time."

Our iron-ores, so far as we know them consist of large occurrences of ore of relatively low iron content. Their utilization will depend on the progress made in concentrating these lean ores to compete economically with richer ores. This again is a matter for practical scientists, and some progress has already been made in this direction.

Wood.

The inroads that are being made upon our forests are a matter of notoriety, nor are these inroads accompanied by anything approaching adequate reforestation. Indeed, it is doubtful whether in some instances reforestation is practical.

Enquiry will prove that timber lands are daily increasing in scarcity, and therefore in cost, and our limitations in Canada in this regard are not only distinct, but actually alarming

What I have said regarding these three basic materials is quite probably true of other essential things, but these do not so properly concern us as a Mining Institute.

One general conclusion we may draw, namely, that efficient and full use of our resources is dependent upon the progress of science, which, applied to their limitations, and supplementing their deficiencies, will have the effect of increasing their quantity and duration.

Dealing now with my second statement, and with those natural resources that I have called "specialized," I would direct your attention to the fact that Canada contains almost the world's reserve of nickel, asbestos and cobalt.

These minerals are chiefly important in being necessary to certain large industries, and, if this word is permissible, they are minerals possessing a "strategic" value, inasmuch as our almost exclusive possession of these minerals should enable us to drive a fair bargain with those nations that possess essential natural resources with which Canada is somewhat meagrely or unevenly supplied.

The members of the Iron and Steel Section of our Institute have not been slow to comprehend the growing importance of alloy steels, but this is an industry that Canada should strive to make a national speciality. We have large water-powers and the means of generating with comparative cheapness large quantities of electricity. Canada possesses, as

With reference to many of the ores of precious metals found in Canada it is well-known that their complexity of composition has been adeterrent to earlier profitable development of many deposits, but Canada today can boast of great strides in the processes of recovering the precious metals. So marked is this feature of Canadian mining, that during the past year, the members of the Canadian Mining Institute decided by a preponderating vote to change the name of the Institute as a recognition of the important status of the metallurgist.

What conclusion do these considerations lead us to? Inevitably, I think, and quite unmistakably, to a recognition of the importance of applied science to our young nation, and

MR. O. E. S. WHITESIDE.
President of the Institute 1920.
(Photo from the Bulletin by permission.)

MR. D. H. MC.DOUGALL.
The Retiring President.

mentioned, a preponderance of the world's nickel and cobalt, and in addition she is supplied with smaller quantities of chrome, molydenum, and magnesite—from which magnesium is obtainable. As a producer of synthetic steels, the variety of which is now immense, Canada only requires for success the development of trained metallurgists, for she has all the natural resources necessary.

The dominance of Canada in asbestos production, and her important contribution of amber mica, should enable us to take overshadowing position in the electrical industry. in which these two products find such varied and indispensable employment.

if this conclusion be admitted, then I think it will be necessary for the Canadian people to entirely revise their valuation of the scientific worker.

The Canadian Mining Institute in common with our sister societies, nas for years urged greater recognition of students of science, of the universities and institutions of scientific learning, and of those civil servants charged with the development of the resources of the mines, the forest, the farm and the sea.

The salaries paid to those engaged in demonstrating in our Universities, and to civil servants engaged in scientific work, are so inadequate as compared with the rewards avail-

able by accepting employment with any of the large industrial companies in the country that the average scientific worker in our universities and Government service is compelled to choose between carrying on at a great personal sacrifice the work in which he is engaged or relinquishing it and accepting employment outside his present duties which will at least be sufficiently remunerative to provide the necessities of life.

Among others, there is one branch of the Civil Service—I refer to the Geological Survey—which has never been appreciated at its true worth. No Canadian Government has yet voted a worthy appropriation for the purposes of the Survey. It has always been hampered in its work by an inadequate number of workers, inadequately paid; and this deplorable, but I think undeniable fact, arises from a fundamental misconception of its importanse. The Canadian people does not know what advantages flow from applied geological research, and, largely for this reason, it does not care. I suggest that here is a direction in which the Canadian Mining Institute can do useful work. We should fully consider the work of the Geological Survey and should present to the Government a memorandum of how we conceive its usefulness can be maintained and enlarged, and then back our recommendations by the entire influence of the Institute. Certain steps have already been taken and these steps should be supplemented to the fullest possible extent. Unless we ask for what we want, and ask plainly and urgently, we shall go wanting.

Canada is not a country where wealth is easily gained, but it is a country not yet fully known, not half-prospected where in the past sincere work has almost always reaped a satisfying reward. What we, and our children, will get out of Canada will be in exact measure to what we put into Canada in the way of brains and work. We have great national wealth, but none to waste. We have problems and limitations, but, if these are properly tackled we can lead the world in many things. Only, we must give up talking thoughtlessly of our "boundless" natural resources, and prepare, by fostering science and encouraging scientific workers, to get the best out of our country, which may well prove to be something that will not only pleasantly surprise ourselves, but more favored nations also.

Further, our problems should be studied in the light of what has been accomplished in other countries, and this should not be left to that small proportions of our people that can afford out of their resources and time to go abroad

MINERAL STATISTICS.

Mr. John Mc.Leish, Chief of the Department of Mineral Statistics, Department of Mines, Ottawa, read an abstract from the Preliminary Report of the Mineral Production of 1919. An abstract, and commentary on 1919 production, was published in the "Canadian Mining Journal" of the last issue. (vide No. 10, vol. XLI, page 189.) Mr. Mc.Leish pointed out the transitionary nature of 1919, and managed, as he always does, to make statistics interesting.

Mr. Theo. Denis, Superintendent of Mines for the Province of Quebec, was able to report that the mineral production of Quebec, "in the first after-war year, was the highest in history." Mr. Denis was felicitous in his presentation of Quebec's encouraging record, and while a more extended review of the Province's production may be reserved until a later time, the following abstract from the printed Report, contains all the necessary information. Mr. Denis's repeated warnings against fraudulent mining flotations are as commendable as they are necessary. An abstract follows:

MINERAL STATISTICS OF THE PROVINCE OF QUEBEC FOR THE YEAR 1919.

The mineral production of the Province of Quebec in 1919 reached a total value of $20,701,005. This is an increase of $1,993,243, as compared with the previous year when the value was $18,707,762. The proportional increase in 1919 over 1918 is then 10.7 per cent. Therefore the past year has been prosperous and it is gratifying to observe that as regards value of output, the Quebec mineral industry has not suffered during the dreaded period of transition and readjustment from war conditions to a more normal peace régime. The Province produces several of the so-called "war-minerals." such as molybdenite, chromite, magnesite, the mining of which received a strong impetus during the hostilities, and the armistice strongly reacted on the activities of these materials. But fortunately, the great majority of our mineral products have so far, been substances used in peace industries, such as asbestos, mica, and building materials. Therefore, while in 1919 we record decreases in some of the items, these were more than compensated by greater production in the others, with the result that figures of production for the first after-war year are the highest ever recorded.

The high proportional increases in value which each year has shown over the other since 1914, have in a measure, to be attributed to higher prices rather than to increases in tonnage, for the various items. The quantities have not grown at the same rate, and as an extreme example, of this state of things, we may quote our main product, asbestos, which in 1919 figures for an increase in value of 279 per cent as compared with 1914, while the tonnage has only increased 33 per cent in the same period.

It is to be particularly a matter of congratulation that during this difficult period of transition, so generally marked throughout the world by industrial and social unrest, the Province of Quebec has been comparatively free from serious troubles as regards undue exigencies of labour, and there have been no strikes on a large scale, such as paralyzed production in many other parts of the world. The cost of labour of course, has increased in keeping with the cost of living, but the demands have never been such that they could not be amicably and satisfactorily settled between employers and employes, without prejudice to the industries.

The progress of mining in the Province of Quebec in the last twenty years cannot be more graphically illustrated than by a table of the annual value of the products of the mineral industries.

MR. THEO. DENIS.
Supt. of Mines, Quebec.

Table of Value of Annual Mineral Production of Quebec from 1900 to 1919.

Year	Value	Year	Value
1900	$1,276,076	1910	$ 7,323,281
1901	2,997,731	1911	8,679,786
1902	2,985,463	1912	11,187,110
1903	2,772,762	1913	13,119,811
1904	3,023,568	1914	11,732,783
1905	3,750,300	1915	11,465,873
1906	5,019,932	1916	13,287,024
1907	5,391,368	1917	16,189,179
1908	5,458,998	1918	18,572,595
1909	5,552,062	1919	20,701,005

The Quebec Bureau of Mines has repeatedly issued warnings to the investing public to put them on their guard against buying shares and stock certificates of mining ventures organized for the sole purpose of attracting and entrapping the hard-earned savings in rural and urban communities. The last few years have been prosperous, savings accounts have grown appreciably, and these conditions have caused the reappearance of the professional promoter, with his flock of peddlers of beautifully engraved stock certificates.

As we have repeatedly stated before putting money in ventures of which he knows little personally, the investor should make thorough enquiries from reliable sources, as to the value of such enterprises and investigate and weigh the chances of success. The Quebec Bureau of Mines is at the disposal of the public for technical information regarding the mines and the mineral resources of the Province. An enquiry on such subjects, addressed to the Department of Colonization, Mines and Fisheries, Quebec will, as a rule, bring to the writer information which will enable him to go into it with a better knowledge of the facts.

MINERAL PRODUCTION IN ONTARIO.

Mr. T. W. Gibson, the Deputy Minister of Mines for Ontario dealt with the mineral production for 1919. He referred to the falling curve of silver production, but this he forecasted would be flatter and more prolonged than its phenonemal rise from 1905 to 1913.

Mr. Gibson mentioned that the increased price of silver had the effect of increasing the value of silver properties to an extent which, while not predictable, certainly would be equivalent to prolongation of the life of the mines in proportion to the amount of low-grade ore thereby made mineable.

Gold production was becoming more important, and Kirkland Lake was a field of established value.

With regard to natural gas, the tendency was to use it in the coarser industries, for which of course it was a most desirable fuel. Now that the supply was decreasing, the Government considered it proper to confine its use to domestic requirements. The task had been a difficult one to undertake, but public opinion had sustained the policy. The result of restricted use had of course been a smaller production, and this had increased the cost of unit production, which may necessitate an increased selling price, but the expectation of a longer life for the wells, and the necessity to conserve natural gas to help the general problem of domestic fuel and heating in Southern Ontario, would offset the disadvantages which an increase in price brings with it.

The extent of variety of Ontario's mineral production does not permit of a satisfying abstract at this time, but some of the outstanding features of the Report may be mentioned.

The total production of silver from the Ontario silver mines since the discovery at Cobalt in 1903 to the end of 1919, is 303,610,836 ozs. valued at $152,239,972. Mines shipping over half a million ozs. in 1919 are given in order as folows:

New developments during 1919 include the completion of the British-America Nickel Company's refinery at Deschenes, near Ottawa, and the new smelter of this Company at Nickelton. Radium-bearing minerals have been found in encouraging quantity near Maberly. The production of soda ash at Amherstburg by the Brunner Mond, Canada, Ltd., is a development of 1919, and its importance is properly emphasised in the Report.

Status of the Engineer.

Mr. James McEvoy of Toronto had consented to open a discussion on this question, and gave a summary what had been accomplished. In part, Mr. McEvoy said:

During the early years of the Institute efforts were made in some of the provinces to pass legislation regulating the practice of engineering of all kinds, but representations made on behalf of the Institute had caused such legislation either to be withdrawn or to have omitted from its scope the direction of mining operations.

The Quebec Act of 1898 specified the character of engineers' work, and provided that no person except a member of the Canadian Society of Civil Engineers could act as engineer within the definition of the Act, and the Act was amended this year to make the provisions apply to any person not a member of a corporation of engineers.

This Act creates practically a close corporation, but the mining engineer is not specifically designated, and the terms of the definition are loose. As far as can be learned the Act is not enforced.

A little over a year ago the Engineering Institute of Canada called a Committee together in Montreal representing each of the provinces to prepare a bill which might be used as basis of legislation in each province and thereby secure some degree of uniformity. The Committee reported and a model act was published in the E. I. C. Journal.

MR. T. W. GIBSON
Deputy Minister of Mines, Ontario.

In Ontario the bill has received earnest and full consideration by the E. I. C. members in Ontario. So far as the C. M. I. is concerned the bill has been discussed by individual members and some of the branches have objected to certain of its provisions. As yet, however, the C. M. I., as a whole, has not decided on any policy in the matter nor has it, so far as the ordinary member knows even considered it at all.

The Joint Committee of Technical Organizations in Ontario has also submitted a model bill, which is a distinctly popular bill, inasmuch, as it sugests the governance of the different branches of engineers under a board of engineers of each class, the whole being under a government department. In this respect the bill is different to the plan of the E. I. C. model, which is more properly of the close corporation type.

A Committee consisting of two representatives from each of the professional organizations in Ontario, namely, the E. I. C., C. M. I., and the organizations of the architects mechanical and chemical engineers, is to convene in Toronto next week to consider the question of engineering legislation.

A study of professional organizations has been made by Sydney & Beatrice Webb, and printed in the Engineering News Record, which shows variations in them ranging from a typical trades union organization to the type that considers only the ethical side of the professions.

This Report makes some definite recommendations, namely:

a. It is undesirable that the government of a profession should be exclusively and autocratically by a lay authority.

With all this we shall agree.

b. It is undesirable to give to professional organizations undivided control over the conditions of entry to the profession, powers of expulsion, etc. What is required is a composite authority.

This Report does not offer any complete solution of the problem, but says finally:

'The only inference we can draw is that the constitution of any professional council, whether statutory or voluntary must necessarily be complicated, ought always to be elastic, and will need to be perpetually revised."

Some general facts to bear in mind are:

Engineers include employing engineers and employed engineers, whose views are unlikely to coincide.

In all professional organizations there are groups of older men, ranking high in the profession, and younger men, who may be called the rank and file. Differences of opinion arise here.

There is a tendency in professional organizations to develop groups having special interests and at a certain stage to split up into separate organizations, possibly leading to disintegration of the parent body.

Is legislation for the engineer to be for self interest, or for service? Should our attitude be: "What is there in this for me?" or, "Will this be of public service?."

Having endeavoured to outline some phases of the question without having personal bias, Mr. McEvoy submitted his own views, as follows:

a. It is yet an open question whether or not we need any legislation for mining engineers. We must bear in mind that if we do not legislate for ourselves someone will legislate for us, unless we are perpetualy armed against outside legislation.

b. That legislation which may be suitable for other branches of engineering may not, in fact is not, at all alike to satisfy the needs of the mining profession or the mining industry. Special provisions for the government of mining engineers is essential, whether this be afforded by special clauses in one all-embracing Act, or by means of a separate ancillary Act.

Third: There is grave danger to the mining industry if legislation of too exclusive a character is enacted. It ought to be freely admitted that the owner of a property can engage any one he likes to tell him what he thinks of it, and how it should be worked. If the foreign capitalist cannot freely send his own man in whose judgment he has confidence to advise him about investment, then without doubt the development of our resources will suffer.

Fourth: That not only for the good to the public, but also for the welfare of the members of the profession itself, it is not desirable to have the profession a close corporation. This may appear to be a debatable point, but while I am open to conviction it is the opinion I now hold after a good deal of thought on the subject.

Fifth: That the Administration or Government of the profession should be carried out with the assistance and advice of members of good standing.

Sixth: It is very doubtful whether in any legislative Act a satisfactory definition exists of what work is legally termed mining, engineering.

In conclusion, Mr. McEvoy said the Engineering Institute of Canada had a definite policy regarding legislation. The unwritten policy of the C.M.I., he gathered, was against legislation. He thought the opinion of the individual members should be expressed, and suggested the appointment of a committee of the Institute, representing all provinces, charged with the duty of following the question to a finality, so that the attitude of the Institute towards legislation could be defined.

The President stated that a Committee had been during the year appointed by the Council to scrutinise all legislation affecting the status of the engineer, and vested with authority to notify any persons moving to effect close corporation legislation that the Institute could not be a party to such legislation, and authority was also given to a member in each province to attend the Legislature to oppose any legislation in which the interests of the Canadian Mining Institute had not been considered.

Professor Haultain said that if he had understood Mr. Mc.Evoy to state that the E. I. C. had appointed a Committee with authority to seek legislation defining the legal status of engineers, Mr. McEvoy was wrongly informed. Apparently Mr. McEvoy's point was that the E. I. C. had a definite policy towards legislation, but the C. M. I. had not yet defined its point of view.

Lunch time had been reached, and unfortunately no discussion of Mr. Mc.Evoy's pro and con recapitulation of the subject followed. The matter was not again reached during the continuance of the meeting, but it is to be hoped that the publication of Mr. Mc.-Evoy's paper in the Bulletin will lead to steps being taken to define the feeling of the members either for or against legislative enactments defining the status of the engineer.

MR. JAMES MC. EVOY.
Toronto.

AFTERNOON SESSION, MONDAY 8th.

Mr. C. E. C. Smith in the Chair.

Reports of Committees.

Committee on Education. Dr. W. L. Goodwin reported progress by the Committee on Education appointed two years ago by the Institute. He was present at the Winnipeg Conference on Education (see C. M. J. issue Aug. 6th 1919, page 581), and the fact that the recommendations which the Committee had previously formulated were identical with the recommendations decided upon by this great conference was a compliment to the idealism of Mr. Corless who first brought this matter to the attention of the Institute, and an indication that we were in the van of progress. Dr. Goodwin asked that his remarks be taken as a report of progress, and moved that the Committee be continued for another year, which was agreed to.

A number of papers of interest to the Iron and Steel Section had been arranged for, but unfortunately none of them were given at the meeting. Mr. G. C. Mackenzie's paper on "Ferro-Alloys in Canada, was looked forward to, but at the last moment Mr. Mackenzie was unable to get to Toronto. Two papers on the Plate Mill of the Dominion Iron and Steel Company at Sidney were in course of preparation, but were not finished in time for presentation. It is expected these papers will be read at the Annual Meeting of the Mining Society of Nova Scotia at Glace Bay in May next, and will appear duly in the Transactions of the Institute. Mr. F. E. Lucas's paper is also expected at the Glace Bay Meeting, and deals with "Economies in Steel Plants".

MR. CYRIL KNIGHT, Toronto.
To whose work as Local Secretary much of the success of the Meeting was due.

Molybdenite in the Ottawa Valley.

Dr. M. E. Wilson described with the aid of lantern slides the occurrences of molybdenite in the Ottawa Valley. From an economic point the work so far done, and the extent of the deposits as revealed by actual mining, show that there would be steady work for a number of mills for many years should the market price of the mineral allow profitable operation of the known deposits.

The Iron Ranges of the Michipicoten District, Ont.

Mr. W. H. Collins, of the Geological Survey, spoke on the iron ranges, and gold occurrences of the Michipicoten District and the vicinity of Goudreau. An abstract of Mr. Collin's report on the work done by the Survey in this region was contained in the "Journal" of 25th February (see page 156).

The most interesting portion of Mr. Collin's remarks was his description of the attempt made to establish a definite stratigraphic succession within the Keewatin complex of the rocks immediately associated with the iron ranges. The general succession of basic volcanics, banded silica, pyrite, siderite and acid tuffs, in the order given was found to apply to the Michipicoten District. If the top and bottom of the known ranges could be determined, then this succession could be used to guide with some accuracy the course of future exploration.

The faults encoutered had a tendency which in nine cases out of ten was to the left, and displacements of 6,000 feet of horizontal throw were frequent.

With regard to the Houldsworth pyrite deposit, about 900,000 tons of high grade pyrite were under development, and Mr. Collins suggested the possibility of further deposits of this kind being discovered.

Dr. Goodwin mentioned that in 1912 he was summering in the Magpie District, and had at that time noticed the difference of texture on the rocks on the upper and lower contact of the iron formation, and was able to confirm from his recollection some of the features brought out by Mr. Collins.

In answer to Mr. Bradley Stoughton, who asked whether the ore could be used without concentration Mr. Collins said that Mr. Cowie of the Algoma Steel Corporation was present, and could give exact information. The siderite runs about 35 per cent iron, and by roasting it can be raised to 51 per cent iron. The ore is almost self-fluxing.

Mr. Cowie said that after driving off the sulphur, the roasted ore contained from 50 to 52 per cent iron, and the manganese content was increased up to as high as 3 per cent. At the Helen Mine, there was an immense deposit and the next generation would still be mining siderite. There was 150 million tons, and all that was required was a bounty to enable it to be opened up.

Work of Mining Organizations in the United States.

Major Percy Barbour, Assistant Secretary of the A. I. M. & M. E. said that during 1919 the American Institute had done a great deal of work of a non-technical character, but no really outstanding mining undertaking had been in progress during that year. The feature of the year had been the activity of the Institute in important public matters, and the Charter of the Institute had been amended to permit of this being done.

The year began with strikes. The mining executive's work had been increased, but the results had been disappointing because of the lessened production and general inefficiency, and he had not been given credit for his greater responsibility and increased worries.

He described how at the Miami Copper Company the industrial troubles had been straightened out by bringing in the workmen and mine foremen into consultation.

The return of the soldiers had presented a great problem, and the four national technical societies had co-operated with great success in solving the problem. Twenty thousand engineers has been put into touch with positions in 1919.

The interest of the mining industry had been watched in connection with such matters as the Mineral Relief Act and mines taxation. In connection with taxation the Institute had assisted the U. S. Government by request.

With regard to the licensing of engineers, Mr. Barbour said the mining engineers did not care whether civil engineers license themselves up the front and down the back, but they ask to be let alone. There were 48 states in the Union, and if a consulting mining engineer had to take out a license in each state, and conform with as many different notions of what constituted the status of the engineer, they might as well go out of the business. Examples of freak legislation were Oregon and Colorado, but the representations of the A. M. I. E. had been successful in opposition. The whole business originated in a difference of opinion between the structural engineers and the architects.

In connection with relief to gold miners, much had been said and written, but nothing accomplished. Most people who had tackled the problem forget that the law of supply and demand is about as immutable as the law of gravitation.

Mr. Corless's paper on "Industrial Democracy and Education" had attracted a great deal of attention, and there had been a widespread demand for copies of the paper. It was a classic. For the first time, the mining engineer has branched out and assumed an important place in literature. Mr. W. R. Ingall's paper in "Industrial Co-operation" has also been widely read.

In connection with the bituminous coal problem, the Institute had recently held an open forum, and good results were anticipated from the concentration of some of the best informed men in the country upon this important question.

In conclusion, Mr. Barbour said the selection of Herbert Hoover as President of the Institute had aroused great hopes for the future.

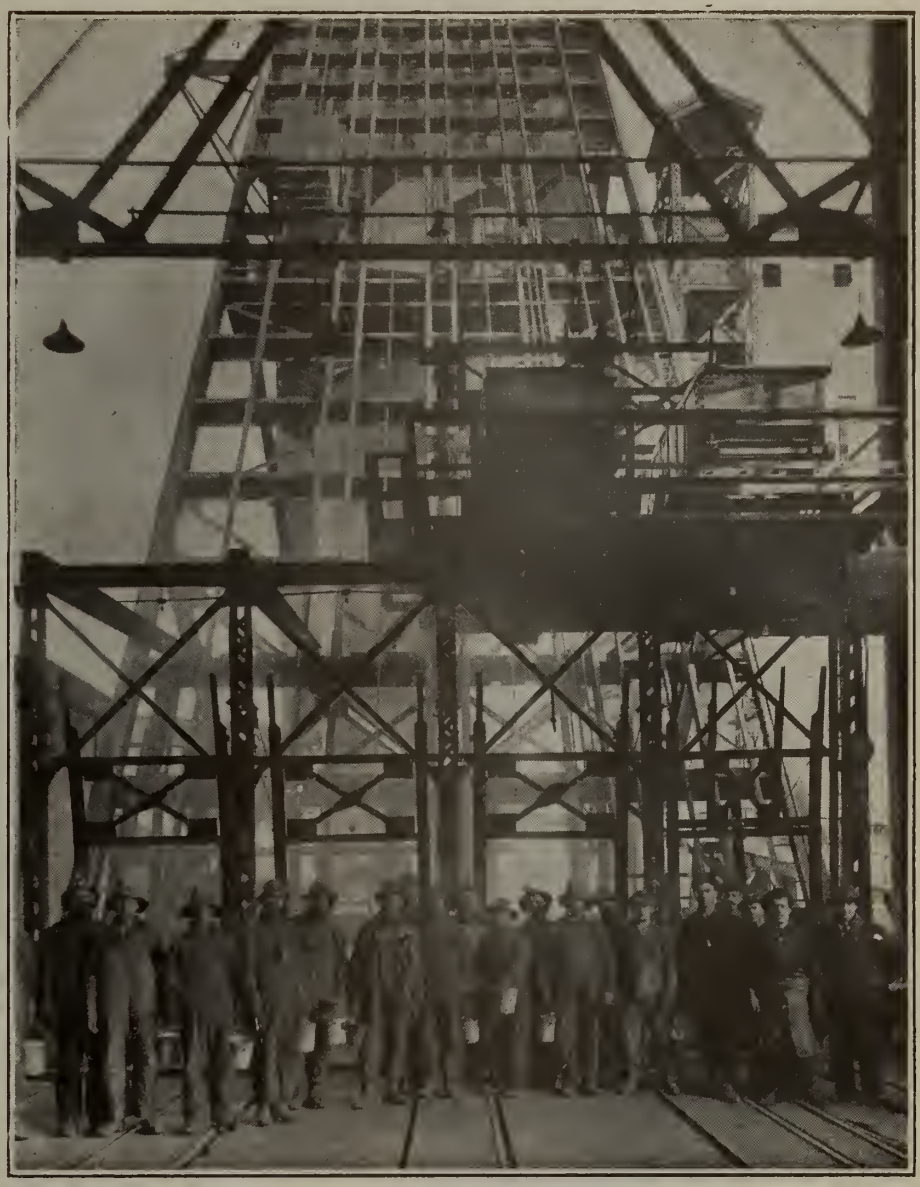
MR. C. V. CORLESS.

MR. J. L. AGNEW.
Vice-President International Nickel Co.

EVENING SESSION, Monday 8th

The Creighton Mine of the International Nickel Company at Sudbury.

In the evening, Mr. J. C. Nichols, General Superintendent of the Mining and Smelting Division of the International Nickel Company, described with the aid of the lantern the operations at the Creighton Mine, and at the Smelter at Copper Cliff. Unfortunately, owing to the use of the lantern it was not possible to make extended notes, but Mr. Nichols had an intensely interested audience. A notable feature was the description of the underground loading plant and crusher. The exposition of the mining system was very lucid, and an excellent idea was given by Mr. Nichols of the extent and shape of the ore body. All but about two percent of the ore was obtained in the different stages of extraction. The hoist and underground loading arrangement, which ensured a steady and equable load for the skips, handled 2800 tons in eight hours. The arrangements for the comfort of the men underground included water-bubblers for drinking purposes, and appeared to be as complete as those on the surface. The "Journal" of February 13th contained a full description of the International Nickel Company's operations by Mr. W. L. Wotherspoon (see page 118), in which issue there is also contained a diagrammatic section of the Creighton Mine, and some views of the Port Colborne Refinery. Additional views are contained in this issue.



Waiting at the Collar of the Creighton Shaft.

Mr. Nichols mentioned that at the smelter, pulverised coal had been used for nine years, without any trouble, notwithstanding that coal containing 13 per cent ash had been used.

The Alfred Peat Bog.

Mr. A. A. Cole, whose abilities as a photographer are well known, showed lantern slides and moving pictures of the Alfred Peat Bog, and synopsised the work accomplished by the Peat Committee, which included Messrs. R. A. Ross of Montreal and B. F. Haanel of Ottawa, on behalf of the Federal Government, and Messrs. R. C. Harris of Toronto, and Mr. Cole, representing the Ontario Government, assisted by Mr. E. V. Moore of Montreal who acted as Engineer to the Committee. The process adopted consists of excavation, maceration and spreading. Maceration appears to contain the solution of the problem, and the final product, after drying and curing in the sun, contains 25 per cent moisture.

The Anrep Plant, which includes an excavator, mounted on caterpillars, a macerator and spreader, was first experimented with, and later a modification of this equipment, with which the name of Mr. Moore is coupled, was evolved. This plant is identical with the Anrep Plant, except in the spreading process. The mechanical processes have been further perfected in the Moore Plant which requires only seven men to operate it, against 13 to 15 in the original Anrep design.

The work done has been on the Alfred Bog between Ottawa and Montreal. The season has a length of from 100 to 120 days. Peat is being sold f.o.b. cars Alfred Station at $3.50 per ton, which allows for the reasonable commercial profit, after deduction of 10 per cent

depreciation and an 10 per cent amortization allowance.

Mr. Cole states: "A ready market is obtainable in Ottawa and Montreal for the product of many such machines as those built for the Peat Committe. It is not supposed that peat fuel will entirely replace coal, even where most plentiful but for certain special uses it has advantages over coal and if used for these purposes will materially help the fuel situation.

Peat can be used to advantage for open grates and in cooking ranges but is not recommended for furnace use except in the fall and spring when light fires are needed or in conjunction with coal when a coal fire has to be hurried.

The programme laid out for the coming season is to work both plants to capacity marketing the product and showing thereby what can be done on a commercial basis. It is also proposed to test out a small three man machine which is now being built and which we hope will make available a great many small bogs of comparatively shallow depth throughout Ontario and Quebec that would be too small to endeavour to work with the larger machines.

It will be gathered that Mr. Cole's communication is of a most important character, indeed, one of the most important and far-reaching of recent meetings.

MR. A. A. COLE.
A Past President.

Mr. R. C. Wallace, who was to have presented some aspects of the mining situation in the middle West, was unable to be present, a fact that was much regretted, as the members would have liked to hear something about the new discoveries in Northern Manitoba.

After Mr. Cole had spoken the members called it a day, and some did not.

Mention should not be omitted of the Ladies' Tea and Reception in the Hotel in the afternoon. There was then observable that social distinction and bearing, and that *joie de vivre* that sits so gracefully upon certain of our members. The attendance at this function greatly exceeded the attendance at any other event during the meeting.

TUESDAY MORNING, 9th MARCH.

Chairman, Mr. O. E. S. Whiteside.

Formation of Proposed Coal Section.

This question was laid over for further consideration by the incoming Council.

In the absence of Mr. J. T. Stirling, a paper on "Coal Mining Industry in the Province of Alberta" was summarised by Mr. McEvoy.

The main points in Mr. Stirling's paper were as follows:

The coal deposits of Alberta are conservatively estimated to contain 1,059,976 million tons. The existing mines have a producing capacity which is twice the present coal requirements of the district they serve.

The growth of the coal production of the West is shown by the following figures of production:

	Tons.
Total North West Territories, 1901	346,649
Alberta, only, 1918	6,148,620
Alberta, only, 1919	5,022,412

In 1919, there was imported from the United States into Canada, into territory which should undoubtedly be supplied with Canadian-mined coal, a tonnage of 2½ million tons.

The possible present market for coal in Alberta and Saskatchewan is from 7,500,000 to 8,000,000 tons per year.

In December 1919, Alberta alone produced 780,832 tons, so that an output of 9,000,000 tons of coal per year is possible in Alberta with the present supply of labour and the existing mine development.

The prejudice against the use of Canadian coal is disappearing, and in a few years the western mines will supply the territory as far east as Fort William.

To hold the Canadian market proper attention must be paid to preparation. Dirty coal must be avoided. Low grades coals have been sent for long distances incurring heavy freight charges, which is not advisable, and arrangements should be made to give the customer authentic information as to quality and moisture content so that the distances to which coal is forwarded may answer to some extent to its quality.

The following figures show the difference between costs of production under conditions of maximum output in months of good demand, and insufficient demand in Spring and Summer.

	Tons mined	Cost	Being per ton
Year 1919	2,395,290	$6,126,120	$2.55
December, 1919	451,016	1.031,112	2.28
April 1919	85,478	308,025	3.60

The intermittent operation of collieries increases costs, and the mines must operate more steadily, or, in other words, the market must be enlarged, or the production must be reduced to fit the market.

The average annual production per mine during 1918 in Alberta, compared with British Columbia and Nova Scotia is given below:

	Tons.
British Columbia	92,106
Nova Scotia	89,516
Alberta	19,936

In Alberta under existing conditions, five times as many plants, offices, and staffs of officials are required for the same production as in the other coal-mining provinces.

Since 1905 there have been opened in Alberta 600 mines, of which only 276 are in operation, meaning that 324 mines, or 64 per cent of the mines, have been abandoned.

During this same period 100,448,038 tons of coal in the ground were affected by mining operations, of which, 47,227,498 tons is estimated to have been extracted, leaving 53,356,540 tons developed, probably not more than half is recoverable. This indicates a loss of coal through improper mining of 26,629,000 tons in less than 15 years.

Since 1903 there has been expended in mining $39,110,775 of which $9,813,500 tons, or twenty-six per cent has been invested in mines completely abandoned.

Of 324 mines abandoned since 1905, only three were so abandoned because the available coal had been extracted.

We may look forward to the time when Canadian mines will supply all the fuel required in Alberta, Saskatchewan and Manitoba.

Canada's Coal Supply.

Following Mr. Sterling's paper, Mr. F. W. Gray read a paper on "Canada's Coal Suply", which will be found elsewhere in this issue.

Lignite in Saskatchewan.

Mr. A. Mc Lean, assisted by lantern slides, described the occurrence and mining of lignites in the district around Estevan, Bienfait and Roche Percee. (See the Geological Survey Report on the Wood Mountain, Willow Bunch areas). Mr. Mc. Lean showed some very nice slides descriptive of the difficulty of determining the horizons in this district. Only comparatively few of the seams have as yet been worked.

Mr. Mc. Lean specially described the mine of the Western Dominion Colieries at Taylorton. This is a shaft mine, with modern equipment, including self-dumping cages, trolley haulages underground, and electric coal-cutters, making a six foot cut. No gas is found in this mine, or generally in the district. Reference was made by a speaker to the unsuitability of box-car loaders of the loading-arm type for the friable lignite, and mentioned that loaders of the cradle type had been found more suitable. The lignite production in 1919 was about 250,000 tons, and in view of the large amount of lignite available for mining, compared with the coal requirements of Saskatchewan, which are approximately 1,500,000 tons annually, it will be seen that a large market is available for the lignites, particularly if a successful briquetting industry is established.

Principles and Practice of Fuel Briquetting.

Mr. Edgar Stansfield, of the Mines Branch at Ottawa, opportunely followed Mr. Mc.Lean's paper by one of the most lucid and comprehensive accounts of the present attainments of the fuel briquetting industry ever given to the Institute.

Mr. Stansfield said that with other gentlemen appointed for the purpose he had visited numerous briquetting plants both in the United States and Europe, and had had many interesting experiences seeing that the work of visiting was commenced on November 11th 1918.

Generally speaking, Mr. Stansfield thought that the failures experienced in briquetting trials in this country had been due to attempting to transplant European methods without regard to the essential differences and the economic factors. There is no royal road to briquetting, and the perfect briquette has not yet been attained. Many difficulties still remain to be overcome, and Mr. Stansfield said the problem involved an infinite number of variables.

Some of the main facts brought out by Mr. Stansfield are as follows:

There are two general types of briquetting plants, namely, those using a hard binder, and those using a liquid or molten binder.

European briquets are of all sizes, up to briquets that are a comfortable load for one man. American briquets have a maximum weight of probably 13 to 14 ozs.. and are generally much smaller. The industry now growing up on this side the water is an American industry.

Desirable characteristics of a briquet should include suitable size without friable corners, should be strong and clean to handle, weather-proof and not affected by rain or frost. not unduly soft in the heat of the sun, and should be good fuel.

As an instance of the small things that influenced briquet making, Mr. Stansfield mentioned a case which occurred in the trials at Ottawa, where one binder had been tried with many failures, but on one occasion a perfectly suitable binder had been made. The raw materials and proportions of this binder were known, but it had not been found possible to repeat the successful result.

With regard to the raw materials used in briqueting, anthracite was the best known example. A large quantity of fines was made in preparing anthracite for market.

It was not usually found necessary to briquet bituminous coal.

Lignite required carbonizing before briquetting, and samples of lignite briquets were displayed by the speaker.

There had been many attempts to briquet coke breeze, and it was usually mixed with bituminous coal. Coke breeze was an abrasive and wore down the briquetting machines rapidly. Charcoal had also been briquetted.

The nature of the material to be briquetted made a great difference to the process. For example, the briquetting of anthracite meant the consolidation of a number of particles of a hard and solid material, but coke was porous, not strong in structure, and drunk up the binder greedily.

Binders.

The number of binders is legion, but the number actually employed is small. Asphalt from oil refineries, and coal tar as among the best materials. Sulphide pitch is a nice binder, but is not cheap, as it contains much water which must be removed, and is of course not a waterproof binder. It must be baked to make it waterproof.

The admixture of a dry binder with the crushed coal is good practice, but when coal comes hot from the carbonizer it is difficult to mix a dry binder that softens with heat.

The speaker said he had concluded from his observations that briquetting was an infant industry, and is not yet standardized as to practice.

The carbo-coal briquet is a good one, but the process of manufacture is quite complicated. Bituminous coal is mainly used, and the object is to get a large yield of tar oils. The coal is carbonized at a low temperature. The coke resulting is mixed with the pitch obtained at a later stage in the process. The briquets are then baked in an oven at a temperature corresponding to the nature of the use to which the briquets are to be put. This makes a very pretty dense briquet, which is a smokeless fuel. The people who make this briquet have a large experimental plant at Irvington, N. J., and one at Clinchfield. Referring to Mr. Gray's paper, a plant of this description at Montreal, treating Nova Scotia coal would give us a fine home-made substitute for anthracite.

Types of Plants Now Working.

Plants at or near coal mines, owned by the coal operators. Plants between the mine and the shipping point. The coal comes from the mine and is screened. Screenings are briquetted. Plants at or near mines, operated by interests independent of the mines, and buying for briquetting purposes the coal from a number of mines. In one case of this kind, washery refuse is sent down by flumes to a briquetting plant. It is hoped that such a central plant of this kind will include the plant of the Lignite Briquetting Company at Edmonton. Another type of plant is found at points of transhipment, where coal is screened. A plant of this kind is a possibility in Canada, should the system of storing anthracite suggested in Mr. Gray's paper be adopted. The fines screened out of transhipped coal, which has already been screened at the mine contains a much smaller percentage of ash than the mine screenings. Screenings from screened lump coal will average about 20 per cent less ash than the mine screenings.

Mr. Payne, of the American Mining Congress, advised the thorough going utilisation of low grade fuels. He mentioned the discussion at the A. M. I. E. meeting in Chicago last September, when the suitability of coals containing more sulphur than it has been customary to specify for gas coals was pointed out. Their utilisation is only a question of additional purifying capacity at the gas-plants.

The morning session was ended, as the time had expired, and the further reading and discussion of the papers on fuel was left until the afternoon.

Complimentary Luncheon by the City of Toronto.

At the noon hour the Institute members were the guests of the Mayor and the City Corporation of Toronto. The Mayor asked the consideration of the mining industry in affording all possible employment for returned soldiers, and gave particulars of the fine record of enlistments held by Toronto. Speeches were made by Dean Adams of Mc.Gill University, by Mr. Bradley Stoughton, Secretary of the American Institute, and by the President. Mr. Stoughton amusingly contrasted the summerlike aspect of Toronto with the sub-Arctic condition of New York and Boston. He congratulated Toronto on its Mayor and feelingly deplored the lack of a similarly good man in other cities. He mentioned the over-shadowing calamity occasioned by the 18th Amendment to the U. S. Constitution, and said that in New York they used to have both optimists and pessimists, but now only optimists were left. "The pessimists are dead."

The President thanked the Mayor for the especial manner in which the Institute had been marked out for distinction in Toronto, which he said had been so unusual as almost to embarrass the individual members, who felt, however, that the compliment paid was to the responsible status reached by the Institute as the spokesman and representative of the mining and metallurgical industries of Canada.

DEAN F. A. ADAMS.
McGill University.

AFTERNON SESSION, 9th MARCH, 1920.

Mr. M. A. Mc. Innis, of the Lackawana & Mc.Crory Coal Company, Montreal, and formerly a Superintendent of the Dominion Coal Company in Cape Breton, gave a paper on:

Coal Transportation.

An abstract of this paper is as follows:

At our present rate of importation of anthracite and bituminous coal from the United States totalling 22,000,000 tons annually, or 60,000 tons daily, we shall have from time to time to deal with abnormal conditions, and for these, and for the ordinary increase in population and consequent increased coal consumption, we should be prepared.

In 1919 Canada consumed 35,000,000 tons of coal, or about 4½ tons per capita. When our population reaches 10,000,000, which may be expected by about 1925, consumption will have increased by 9,000,000 tons, to a total of 44,000,000 tons., which, unless our home production can be increased in the meantime, means that by 1925 we shall have to import 27,000,000 tons, or 74,000 tons daily. Of our total imports 42 per cent is water-borne, 46 per cent rail-borne, and 12 per cent comes by car-ferries.

For handling our water traffic we have at present available the following plants:

	Plants	Storage Capacity	Discharging Rate Per Hour
On St. Lawrence River	44	1.750,000	7,800
On Lake Ontario	9	29,000	240
Lake Erie	3	5,500	300
Huron and Georgian Bay	52	815,000	4,800
Superior	11	2,800,000	3,600
Sault Ste. Marie	4	715,000	1,400
		6,114,500	18,140

The 12 per cent of the imports handled by ferries to two points on Lake Ontario and four on Lake Erie amounts to about 2,600,000 tons yearly.

British Columbia, Saskatchewan and Alberta do not need to import fuel, and the matter of transportation in these three provinces need not concern us.

In Manitoba, although about 1,500 miles distant from the mines, the water haul of 800 miles with a low freight rate keeps the price of coal in Winnipeg within $1.50 per ton of the price in Quebec and Ontario.

Our greatest difficulty in importing coal by rail occurs at what is known as the Niagara Gateway. Canadian roads at this point are unable to accept freight at the speed and in the quantity offered by the American roads. Ontario points must take more coal by water, and adequate unloading and storage facilities must be developed to allow this to be done.

Importation of coal into Eastern Ontario and Quebec has but seasonable difficulties. Ample transportation facilities exist for the importation of both American and Nova Scotia coal into this territory.

The Maritime Provinces have no difficulty in providing themselves with coal.

The coal trade of Nova Scotia advanced in the early nineties in exact proportion as the transportation facilities of the St. Lawrence improved. With steamers of 30 ft. draft and 10,000 tons capacity coal could be landed in Montreal for 50 cents a ton freight. As the transportation and handling facilities were improved the coal importations from Nova Scotia to St. Lawrence ports improved. The market was there in every case, and the coal was in Nova Scotia. **Transportation was the weak link in the chain.**

Storage of coal in the Summer months has in the case of anthracite been assisted by the differential price between Summer purchases and Winter purchases, and the application of this principle to bituminous coal is urged.

Store coal early in different parts of the country, and it will diminish to a large extent the danger of coal famine, will avoid high prices caused by shortage, and, without laying an extra mile of track, it will increase the effectiveness of our existing transportation systems by giving them the bulk of coal to be carried when it can best be handled. The maximum service from coal cars will also be thus obtained, as they can be unloaded more quickly in Summer, and the tying up of railway yards and junctions by congestion of unloaded cars would be avoided.

No discussion folowed the reading of Mr. Mc.Innis's paper, which perhaps is explainable by the fact that most of the members interested in coal matters had been called to a meeting of the Sub-Committee on Mining and Metallurgy by the Hon. Advisory Council. There has rarely been presented to the Institute such a symposium of papers on the coal problem as those which were concluded by the reading of Mr. Mc.Inis's paper. These papers covered adequately the production of coal in the eastern and western mines of Canada, the use of the Saskatchewan lignites, the briquetting of coal and lignites, the national aspect of the subject and the transportation questions. Those who arranged this symposium anticipated a real discussion, such as was held in New York recently, and actually there was not a peep out of anyone. This circumstance cannot be regarded as less than disappointing.

Oil Papers.

Following the coal papers a number of papers were presented dealing with oil in Canada.

Dr. M. Y. Wiliams spoke regarding the future prospects for oil and gas production in Ontario, and showed a number of lantern slides of Ontario oil wells. After describing the well-known fields in South-Western Ontario, Dr. Williams made reference to his preliminary investigations in the search for oil in the slope of the James Bay District, and showed photographs of the country. He stated that privately conducted search for oil was being undertaken in this area. (A Report by Dr. Wiliams on the South-Western Oil Fields of Ontario will be found in the Summary Report of the Geological Survey for 1918, Part E.)

MR. D. B. DOWLING.
A Past President of the Institute.

Mr. Estlin's paper on Natural Gas in Ontario was not presented.

Oil Possibilities in Western Canada.

Dr. Dowling spoke on the above subject, illustrating his remarks by a series of coloured and relief lantern slides of much excellence. The "Canadian Mining Journal" hopes to have an opportunity of publishing Dr. Dowling's paper, as it is one which not only contains excellent information, but presents it in a lucid and understandable form. Dr. Dowling stated that oil was a result of low forms of marine life. It is found in rocks of older age in which the remains of life are not so discernible or traceable, but it is found in greater quantity in those later rocks in which we find more evident and numerous traces of life, particularly in rocks of Tertiary Age, which, Dr. Dowling suggested would appear to indicate that life had been increasing in abundance upon the earth. By a process of elimination Dr. Dowling showed on coloured slides those portions of North America where oil might be found, distinguishing between the older and newer strata with which the presence of oil is associated.

Dr. Dowling mentioned how in the West many oil wells had been spoiled by salt water by being bored through a strata which contained a moderate supply of oil, in the unrealized hope that deeper boring might produce a greater flow of oil. He suggested that some one well should be chosen to treat the presence of the deeper seated oil horizon, and that it was a pity to spoil a lot of wells now assured of a moderate supply.

Mr. A. P. Rowe, in discussing Dr. William's paper, said that so far as the evidence shown by the drill went it had showed the presence of oil in synclines.

Mr. Louis Simpson of Ottawa thought the Institute should press for the exemption of oil-drilling machinery from customs duties.

Mr. Gibson, who was in the Chair, said it was a pity Mr. Eugene Coste was not present as he was interested in the possibility which had been suggested of oil coming from pre-Cambrian sources. The reference was to an occurrence of oil in Southern Alberta, near the Rockies, where pre-Cambrian rocks have apparently been pushed over newer formations. Oil has been obtained from cracks in the pre-Cambrian rocks under these conditions.

This ended the proceedings on Tuesday afternoon.

THE SMOKER.

The smoker is best described as a "peach". The battery-commander was Lieut.-Col. Penhale, and when he called "Fire" his guns roared. A gentleman with a pleasingly rotund voice had reached the culminating point of "The Bandelero" when there was a regular movie smash of dishes and plates, and two colliding waiters were apparently thirsting for each other's blood. The audience was quite thoroly fooled, and not until the ring shoes and gloves were noticed did the spectators realise that the "Penhale has been up to one of his tricks". The mill was a good one, and singular-

ly enough no one remembered the singer until next morning. Eddie Holland was the raconteur of the evening, and gave a performance that was at once *amusant et risque*. One of the most pleasing numbers was the rendition of the "Marsellaise" by Mr. Denis, who covered himself with glory. In other phrase, "he done fine". The singing-sheet was good, and the enthusiasm of the singing-leader was so infectious that even Presbyterians were noticed yodelling.

Mention must not be omitted of the pianoforte solos by the Chairman's charming daughter.

WEDNESDAY MORNING, MARCH 10th. 1920.

The opening session of the last day of the meeting commenced with the reading of a short paper by Mr. G. R. Mickle, of the Provincial Mines Office, entitled "Expectations", which had been announced as the mystery paper of the meeting.

Mr. Mickle spoke of the two periods of mining development, namely, that of reaping and that of sowing, or the period of putting money into development, and the period of taking profit-yielding minerals out. He showed the curve of probability in each period, and instances in illustration the mines of Cobalt, now in the productive stage, and the mines of Porcupine, still in the development, or the "expectation" stage.

Following Mr. Mickle, Mr. J. A. Campbell, M.P. spoke at some length regarding the Government's attitude towards mining development.

Mr. Campbell's remarks chiefly had reference to conditions in Northern Manitoba. He gave an interesting account of the promising mines in Northern Manitoba, and explained the dire need of that district for railway communication. He refered to the extraordinary richness of the Mandy copper deposit, and its ability to stand the transportation and re-shipments charges to Trail B. C. for treatment. Mr. Campbell also spoke of the Flin-Flon mine, and indicated the probability of its sale to interests that would energetically develop the deposit, and would erect a smelter that would serve other mines in the district and generally help development.

The speaker dealt at length with the necessity to abolish the dual control of natural resources that now obtains in the Western Provinces. There should either be definitely vested in the provinces or in the federal government. The present uncertainty was hindering development.

Present Method of Teaming Mine Supplies in Northern Manitoba.

Dr. J. B. Porter of Mc.Gill University reported progress made by the Committee on Engineering Standardization, with especial reference to standardization in the mining industry. He asked for assistance in the Committee's work, and asked that members would communicate with him if they had any suggestions to bring about more complete standardization.

Mr. W. S. Landis read a paper on Canadian Cyanide, its Manufacture and Utilization.

Mr. Landis said that in the Autumn of 1916 the cyanide situation became so acute that a large mining corporation with headquarters in the United States interested the American Cyanamid Company in undertaking serious development work at the Cyanamid Plant at Niagara Falls, Canada, with the object of developing a process of producing cyanide from cyanamid. No operating plants or processes were found to exist that could be given consideration, and they were forced to commence at the fundamentals of the process. Plans were completed for the experimental installation at Niagara Falls, Canada, and the first units were put into operation about 1st January 1917.

Extensive tests of the Aero Brand cyanide were made in Mexico, and recoveries were found to be equal to those obtained from 98 per cent sodium cyanide. The brand had been in extended use in the silver districts of Ontario, with very successful results.

Mr. Landis said that today Canada possesses a cyanide manufacturing industry which within three years has so grown and expanded that it is supplying the bulk of the cyanide consumed in the mining and fumigating industries of the United States, and will shortly lead in the Canadian and Mexican fields. The proximity of the Ontario fields to the point of manufacture gives a favorable delivery service, and the Company confidently look forward to their brand of cyanide replacing the previously used and more expensive high-grade material.

MR. G. C. BATEMAN.
Who announced the coming development of the Flin-Flon Mine.

WEDNESDAY AFTERNOON, MARCH, 9th.

Quebec Asbestos Deposits.

Dr. Harvie, of the Geological Eurvey, described the geological characteristics of the Quebec asbestos occurrences. Mr. Theo. Denis and Capt. J. C. Ross discussed the probable depth of these deposits, and urged the speedy publication of Dr. Harvie's Report.

Nickel Coinage.

Mr. MacDonald of the International Nickel Company led the discussion on nickel coinage by a very convincing presentation of the physical and financial advantages that go with nickel coinage. Mr. MacDonald said the the press articles advocating nickel coinage in Canada had done so largely from the standpoint of national pride in our national metal, but while he did not minimise the usefulness of sentiment, he desired to set forth the very substantial advantages that nickel was intrinsically possessed of. The use of nickel in coinage dates back to 235 B.C. in Persia.

Following are some of the main points made by Mr. Macdonald:

Seventy-four countries have adopted some form of nickel coinage, and eleven countries have adopted pure nickel, namely, in the following order of date:

Switzerland, 1881; Austria, 1892; Italy, 1901; France, 1903; Serbia, 1906; Mexico, 1910.

Properties possessed by pure nickel are responsible for its constantly increasing use in coinage, among which may be named:

a. Stability of value of the metal.
b. Desirable appearance.
c. Resistance to wear, corrosion and oxidation.
d. Malleable and susceptible to the die.
e. Difficult to counterfeit.

Mr. MacDonald compared the qualities of nickel with cupro-nickel and other alloys, with bronze and aluminum, and with silver for coins of low intrinsic value. Aluminum is too light. Cobalt is too hard. Nickel-copper, after use, assumes a greenish cast which is displeasing. Appearance of bronze coins becomes unattractive in use, and if used as tokens for coins of higher value can be easily counterfeited because of ease with which metal can be worked. The wear is also considerable, amounting to about one per cent per annum.

The speaker quoted a table of figures showing resistance to abrasion established through experiments by the Swiss Government, giving nickel by far and away the lead in all suitable coinage metals.

Mr. MacDonald strongly urged the adoption of a five cent coin in place of the small and inconvenient coin of silver now used, and suggested the replacing also of the ten cent silver coin by one of pure nickel. The nickel 5c coin would be same size as the present silver 10c coin, and the 10c coin would be the size of the present U. S. nickel.

The seignorage of the Government would in this event be in excess of $500,000 per annum. If the present silver 5c coin was returned and nickel coinage substituted, the Government could recover silver which cost 70c an oz. and sell it at the present market rate. Should half the existing silver coinage represented by 5c and 10c pieces be so treated, a gain of one and one-third million dollars would result.

Mr. Corless, in response to an invitation by the Chairman to speak, said the matter had been entirely covered by Mr. MacDonald.

Dr. Coleman said he had advocated nickel coinage for many years, and would strongly suport any move that the Institute could make to have nickel substituted for silver in our two smaller coins.

Mr. Gibson said it was expedient and advisable for the Canadian Mining Institute to make some active move to assist the Government in its consideration of this question. Sentiment was not a negligible thing in national life, and he thought that the minting of nickel coin would strike a responsive note of pride throughout the country. The 5c. coin is entirely too small, and utterly inconvenient to handle, as those who had seen a lady fumbling in her purse with gloved hands for a 5c. piece on a cold day could realise. The coin should be of pure nickel. Nickel alloy becomes greasy and malodorous. To test this question, Mr. Gibson said he had for many years carried a few pure nickel and nickel alloy coins in his pocket. The nickel coins were as bright and attractive as when newly minted. The nickel alloy coins were dull and unsightly. He urged the passing of a resolution asking for pure nickel 5c and 10c coins.

Dr. Miller (who was in the Chair) read from the Hansard some remarks of the Finance Minister who held office when the Canadian Mint was established in 1901, and at that time the adoption of a nickel coinage was urged. The Minister of Finance said: "To a certain extent this desire for nickel coinage has been the outcome of legitimate national pride. No doubt this feeling has influenced the establishment of the Mint". Dr. Miller said: "The case is proved. What shall we do about it?

Mr. Gibson moved, and Mr. A. J. Young seconded the following motion:

"The Canadian Mining Institute desires to go on record, and would strongly recommend to the Dominion Government the advisability of introducing nickel coinage at the earliest possible date."

There was no dissent from the motion.

Mr. Macgregor said that a certain amount of educational work would be necessary, and that it was desirable that some member of the House would raise the question at this Session. He moved that "We request the Council to procure the assistance of some member of parliament to bring about a discussion on the question of nickel coinage at the present Session, and that the full powers be given to the Council to assist in any way possible. Dr. Porter seconded and the motion was carried. A further motion was made and adopted that a copy of Mr. MacDonald's paper would be forwarded to the Minister of Finance.

It may be mentioned that a very full exposition of the advisability of nickel coinage will be found in the description of the Mond Nickel Company's operations which was issued in 1918. This description contains reproductions of all the nickel coins in use throughout the world at that time.

The Lost Placers of Ontario.

Dr. Coleman said he has advocated nickel coinage old papers he found a little vial, and remembered where it had come from, and that brought to his mind the question of placers.

Placer mining usually preceded quartz-mining, with the exception of the Klondyke. Two other exceptions were South Africa and Ontario, which had never had a placer stage. Why these two exceptions? The reason in the deep-seated and fine grained deposits of South Africa was obvious. Why had we not placers in Ontario, where the gold is found free?

A good many years ago a placer was discovered in Ontario. It was at Vermillion Lake. Dr. Coleman said he had got a hundred colours in the pan, and had found a nugget worth four cents. Where did the gold come from. He thought it came from the North because the glaciers came from there. Porcupine is now a very imposing region. We have had over $100,000,000 of gold recovered or in sight. How much more was there originally? I think at least double that amount. We are half way down in the Archean at Porcupine. Thousands of feet of rock have been destroyed. How much above the present surface did these quartz veins extend? Maybe a

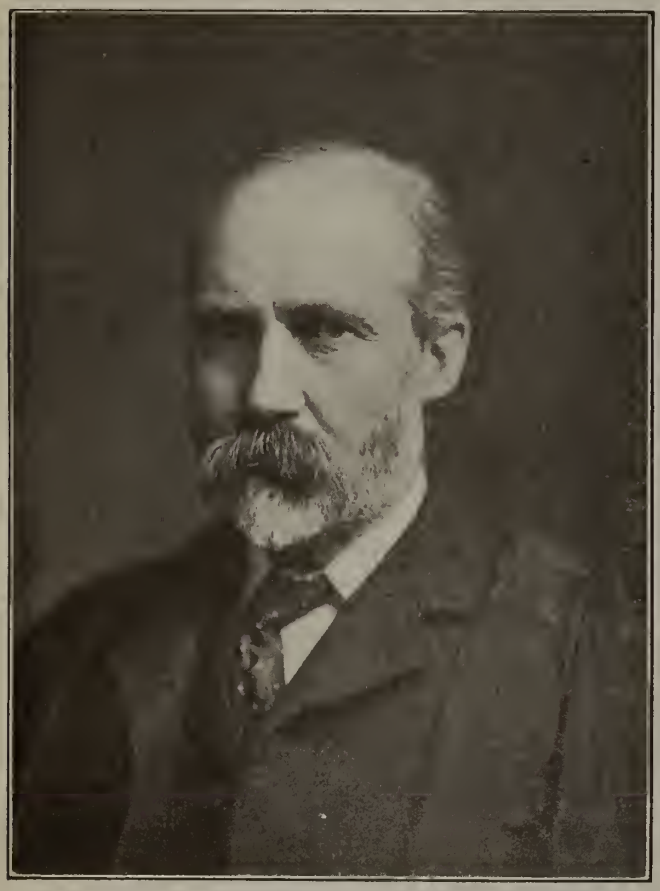
thousand feet. Were these upper veins as rich as those we know? Have we lost millions of gold by their destruction? Where did it go?

The highest point at which I got gold at Vermillion Lake was where the coarsest gold occurred, and it is 400 ft. above the present gold-bearing rocks of North Ontario. When did the weathering begin that set free the quartz deposits? Where did the rivers of that day flow? The placer deposits ought to be on the way to James Bay. About half of the Porcupine region is covered with drift, and as you go North the drift covers everything. There is a possibility of placers in the clay belt. There ought to be placers in the Paleozoic rocks of the Hudson Bay slopes. Is there any gold in the Cobalt conglomerates?

Mr. J. W. Evans said that in the old days when he prospected Vermillion they found that all the gold was in the first six inches of sand below the grass roots, and we wondered why. It was all in the red sand below the grass roots. No one went to bedrock.

Dr. Coleman did not think anyone ever went to bedrock.

Mr. Gibson asked why no suggestion was made of silver placers? Dr. Coleman said "Look for it under the clay."



DR. A. P. COLEMAN.

Dr. Miller said he once made an estimate of the erosion of Cobalt rocks, and said more had been eroded then since recovered.

In calling upon Major Mc. Millan to speak on this subject, Dr. Miller struck one of the key-notes of the meeting by refering to the number of members present who had been absent for the past four years. The presence of members returned safely from the war, and again busily ocupied in mining work, gave to the Toronto meeting almost a sense of elation, and Dr. Miller's remark was audibly appreciated.

Major McMillan presented the changes in the mining camps as he was impressed by them after three and a half years absence on overseas service, and compared the conditions of 1914-15 with those of 1920.

Developments in Cobalt traceable to increase price of silver. Has been an endeavour to increase mill capacity as mill-heads have decreased in value. This has been secured by much coarser grinding by stamps and the addition of tube-mills for re-grinding. Another factor has been increased recovery due to flotation. A minor factor has been the enhanced value of cobalt residues, making it profitable to mine cobalt ores, and to introduce tables to recover the residues.

Previous to the war, mechanical concentration at Cobalt gave a 75 per cent recovery from 20 oz. silver ores. Tube-mill re-grinding and cyaniding recovered from 10 to 15 per cent additional. In 1915, cyaniding bid fair to replace straight concentration, but flotation process made great progress in the meantime, and today is in use at Cobalt in mills with a daily capacity of some 1,600 tons. Re-treatment plants have since become general.

Progress in concentration is exemplified by a comparison of practice at the Coniagas mill in 1914 with that in 1920, as outlined by Mr. Reid.

1914. Straight concentration. 60 stamp mill treated 180 tons a day of 20 oz. ore plus high grade. Stamps crushed to 14 mesh; sand and slime tailings went direct to waste from concentrating tables carrying 4 to 5 ozs. silver.

1920. Concentration and flotation. 60 stamps treat 300 tons a day of 10 oz. ore. No high grade. Crush in stamps to 3 mesh and as coarse as 2 mesh. Table this product and re-grind the coarser than 100 mesh material in tube mills preparatory to treatment by flotation. One oz. tailing to waste.

Increasing value of Cobalt ores in the past ten years is shown by the following table of the value in ozs. per ton of the McKinley-Darragh heads.

1910	47.0	1915	17.2
1911	39.7	1916	14.8
1912	32.7	1917	13.4
1913	31.0	1918	12.9
1914	17.2	1919	11.8

Change produced in Cobalt camp is remarkable. From a camp with stopes of narrowest possible dimensions on high-grade veins, it has become one with workings comparable in size with those of any precious metal mines. Several mines contain stopes 20 to 40 feet in width. In the Coniagas, where formerly the widest stope was 15 feet, there are now two with a width exceeding 60 feet.

Extensive exploration has taken place in all the mines and drilling practice is much improved by introduction of drills of the Leyner type.

A number of properties considered to be worked out have been acquired by companies owning the largest mills, and a singular feature of the sales instanced by Major McMillan was that "in every case where the properties have been sampled this has been done by the vendors in order to determine whether they should accept the price offered." Major McMillan's statement caused some amusement.

The increased cost of wages was referred to and instances given, and it was mentioned that as a result of this mechanical haulages had been introduced, and electric storage batteries of various makes are in use on tracks of ordinary mine guage hauling 8 to 10 cars

Major McMillan suggested that the progress of mining and metallurgical practice in this camp during the past ten years was worthy of compilation for permanent record.

Full particulars were given of changes in underground practice at the Hollinger Mine, and refereuce was made to the introduction of the Armstrong shovel underground. The best performance to date has been 100 tons with 4 men in attendance. Large pieces of rock in the muck cause trouble, and sometimes the machine lifts the light track and at other times refuses to lift the piece of rock. It is believed that this machine can however be modified to suit the conditions.

At the McIntyre Porcupine the main shaft has a depth of 1550 feet, and the ores have consistently improved in depth so far as development has been reached.

The production record of the Dome was referred to as being previously unattained in gold-mining in Canada, being 7 tons daily for each employee underground, and the milling of 3 tons daily per employee. The methods used to secure the Dome's results include, adequate shaft and haulage ways, box-hole chutes 6 ft. in width at the angle of running muck, say 33 degrees; the use of 4 ton cars, holding 85 c. ft. on all developed levels; haulage by electric storage-battery locomotives; ore passes to the eighth level where the primary crusher is situated, hoisting from ore-pockets by means of 4-ton skips working in balance, and haulage from surface

bins to secondary crusher in 25-tons cars. Those who saw Mr. Nichol's description of the Creighton workings will recognize some similarity between the methods at that mine and at the Dome.

References were also made to the progress at Kirkland Lake, where in six mines some 300 men are employed, to Boston Creek, and to Gowganda silver mines. Major McMillan expressed some definite opinions as to mismanagement and waste of investors' funds which had come under his observation through the direction of affairs by unqualified persons.

At this point resolutions were passed thanking the Local Committee for its work; and also expressing the thanks of the Institute to the Ontario Government, to the Minister of Mines, and to the Mayor and City of Toronto. The ladies were also thanked for the arrangements made for the comfart and entertainment of the visiting ladies.

Prof. Haultain asked the loan of the lantern for a minute while he presented some "finished business", and displayed a cheque for $25.00 signed by a well-known member of the Institute, which he observed did not bear the statutory affixation of a two-cent stamp.

The President announced the names of the officers for the ensuing year.

The Silver Islet Mine.

Mr. T. L. Tanton, in a brief but an absorbingly interesting address, described the history of the Silver Islet Mine in Lake Superior, and showed photographs and a diagramatic geological section of the locality. He pointed out that attention had been confined to the vein which yielded such phenomenal results on the Islet itself, and stated that another vein was recently discovered crossing, under water, the end of Burnt Island. He referred to the remarks of Sir. Wm. Logan many years ago, who had suggested search for mineral in the fractured zone. Mr. Tanton said that the prospecting which had been done on the land had not been directed by geological deduction, and suggested that attention should be directed to those points in the fractured zone on the mainland where the quartz veins intersected the dykes. He believed that mineralization was much more likely at these points than in the sediments which are included between the parallel dykes.

The concluding paper of the meeting was one by Mr. J. W. Evans who dealt at length with the minerals and producing mines of Eastern Ontario. Mr. Evans urged the payment of a bonus to enable the iron ores of the Marmora district, which are magnetites, to be developed by the electric furnace. He referred to the vanadium and other rare metal content of some of these ores.

The paper on "Mining Methods at Nipissing" by H. Park, Jr., was read by title.

This photograph was taken at a previous Institute Meeting in Montreal. Among those included in this group who took part in the Toronto Meeting will be noticed Messrs. Mc.Leish, Gibson, Cole Mc.Dougall, Adams, Goodwin, Tonge, Dresser etc. As Mr. Bradley Stoughton said at the Dinner, the Toronto gathering missed Mr. Dresser and Mr. Stevenson Brown, Mr. Hardman, and others of the "Old Guard."

THE ANNUAL DINNER.

The Anual Dinner was attended by the Lieutenant Governor of Ontario, by the Minister of Mines, and by representatives of sister societies and the Toronto Board of Trade. The most marked feature of the meeting was the amount of advice the Institute received. It was pointed, free and copious. The variety and vociferousness of the college yells kept the uninitiated hesitating as to whether the function was a poultry show or a boiler-shop. "Foghorn" MacDonald's rendition of "Drill ye tarriers" had a delicious Hibernian savor, and was up to the standard of the Vancouver meeting, led by Major Brock. The Minister of Mines was in happy vein, and was duly received into the bosom of the Institute. Mr. E. P. Mathewson discoursed on tittlebats and tittlemice, and grew eloquent on the distinction between tweedledum and tweedledee. His manner was of Pickwickian excellence, but it is to be doubted whether that genial gentleman could have excelled the gallinaceous arias that ever and anon escaped the throat of the gentleman who gave his name to "Matheson, Ont."

The retiring President announced the resignation of Mr. H. Mortimer Lamb, and took the opportunity to express his personal appreciation of the Secretary, and asked permission to voice what he believed to be a general opinion "that the present esteem in which the

"Institute is held, and the harmonious nature of its "membership, is to a very large extent the result of "Mr. Lamb's services."

Referring to Mr. Whiteside's incumbency, the retiring President bespoke the hearty support of the members. Mr. McDougall said that the new President represented that part of Canada which contains the largest coal reserve we have, which "is equivalent to saying that it will some day be the most important industrial and political factor in our national economy. The increased interest taken by the West in Institute affairs, is I believe, the best indication of our vitality and ability to read the signs of the times."

Mr. Bradley Stoughton, whose remarks are always anticipated by a pleased preliminary expression on the faces of the members, expressed his sorrow at Mr. Lamb's resignation and referred feelingly to their personal friendship.

Mr. Whiteside, the new President, spoke most appreciatively of Mr. Lamb, and asked the members to rise and drink his health, which was done with a will.

Mr. Marriott, representing the Toronto Board of Trade, said he knew there was money in mines, because he had put some in them, and referred to some nicely engraved stock certificates he was possessed of, some of which paid dividends, and some of which did not. The members responded with a ditty from the pen of a knight-errant, which intimated delicately, "the mines that make us happy, are the mines we sold to you."

MR. E. P. MATHEWSON.

THE EXCURSION TO PORT COLBORNE.
Thursday, March 11th.

Notwithstanding that some members of the Institute felt like singing "We don't want to get up this morning," ninety of them were at the station at 8-10 a.m., to take advantage of the invitation extended by the International Nickel Co., to visit the Port Colborne Refinery.

The International Nickel Co. proved a generous host, providing the visitors with breakfast, lunch and dinner, for which purpose a regular Pullman diner was attached to the train.

The outward trip from Toronto occupied some three hours, and the return trip a little longer. The fun was unlimited, and there was leisure to observe that as yarners certain members of the C.M.I. have Boccaccio backed off the map, and are in fact the pink penultimate.

Arrived at the Refinery, the visitors were shown every part of the establishment, from the cupola house to the manufacture of nickel-shot. The arrangements for handling material are well-thought out. In the cupola-house the arrangement of the three large double-acting cranes is particularly interesting to observe, particularly in the changing of pots. The Cottrell House proved most interesting, notably the pyrotechnic effect of the rectifiers which are interposed between the d.c. motor-generator and the step-up terminals.

A full description of this refinery was written by Mr. Wotherspoon, of the International Nickel Company, and is reproduced in the 1919 Report of the Ontario Bureau of Mines, q.v.

On leaving the Refinery, Major Leonard expressed the thanks of the members to Mr. Miles and his assistants for their hospitality and the thorough manner in which the works had been shown and explained to the visitors. Mr. Miles in replying said the reason the Company had not previously given out its secrets was, as the visitors had been able to observe, because it did not have any.

Before leaving Port Colborne, the members also visited the works of the Canadian Furnace Company, and witnessed the tapping of a run of pig-iron. A description of this plant will be found in the February issue of "Iron and Steel of Canada". This blast furnace, which was blown in September 1913, has since steadily continued its annual output of 120,000 tons of foundry and malleable iron. The Port Colborne blast-furnace has one of the best and most consistent records of any in North America. The arrangements for unloading ore and coal, and for stocking are well laid out, and full advantage has been taken of the advantageous water-front location of the plant.

Mention was omitted in the account of Monday night's session of the moving pictures of the Cobalt silver-mining industry, taken at the instance of the Ontario Government. These pictures were excellent, but discerning observers may have noticed a timberman feverishly driving in a new cap over a timber of some antiquity, judging by the fungoid growth which covered it. One also admired the determination with which the movie man persisted in photographing the lighting of a series of fuses, until it occurred to one that possibly fuses they were, "and nothing more." It was noticed that Mr. H. Y. Russel showed no alarm.

Views of the Mine, Smelter and Refinery of The Inter national Nickel Company, Limited.

THE PORT COLBORNE NICKEL REFINERY.

THE SMELTER — COPPER CLIFF.

THE CREIGHTON MINE.

MR. G. G. S. LINDSAY.
A Past-President of the Institute.

MR. J. B. TYRRELL.

MR. R. B. WATSON, Cobalt.

MR. M. J. BUTLER, C.M.G.

Registration for Annual Meeting of Canadian Mining Institute

Toronto, March, 8th, 9th and 10th.

C. A. Newton, Toronto.
F. W. Gray, Ste. Anne de Bellevue. Quebec.
O. N. Scott, Toronto.
D. H. McDougall, New Glasgow, N. S.
Jas. McEvoy, Toronto.
C. E. C. Smith, Toronto.
T. L. Walker, Toronto.
W. G. Miller, Toronto.
Geo. C. Riley, Montreal
Jas. R. MacGregor, Toronto.
P. E. Hopkins, Toronto.
W. K. McNeill, Toronto.
Eug. Poitevin, Ottawa.
S. J. Schofield, Ottawa.
Arthur Buisson, Ottawa.
Robert Harvie, Ottawa.
Charles Camsell, Vancouver, B. C.
M. E. Wilson, Ottawa.
E. L. Bruce, Ottawa.
Edgar Stansfield, Ottawa.
E. R. Collins, Copper Cliff, Ont.
W. Peek, Ottawa.
H. E. T. Haultain, Toronto.
A. O. Dufresne, Quebec, Que.
John C. Rogers, Copper Cliff, Ont.
J. L. Agnew, Copper Cliff, Ont.
M. F. Fairlie, Cobalt.
W. P. Alderson, Perth.
Theo. C. Denis, Quebec.
J. W. Rawlins, Copper Cliff.
Alfred J. Tonge, Sydney, N. S.
W. H. Collin,s Ottawa.
C. A. Richardson, Toronto.
T. L. Tanton, Ottawa.
R. E .Hore, Toronto.
Geo. S. Cowie, Sault Ste. Marie.
F. D. Reid, Cobalt.
E. Roland Gilley, New Westminster. B. C.
John McLeish, Ottawa.
Louis Simpson, Ottawa.
M. Y. Williams, Ottawa.
J. G. McMillan, New Liskeard.
C. A. Morris, Montreal.
Adrian E. O'Brien, Toronto.
A. Pryse MacKenzie, Toronto.
H. H. Claudet, Ottawa.
F. W. Simpson, Thornhill.
O. H. Hugill, Sault Ste. Marie.
A. L. Irwin, Toronto.
E. P. Rowe, Toronto.
Norman M. Campbell, Montreal.
F. A. Bapty, Deloro, Ont.
James White, Ottawa.
H. E. Purdy, Toronto.
J. C. Fawcett, Toronto.
G. B. Doner, Toronto.
C. S. Parsons, Toronto.
F. M. Smith, Queen's Kingston.
W. J. Embury, Queen's Kingston.
J. S. DeLury, Winnipeg.
Geo. A. Guess, Oakville.
O. E. S. Whiteside, Coleman, Alta.
W. P. Mackle, Toronto.
H. A. Oaks, Toronto.
J. G. McNiven, Toronto.
A. G. Horning, Toronto.
J. C. Perry, Toronto.
L. J. Robinson, Toronto.
G. M. Thorpe, Toronto.
G. W. H. Coo, Toronto.
R. J. Henry, Toronto.
A. M. Anderson Toronto.
H. J. LaRonde, Toronto.
E. L .Brown, Toronto.
S. J. Duggan, Toronto.
E. W. Rolph, Toronto.
W. J. E. Wyllie, Toronto.
J. H. Black, Toronto.
R. J. Paul, Toronto.
D. G. H. Wright, Kingston.
F. J. Ellis, Kingston.
F. V. Lord, Kingston.
J. F. Young, Toronto.
J. F. Comer, Kingston.
C. V. Corless, Coniston.
Wm. G. Milligan, Toronto.
C. M. Beck, Penetang.
A. R. Clarke, Toronto.
G. C. Bateman, Cobalt.
W. E. Simpson, Boston Creek.
A. P. Coleman, Toronto.
J. C. Ross, Montreal.
D. B. Dowling, Ottawa.
Jno. J. Penhale, Sherbrooke, Que.
Eric C. Macdonald, Montreal.
A. L. Parsons, Toronto.
Arthur A. Cole, Cobalt.
Henry M. Payne, New York.
L. H. Goodwin, New York.
D. A. Dunlap, Toronto.
Bradley Stoughton, New York.
Percy E. Barbour, New York.
A. Longwell, Toronto.
Geo. W. Rayner, Toronto.
C. E. Macdonald, Toronto.
Geo. A. Morrison, Creighton Mine.
W. L. Goodwin, Kingston.
C. L. Drury, Toronto.
R. Dawson Hall, New York.
A. J. Young, Toronto.
Geo. R. Rogers, Toronto.
G. R. Mickle, Toronto.
D. C. Maddox, Kingston.
A. B. MacCallum, Ottawa.
R. F. Segsworth, Toronto.
W. E. Segsworth Toronto.
A. D. Miles, Toronto.
F. M. Connell, Toronto
I. M. Marshall, Kingston.
G. E. Silvester, Toronto.
Charles, A. Poynton, Kingston.
F. W. Guernsey, Thompson, Nev.
H. G. Young, Montreal.
A. G. Burrows Toronto.
Edward H. Robie, New York, N. Y.
J. W. Evans, Belleville.
J. J. Harpell, Ste. Anne de Bellevue, Quebec.
C. J. B. Armstrong, Cobalt.
B. V. Kelly, Timmins.
A. R. Webster, Toronto.
Phillips Thompson, Oakville.
A. W. G. Wilson, Ottawa.
Thos. W. Gibson Toronto.
James W. Moffat, Toronto.
J. Murray Clark, Toronto.
W. S. Wilcocks, Flesherton, Ont.
C. W. Gishem, Toronto.
Fred C. Dyer, Toronto.
E. P. Mathewson, New York City.
R. W. Leonard, St. Catherines.
Jack C. E. Skinner, Toronto.
W. R. Rogers, Toronto.
A. W. Mellish Toronto.
A. L. Anderson, Winnipeg, Man.
J. F. King, Toronto.
H. V. Ellsworth, Ottawa.
S. J. Cook, Ottawa.
J. F. Black, Sudbury.
L. B. Reynolds, Waterford.
Lorne M. Campbell, Toronto.
J. C. Nicholls, Copper Cliff.
James T. Kemp, Port Colborne.
J. More, Port Colborne.
R. W. Brigstocke, Kingston.
M. J. Butler, Oakville.
T. F. Sutherland, Toronto.
J. H. Stovel, Bessemer, Alta.
C. D. Chisholm, Toronto.
Jack Monroe, Toronto.
Frank M. Perry, Sault Ste. Marie.
J. B. Tyrrell, Toronto.
B. Neilly, Cobalt.
Geo. H. Gillespie, Madoc.
A. MacLean, Toronto.
J. Bartlett, Sudbury.
H. B. Davis, Toronto.
J. Mackintosh Bell, Almonte.
W. A. Parks, Toronto.
R. A. Elliott, Deloro.
N. L. Brown, Kingston.
G. J. MacKay, Kingston.
D. E. Creigie, Toronto.
S. B. Wright, Deloro.
F. W. Field Toronto
E. W. Wright, Toronto.
H. C. Smith, Toronto.
M. B. Barker, Kingston.
J. S. Stauffer, Kingston.
E, H. Birkett, Cobalt.
E. E. Campbell, Anyox, B. C.
W. S. Lecky, Ottawa.
A. K. McGill, Kingston.
Frank D. Adams, Montreal, Que.
M. A. McInnis, Montreal, Que.
Geo. E. Sancton, Montreal, Que.
S. R. Brooks, Black Lake, Que.
F. P. K. Gallagher, Montreal.
H. M. Porteous, Kirkland Lake, Ont.
H. A. Stevenson, M.P.P., London, Ont.
J. B. Porter, Montreal, Que
H. Y. Russel, Montreal, Que.
D. E. Keeley, Schumacher.
E. C. Keeley, Kirkland Lake.
E. Hibbert Nickelton.
P. Kirkegaard, Cordova Mines.
Fraser S. Keith, Montreal.
C. L. Cantley, New Glasgow, N. S.
J. G. O'Connor, Hamilton, Ont.
R. J. Young, Kingston.
B. C. Lamble, Orillia.
J. L. Coulson, Toronto.
G. C. Montoire, Kingston.
H. T. Leslie, Toronto.
Thos. Southworth, Toronto.
E. V. Neelands, Toronto.
H. G. Slater, Toronto.
Wm. Nicholson, Banff.
A. S. Fuller, Porcupine, Ont.
C. H. Manaton, Toronto.
Wm. McLeish, Toronto.
Ellis Thomson, Toronto.
Peter MacLaren, Toronto.
S. J. Evered, South Porcupine.
H. C. McCloskey, Cobalt.
H. Park, Cobalt.
A. W. Gray, M.P.P., Westport.
H. E. Kee, Cobalt.
A. Ferland, Haileybury.
K. B. Heisey, Markham, Ont.
J. A. Campbell, M.P., The Pas, Man.
J. F. Robertson, Coniston.
W. S. Landis, New York City.
F. S. Pearce, Mamora, Ont.
R. H .Hutchison, Sudbury.
W. F. Ferrier, Toronto.
John A. MacDonald, Cobalt.
Douglas A. Mutch, St. Catherines, Ont.
Tom R. Jones New Wilmington, Pa.
F. D. S. Robertson, Toronto.
M. B. R. Gordon, Toronto.

Canada's Coal Supply

By F. W. Gray.

The political division of North America, as it finally evolver from the conflict of races and the divergent search for an identical ideal by two branches of the English-speaking peoples, bore no considered relation to the balancing of the mineral resources of Canada and the United States; and, in so far as coal supply is concerned, the boundary line was fixed before the national importance of coal in peace and in war was realized, and in ignorance of the coal resources of what used to be known as the Far West, and is now known as the Canadian provinces of Alberta and British Columbia.

It no national issuse has arisen, and North America has developed its resources as one nation, then in the East the coalfields of Nova Scotia would have supplied the Atlantic seaboard with bituminous coal; British Columbia and Alberta would have supplied the Pacific seaboard and the North Western States, and the central territories would be supplied entirely from the great central coalfield of Pennsylvania and the adjoining coal-yielding states.

This is the natural scheme of distribution. Under such circumstances, however, it is certain that the territory which is now included within our own borders would not have reached so advanced a development as is the case, as the independent impulse of our own nationality would have been absent in the North, and industry would have concentrated itself further south and nearer the great central coalfield. Also, it may be surmised, the coal production of Nova Scotia would have ben upon a much larger scale than it is, while Sydney, Nova Scotia would have been of greater importance and Montreal of lesser importance than is the case today.

But the national issue did arise. Canada is a nation, so acclaimed and recognized in the councils of the world powers, and although the boundary line between ourselves and our good friends in the United States has certain disadvantages to ourselves, we must even make the best of accomplished facts.

Canada's Coal Problem is Largely one of National Defence.

Our unevenly distributed and deficient coal resources, and to a large extent also their backward state of development, are a consequence of this country's determination to be a nation within the British Empire. We have desired national independence, and have achieved it, and as our coal problem is an outcome and a concomitant of this desire and achievement, it becomes a principal duty of Canadians to work for the solution of our most pressing internal problem—the country's coal supply.

It is necessary to state these dominating considerations in order to emphasize that our coal problem is not altogether economic or geographical, but is primarily associated with Canada's national independence and defence. It is with this idea taking precedence of purely commercial considerations that this presentation of the question is submitted.

*A paper prepared for presentation at the Toronto Meeting of the Canadian Mining Institute, March 8-10th 1920.

Canada has no Anthracite.

North America is favoured above the nations of Europe in having a supply of anthracite, a most desirable fuel, more especially for congested centres of population, because of its smokeless character and greater heat value.

Unfortunately, Canada has no anthracite, so far as is known, with the exception of some anthracitic metamorphosed coals of relatively small tonnage in the West. Therefore, if we use anthracite it must be imported.

Bituminous Coal is Already Sole Fuel Used in Large Tracts of Canada.

Large parts of Canada use bituminous coal and have never found it necesary to import anthracite. In many parts of Canada the burning of anthracite is not understood, and all grates and furnaces are adapted for the burning of bituminous coal. This being the case, and seeing that Europe gets along with bituminous coal, it can hardly be argued that anthracite is indispensable in those districts of Canada that can be supplied with bituminous coal from Canadian mines; and it follows that anthracite, under such circumstances, no matter how desirable, is a luxury.

Anthracite a Rapidly Diminishing Commodity.

There is also the further consideration that men can always do without that which they cannot get, and anthracite will shortly be a luxury for the rich only, as it will steadily increase in cost as it decreases in quantity. Old anthracite mines are today being worked over for what was left by a more opulent generation, and anthracite seams of under two feet in thickness are being mined, facts which tell more eloquently than figures the impending scarcity of anthracite.

Can Zones of Distribution of Canadian Bituminous Coal Cover Canada?

Assuming therefore that bituminous coal can entirely replace anthracite in Canada, we have only to consider over what extent the bituminous coals we have can be distributed, or, how we can extend the zones of distribution of Nova Scotia and Western coal so that they may approach, and if possible, meet.

So far as Canada west of Fort William is concerned it surely can be equally well supplied with bituminous coal from the western mines in Canada as with bituminous coal brought from Pennsylvania. Transportation distances do not enter into the question in the same grave manner as they effect Nova Scotia coal.

West of the longitude of Lake Superior, there is as much bituminous coal in the province of Alberta alone as in the remainder of the western half of North America.

Canada has not yet apprehended all the implications of the vast concentration of coal, and probably oil also, that exists in Alberta, and there is no compelling reason why the zone of distribution and use of Alberta bituminous coal should not be as extended as that of Penn-

sylvania and West Virginia. **West of Fort William, Canada is more than capable of providing itself with all possible requirements of fuel.**

Problems of Coal Mining In Nova Scotia.

There remains to consider the possible radius of distribution of the coal of Nova Scotia, but first something should be said as to the extent of the maritime coal deposits and the costs of mining them.

The coalfields of Nova Scotia, while they are not relatively large, forming as they do only one percent of Canada's coal resources, have never been worked to full advantage because of divided interest and scattered operation.

The consolidation of operation that followed the formation of the Dominion Coal Co. was the salvation of the Sydney field, but, unfortunately, consolidation did not go far enough to ensure the maximum cheapness of production that it only can make possible. Sporadic, uncoordinated, hapharzard, and in some instances, unwise operation of the coal deposits of Nova Scotia, have conspired to prevent a healthy growth in the annual production of this province. One who, say in 1907, had looked forward to the annual coal production in Nova Scotia of ten million tons by 1920, could not have been regarded as unduly optimistic Indeed, the objective of the Dominion Coal Company alone was at that time seven million tons annually, as those who refer to the late Mr. James Ross's remarks on the matter may confirm for themselves. The disappointingly small production of Nova Scotia during the past six years is chiefly a result of the war, and in that respect is a passing incident, but underlying, and altogether apart from the temporary effects of war, coal production in Nova Scotia has shown a recessive rather than an advancing tendency. What is the reason for this lack of vigor in the maritime coal industry?

Without attempting to excuse the faults of operation that have hindered coal production in Nova Scotia, it may be answered that the non-progressive character of the industry is due to a general lack of encouragement on the part of the railways and large purchasing interests in Canada; and the failure of governments in successive administrations to understand the paramount influence of coal supply on financial, military and naval security.

Canadian Railways Have Demanded Unremunerative Selling Prices.

For many years it was the policy of the Canadian railways to screw down the Nova Scotia coal operators to a minimum selling price. American competition being skilfully used to effect this. As an instance, it may be mentioned that Cape Breton coal was sold to the large railways in Canada delivered at Montreal at $2.40 per ton, a figure that was—when the costs were correctly calculated—below the cost of production. The American coal against which the Cape Breton coal competed or a rigorous basis of monetary cost, was itself sold at prices below the cost of mining to the American operator, a fact that the statistics of the United States Fuel Administration have since abundantly demonstrated.

A combination of inaccurate (or perhaps one should say) partial cost-sheets, divided interests and low selling prices for coal prevented the coal companies in Nova Scotia from accumulating adequate financial reserves, with the result that they found it difficult to survive the ordinary hazards of coal-mining, and periods of trade depression. But a principal pre-disposing cause of these unfortunate conditions has been the unreasoning hostility of certain sections of the public towards the coal operators and the short-sighted attitude of the railways, including the Canadian Government Railways, in enforcing prices that did not permit coal operators to expend the large amounts of capital that maintenance of output capacity and reasonable increase of production insistently demand in coal-mining.

This feature of Nova Scotian coal-mining is not new, but of long standing. The writer, in a Bulletin prepared for the Mines Department in 1916, stated the matter as follows:

"Within the past twenty years the price of coal has varied very little, it being one of the few commodities that have not materially increased in price. It is doubtful whether the market for Nova Scotian coal has ever yielded the operators a greater price than $2.50 per ton at the pit-mouth, and the average price realized, after allowing for waste and slack coal, is very much less than this figure. A comparison with normal European pit-mouth selling prices will show how moderate this figure is, if due consideration is accorded to the higher cost of labour and materials in Canada. The margin of profit has been too small to permit of the accumulation of proper reserves to provide against the troubles from mining coal, or to allow of adequate depreciation reserves for the amortization of capital liabilities and the depletion of coal areas. Therefore, periods of financial depression, or mining accidents, have too often forced the abandonment of mining operations, and have involved investors in losses.

Output of Coal in Nova Scotia capable of Great Expansion

Coal must always cost relatively more to mine in Nova Scotia than it does in the uniquely favored deposits of the United States, but a considerable part of the abnormally high mining costs in Nova Scotia at the present time is a result of too small a production of coal in relation to the capital invested in mine properties and transportation equipment. Nothing can so effectively lower the unit costs of production in Nova Scotia as an increase in the output of coal. The coal companies there possess equipment sufficient to handle from two to three million tons annually of additional coal so far as transportation and marketing facilities are concerned. Given a sufficient expenditure and the necessary lapse of time to open new collieries and extend the existing collieries, there is no reason why Nova Scotia cannot produce twice its present output of coal. Such a programme is however only possible through the thorough-going consolidation of the operating coal companies, unification and concentration of direction, and very large capital expenditures on new mines and transportation equipment. Before investors can be induced to undertake the heavy committments indicated there must be a change in the attitude of the public and the railways towards the coal-trade. Mr. C. A. Magrath, the Fuel Controller, in his Final Report, suggested that the railway companies should give contracts for their coal supply for a term of years, at cost, plus a fair percentage of profit, provided the coal companies made the necessary expenditure to equip and maintain properties with all appliances to enable production to be carried on at a minimum of cost. There is much to be said for this suggestion. It should be obvious that if in times of plenty our Canadian railways choose to starve our domestic coal mines by buying coal in the United States, or by demanding that the domestic producers meet United States competition even though that involve a profitless transaction or an actual loss to the

Canadian producer, our coal trade must live a precarious life, and will always be unready to meet the national emergency which may at any moment arise through politicial, social or diplomatic occurrences, or by reason of physical hindrances.

Canada cannot be run as a successful economic whole if we ignore the obligations of nationality and insist on buying goods in the cheapest market merely because they are cheap. That way lies loss of independence and national disintegration.

Coal Resources of Nova Scotia Imperfectly Known.

The apathy of public opinion if not actual hostility towards the strnggling coal trade of Nova Scotia is not less effective because it is based on ignorance and is against the best interests of Canada, for not only has it discouraged the expansion of the known coalfields, but it has deterred the search for the hidden coalfields, the existence of which is much more than a presumption. It would be entirely incorrect if we were to assume that the known coal deposits of Nova Scotia comprise the whole of the coal resonrces of that province, and here again there is reason to complain of the lack of interest on the part of our governments, for no part of Canada has been so neglected during the past thirty years in the matter of geological exploration and mapping as Nova Scotia.

As a case in point, one would mention the Springhill Coalfield, which has an unknown but extremely probably southward extension. The port of Parrsboro which now serves the Springhill coalfield, as known, is distant by water only some 90 miles from St. John, N. B., which place by the direct line of the Canadian Pacific Railway is about 380 miles from Montreal. There is nothing insuperable in sending coal from this field to Montreal even by rail. Much longer hauls are made from the mines to great cities in the United States.

There is however no necessity to send coal by rail. It has in the past gone from Nova Scotia to Montreal by water at the rate of two million tons in the season of navigation, and could be sent in very much greater quantity by providing additional transportation equipment.

The feasibility of sending coal by water from Nova Scotia to Montreal has already been demonstrated. What can be done to cover the gap between Montreal and Fort William that is now entirely dependent upon United States coal? The cheapness of transportation from the United States central coalfield to the Great Lakes and the adjoining territories arises from a combination of water transport and a preferred inland freight rate from the mines to the Great Lakes ports. The carriage of coal to Canada gives an outward load for the cars carrying iron ore from the Lake Superior ranges to Pittsburgh, which otherwise would make the outward journey in an empty condition. From such points as Ashtabula and Cleveland, the transportation of coal to Canadian ports is cheaply affected by the water routes.

Deepening of St. Lawrence Waterway Would Extend Zone of Distribution of Nova Scotia Coal.

Apparently the only way by which the radius of distribution of Nova Scotia coal can be greatly extended east to say the eastern extremity of Lake Ontario is by deepening the St. Lawrence channel so as to give access to ocean-going vessels to the Great Lakes. In such event, Nova Scotia coal could compete on fairly even terms so far as transportation is concerned with United States coal, as the all-water route from Nova Scotian ports to the point of unloading in a Great Lakes port would offset the preferred rail rate from the United States mines to the point of transhipment on the Great Lakes. This project is under investigation. So far, all the protests that have been made against the project are such as, if conversely applied constitute arguments for its carrying out, so far as Canada is interested.

It may be submitted that if the project is pronounced feasible it offers to Canada the opportunity to become thoroly self-supplying and self-contained in bituminous coal supply. By affording to Nova Scotia a cheap water-route for coal shipments, the coal miners there would be able to so enlarge outputs as to effectively reduce costs of production, and soft coal from Nova Scotia could be shipped far enough west to span the country and meet Canadian soft coal shipped from the western mines.

The deepening of the St. Lawrence waterway is however not an immediate possibility, while the necessity to make Canada more independent in bituminous coal supply is indeed a most immediate urgency. What is feasible is the enlargement of distribution of Nova Scotian coal today? We can at least get back to the pre-war shipments to St. Lawrence ports of some two million tons annually. Further the same factors of increase in the cost of coal production have been at work in the United States also. There is also some encouragement in knowing that the Canadian people have to some extent awakened to the serious handicap we suffer from such entire dependence on the Unitd States for coal, the danger of dislocation of our business, the threat of discomfort and physical danger that are always impending whenever interruptions to our coal supply occur.

These new conditions suggest that an extension of the pre-war radius of distribution for Nova Scotia coal may be possible at the present time if energetic effort is made by the operators to recover and extend the St. Lawrence markets.

The present moment offers an opportunity to the coal interests of Nova Scotia, and the transportation interests of Eastern Canada to work together to secure the future permanency of the coal trade of Nova Scotia, which, whether they appreciate it or not, is something on which the railways, the public and the Government of Canada are equally interested with the coal operators and the mining population.

The equipment of the Nova Scotia collieries is modern, and, apart from the duplication inseparable from divided interests, no grave criticism can be made of the technical or business menagement of the operating properties, but some changes will be necessary before the most efficient production is possible. In particular, the present system of single shifts will have to be replaced by multiple shifts. The present practice of working the collieries for only eight hours in each 24 hours, often for only five days a week, does not permit of full returns from the capital invested, or the extent of underground territory developed.

To sum up these opinions—which it may again be emphasized are all dependent upon the assumption that Canada can only be politically dependent in so far as she controls and supplies her own bituminous coal—it would appear that to effect the necessary increase in the coal output of Nova Scotia, two things

are chiefly required, namely, a unified control of the operations of mining, transportation and sales, and the recognition by purchasing interests, for their own future welfare and protection, of the necessity to buy Canadian-mined coal, and to pay a just price for it.

The writer will not attempt to discuss what relief we can obtain from utilisation of our peat-bogs and hydro-electric reserves, for these have been ably dealt with by specialists, and even their completest utilisation can only be in the nature of a palliation of the fuel problem, and can never constitute a remedy.

Coal Problem one of Deficient Transportation.

With regard to the bituminous coal supply we may conclude that the problem is not one of a source of supply in Canada as it is one of deficient and difficult transportation. Canada has sufficient bituminous coal for its own needs, but the country has never undertaken to become thoroly self-suporting from a conviction that this was not only desirable, but actually essential to national independence. It cannot therefore be said that our capacity to be self-supporting in bituminous coal supply has even been tested.

Storage of Anthracite Urged DuringSummer Months.

With regard to anthracite, the situation is different. It has been contended that the use of anthracite where Canadian bituminous coal was available is a luxury, and this contention is still maintained. There is however a portion of Canada, which, until our transportation systems are perfected, must have anthracite, although, as also already intimated, the anthracite supply must year by year decrease in quantity and increase in price by reason of exhaustion of the United States reserves. It is suggested that the whole matter of anthracite supply is in need of oversight by some department of the Government, similar to the recent organization of the Fuel Control Department. It is unnecessary to enter into details of why it is desirable that anthracite should be purchased, transported and stored in Canada in the Spring and Summer seasons. The ideal condition would be to have the cellars of the ultimate consumer filled before the close of Summer with sufficient coal to last until the next Spring, but this is an ideal difficult of attainment. The possibility of storing anthracite in Canada during the Summer to an extent sufficient to eliminate entirely any movement of anthracite from the United States to Canada, after say October first in each year, is a proper matter for Government enquiry, and if found feasible, for government management. Such an arrangement would save much money, much anxiety in Canada, and would be welcomed by the United States railways and mine operators. The necessity to import anthracite being one of our national handicaps, it is for that reason alone a matter in which the government should take the initiative. Anthracite, unlike bituminous coal, suffers no deterioration in storage, and it not subject to spontaneous combustion or heating when piled.

Canada's Future Rests Upon Coal and Iron.

In conclusion, one may be permitted to quote a remark of George Stephenson's, made long before coal had become so indispensable as it is to us today. "The strength of Great Britain lies now in her iron and coal beds: the Lord Chancellor now sits upon a bag of wool, but wool has long ceased to be emblematical of the staple commodity of England. He ought to sit upon a bag of COALS" In Canada, we have long thought in terms of wheat and lumber, but these are in process of ceasing to be our staple commodities. Iron and coal are the two things upon which our future chiefly rests, and we cannot long have our frontiers march with the opulent and enterprising nation of the United States unless we develop our coal resources in a more thorough going fashion than has hitherto been attempted. Far from expanding our coal output we are not even holding our own, and every year's record of Canadian coal output is more disappointing than the one preceding. How is it that the worse examples of dishonored bond issues in Canada are connected with coal-mining enterprises, and that in at least two well-known instances, the capital invested by Canadian and British interests has been lost, and re-organization has been effected by United States capital? While a good many reasons could no doubt be advanced in explanation, the lack of any well-defined policy to foster coal production in Canada, **because of its national importance**, will explain the ill fate of many well-intentioned and promising coal mining flotations on this side the line.

It may be necesary to explain that this presentation of the Canadian side of the coal problem is not made in any spirit of hostility towards the United States. On the contrary, the generous and whole-hearted manner in which the U. S. Fueld Administration co-operated with the Fuel Controller of Canada in the desperate conditions of fuel shortage in 1917-1918 is gratefully remembered here. In this instance the United States shared its inadequate supplies of fuel with Canada in a manner worthy of all praise.

The people of the United States, however, are the last people in the world to excuse a lack of enterprise in another people, and if they should criticise the backwardness of our fuel policy, it would be criticism well-deserved.

MR. T. L. WALKER.
University of Toronto.

"INVESTOR" OR "SPECULATOR"?

Protection of the "Investor in mines or "prospects" is somewhat of an abstract science.

Mr. Tyrrell and Mr. Hore—both eminent in their profession—have stated their views as to the advisability of safeguarding the "Investor" while encouraging the "Prospector".

They are not so divergent in their conclusions as the esteemed Editor of The Canadian Mining Journal assumes— for the advocate standardization without circumstancing the sphere of influence of the pioneer to whom must be accredited most of the "Great Adventures" in Miningdom.

Perhaps Mr. Tyrrell, accustomed as he is to pass judgement upon immutable geological conditions, is too much of a strict constructionist.

Then, again, Mr. Hore, with the ardour of the scientist who revels in rocks, naturally is predisposed to favor the "pick and pan" fraternity.

How to bridge the "two stools" upon which these gentlemen are seated, is one of the problems they bestow upon the so-called "Farmers' Government".

Unfortunately, the Idealist on the platform is not prolific in practical performances—unless popular sentiment is aroused and support is forthcoming. I once heard John P. St. John, who "prospected" Prohibition, remark that, "prohibition legislation is feasible only insofar as the people make it effective". So it is with "Blue Sky" laws. Statutory provisions governing mining promotions and the sale of shares in mining ventures, cannot accomplish what either Mr. Tyrrell or Mr. Hore urges,—unless the people make it clear to the Governments that a stricter censorship of syndicates and companies seeking public monies is imperatively necessary.

Also, unfortunately, the rank and file of the public know little or nothing about mining industrialism—and will not learn—because the altogether too unanimous impression is that having-to-do with "a mine" —even if it is not "a hole in the ground"—is proof all-sufficient of obliquity.

Impliedly, the Ottawa Government acclaim the inconsequential character of their Geological and Mining Departments, by keeping the staffs on a "starvation wage"—doubtless to minimize their mischief-making —and "give the Investor a run for his money". Consequently, the Provinces maintain bureaus for their revenual possibilities; taxation, fees, licenses, designedly make it difficult for any "guilty man to escape".

Ontario geological and mining officials have preeminent status for their integrity and scientific services—but that status is personal to those officials—and the people most concerned played a feeble role in creating it. Instead of being the creatures of environment, the official spokesmen domiciled at Parliament Buildings, Toronto, have been constructive—while there have been times when anything aiming at corrective regulation of "mushroom" mining promotions was declared to be subversive of the rights of the "speculator", including those who had to make affidavit as to "bona-fide" discoveries—usually an elongation of the truth, to begin with.

A year ago Mr. Lucas was almost "hung, drawn and quartered" for thinking of "ideal" mining legislation. The mediums of share distribution were lachrymose at the thought of the hardy "prospector" being prevented from marketing his wares. Trades or organizations resolved that "the purchasing power of the prospectors" was to be "cribbed and confined"—and the capitalist was execrated for an attempt to "crab the mining game".

Mr. Tyrrell is familiar with all of this. Mr. Hore has followed closely events in the Ontario North Country. There is a middle ground upon which the "prospector", the "promoter", and the "investor" can operate—and, after all, it is technical advisers primarily—and a more rigid accountability—that will remedy a great deal of what is urgently sought. The "Investor", per se, never discovered a new mining field. The "Speculative Investor" provided capital to prove mining fields. But, for example, it was Hamilton Smith who induced Rothschild to advance Rhodes enough to make De Beers Consolidated a going concern—and Smith was a trained mining man. Rhodes was not an "Investor". He was a "digger". So was J. B. Robinson, who "beat" Rhodes to an important portion of the western Witwatersrand. Beit, apart from Kimberley experience, was not expert in mining matters. Nor was Julius Wernher—nor Hermann Eckstein. Promoters and "Investors", counselled by scientists subscribed capital, or procured it, Mr. Tyrrell will recall that Cobalt lacked "Investors". It made millionaires overnight—and for years "bloom" and "calcite" with a bit of "smaltite" or "native" was justification for starting printing presses running off reams of script—without the judgment of recognized mining scientists. Hence the disastrous failure of the entire Montreal River area—with two or three exceptional claims, thus far.

On the other hand, Cobalt and Porcupine were visited with condemnation by scientists of international repute. Other scientists, more familiar with such occurrences, recognized the attractive geological and mineralogical conditions. Cobalt capitalizations were of the "wildcat" species; yet the less than a dozen real silver mines there have broken all records for values in a given tonnage. It was rash assumptions that every "silver showing" in the diabase would be "another Kerr Lake", that wrought havoc. The inexperienced "placed their bets" on the checker-boarded Montreal River country; the Township of Bucke, in South Lorraine, and elsewhere—not to speak in polite society of the Gillies Limits—and the Government helped themselves to the contents of the till. The Government "needed the money". What the Government did not take, the "prospector", "promoter", or the now-you-see-it-and-now-you-don't "mining" brokers took.

Canada simply learned the "mining game" from the United States, Australia, and South Africa. It is unlearning some of it—and there is healthier sentiment. What is needed more than anything else, is a campaign of education in which the new Ontario Mine Operators' Association, the Mining Institute, and the newspapers, can materially assist the Government. Mining engineers are not infallible. Those who are qualified to sit in judgment upon propositions are as high-minded as those who frown upon "Mining" as a profession. When the Get-Rich-Quick elements are restrained by having newspapers decline to let them have space and publicity; when "dope" literature is

censored —and incorporation papers cannot be obtained without explicit sworn statements as to values and work done—such statements to be subjected to inspection—then the "prospector" will have to take his chances with the "speculative investor".

Meanwhile, it might be as well for bankers, business-men—and Governments to concede to reputable mining scientists the same rating as the other professions. For every "prospector" who has something worth having, there is an army of others without anything of much merit. It is the recognized engineers or geologists who should decide. After that "the dopester" should be made amenable to police regulations.

Alexander Gray, Montreal.

Northern Ontario Letter

THE SILVER MINES.

New favorable developments at such properties as the Nipissing, Kerr Lake, Beaver Consolidated, La Rose and Chambers-Ferland are adding to the aggregate of ore reserves in the mines of Cobalt. The supply of labor is adequate, and the men show general contentment. Wages, based on the high price of silver is accepted as an equitable scheme, while the recognition of workmen's committees, at each of the mines affords ample opportunity to keep working and other conditions satisfactorily adjusted. In this way harmony is manifest on every hand.

It is officially announced that as a result of the exploration and development program commenced a few months ago, the Chambers-Ferland has already placed at least $150,000 in new ore in sight. The average grade is about 15 ounces of silver to the ton. At the present point of operation, average values of 28 ounces to the ton occur over a width of about five feet. Regular shipments are being made to the Dominion Reduction Co. for treatment.

On the Beaver mine large quantities of sing mine produced an average of $10,603 every twenty-four hours, while development work in a general way was favorable. In his regular monthly report to the president and directors, Hugh Park, manager, states in part:—"During the month of February the company mined ore of an estimated value of $307,485 and shipped bullion from Nipissing and custom ores of an estimated net value of $409,253. Development and stoping operations at all shafts continued to be favorable during the month. Exploration work resulted in the discovery of medium grade mill rock have been developed, and the life of the mine has been lengthened considerably. Substantial quantities of high grade also occur, but it is to the mill rock that reliance on a large and sustained silver output is based. Mining and milling costs combined amout to between $7 and $8 to the ton of ore treated, which is exceedingly low for Cobalt ores.

During the month of February, the Nipiss

mined. Of, course, the fact that the Mining Corporation paid close to half a million dollars for the property makes it only reasonable to suppose that a large tonnage of ore will be taken out on which to realize the profit commensurate to the gamble taken.

In the Mining Corporation, an electric pump with an automatic starter has been installed, and with which all the mines of the company are de-watered. A huge stope in the lower workings, some 800 or 900 feet in length, nine feet wide and about 60 feet in depth has been converted into a giant sump to which all the water from the various properties has a natural flow. The scheme has eliminated the necessity of duplicating pumping equipment, and has reduced the number of pumpmen.

The Coniagas Company is still negotiating for a working option on the Gamble-Thompson claims in the Gowganda district. Indications that the deal will go through are quite promising.

During the month of February the Hargraves Consolidated, a merger of the old Hargraves and the Reliance properties, shipped 210 tons of ore to the Dominion Reduction plant for treatment. The ore contains an average of about 15 ounces of silver to the ton. As yet a force of only ten men is engaged on the Hargraves Consolidated, and the work is confined to the Reliance part of the property.

Arrangements have been made to carry on sinking operations on the Oxford-Cobalt property, situated in Gillies Limit, about one mile south from the Kerr Lake mine. A contract for 200 feet of sinking has been let, the work to commence just as soon as the air transmission line is completed.

The possibilities of working some of the outlying properties in the Cobalt district for the cobalt (the metal, cobalt) which they may contain is occupying the attention of a number of mining men. With cobalt valued at $2 a pound and coming in for increased use, it is thought that some of the old properties might be turned into revenue producers. This belief is greatly strengthened by the following facts:—

From the silver producing mines of Cobalt, in 1918, approximately $3,793,652 worth of cobalt was produced as a by-product. This includes 438,229 pounds of metallic cobalt valued at $1,074,556, and 1,147,535 pounds of cobalt oxide valued at $1,813,947, together with other cobalt compounds amounting to 185,416 pounds, valued at $905.14, or a total valuation of $3,793,652. In view of the increasing use of stellite which is a new steel manufactured from an alloy in which cobalt plays an important part, and which is used in the manufacture of high-speed tool-steel as well as cutlery, etc., it is believed that quotations for cobalt metal will continue to rule high.

The suggestion has been made that now is an opportune time for a re-study of the geological conditions in the various precious metal mining districts of Northern Ontario and that it would be well for the Ontario Bureau of Mines to supervise the work. This would tend to assure access to all underground workings and make it possible to prepare a geological map, on a basis of correlation. It is thought that even in Cobalt a re-study of conditions would be valuable, while in such districts as South Lorrain it might reasonably lead to renewed activity with fair prospects of success.

Ore Statement.

During the week ended March 12th, four Cobalt companies shipped an aggregate of five cars containing approximately 367,964 pounds of ore. The McKinley-Darragh with two cars was the heaviest shipper. A summary follows:—

Shipper.	Cars.	Pounds.
McKiuley-Darragh	2	143,840
La Rose	1	87,859
Temiskaming	1	72,008
O'Brien	1	64,257
Totals	5	367,964

THE GOLD MINES.

The voluntary increase of 50 cents a day to the mine workers in the Kirkland Lake district is an outstanding feature in connection with the gold mining industry of Northern Ontario. The step is pointed to as one which indicates the sincerity of the mine operators of Kirkland Lake in their endeavor to share with their employes the advantages of the gradually improving economic condition. As to what may occur along these lines in the other gold mining camps of this country, time alone will determine, but, in other camps, as was the case at Kirkland Lake, it is felt that a spirit of co-operation will continue.

Official figures which show that after resuming milling operations last spring the Dome Mines, up to December 31st treated 187,580 tons of ore and recovered $1,290,301.19 are received with a high degree of optimism by shareholders. While the mill operated in June, yet the achievement really only represents the last half of the year as some little time was lost in getting work well under way. This being true, it is interesting to note that an average of over thirty thousand tons of ore was treated monthly. It also shows that an average of $6.87 a ton was recovered from the ore milled. Prior to the war the Dome handled its ore at a total cost of between $2.50 and $2.60 a ton. At last Summer's meeting the general manager stated that costs had advanced about 30 per cent. This being so, it is evident that a cost of about $3,50 would cover that of the present, in which case the net profit during the last half of 1919 amounted to more than an average of $100,000 a month, or at the rate of upwards of 30 per cent annually. It is believed that when the company's year ends, on March 31st, a surplus of around $900,000 will be shown. This would compare with $56,801.26 a year ago. The rapid recovery thus realized is one of the outstanding achievements in the Porcupine district.

Shareholders of the Dome Extension Company, at a special meeting held on March 10th, ratified a by-law authorizing a six month's extension on the working option held by the Dome Mines.

Operating its mill at full capacity, and with mill heads running higher than the average, the McIntyre-Porcupine is setting new high records in point of value produced. In January it is stated in usually well-informed circles that upwards of a quarter of a million dollars was produced. Also, the current rate of output would tend to indicate net profits of around 25 per cent annually on the company's 3,600,000 issued shares. Development work at depth continues very favorable.

The endeavor to place the Dome Lake property on a self-supporting basis is being carried on with fair prospects of success, although ore reserves are low and the cost of operation is running neck-and-neck with the gold content of the ore.

The increase in wages at Kirkland Lake, previously

referred to, amounts to an average of about 50 cents a day, and will give muckers $4.25 and machine runners $4,75 for each eight-hour day worked. This increased rate is expected to attract additional men to the camp, and may reasonably meet the added demand for workmen as a result of the resumption of work at the Wright-Hargreaves and at the Tough-Oakes.

The Chaput-Hughes property has inquired as to the possibilities of purchasing the small mill on the Burnside Company, in that the latter in merging with the Tough-Oakes will have no use for its mill. In regard to this, however, only a limited amount of work has been done on the Chaput-Hughes and the ore necessary to operate a mill has not yet been found. The property is well located.

About April 15th, it is officially announced, the Wright-Hargreaves will commence work in connection with installing its new large mill, the machinery for which is already on the ground.

Financial arrangements necessary to assure an extended program of exporation and development work on the Hunton-Kirkland property are being made, and the prospects of success are very bright, is the advice submitted to the correspondent of the Journal by a mining man who is heavily interested in shares in the company.

Arrangements are being made to deepen the shaft on the Elliot-Kirkland, which properties lies directly west of and adjoins the Kirkland Lake Gold Mines. Formerly, work was carried to a depth of 500 feet on the Elliot, and, although the main fractured zone was encountered, yet only a very limited amount of gold ore was found. Now, going on the theory that as the ore body extends to the West the horizon of mineralizatiion dips downward, the Elliot-Kirkland Company will carry their shaft to a depth of perhaps 700 feet, at which point exploration work will be carried on.

A deal for the Stitt property in the township of Grenfell is pending, according to advice received from Kenogami station. The Stitt group of claims will perhaps be remembered on account of the interest which they attracted a few years ago following the discovery of rich gold ore in narrow veins. The geology is very similar and is believed to be the westward extension of that belt which passes through the Kirkland Lake district.

Official information from the Argonaut Gold Mines at Beaverhouse Lake, some twelve miles east from Kirkland Lake is very reassuring. It is stated that the shaft has been completed from the 70-ft. to the 200-ft. level at which point drifting has been carried on for a distance of over 100 feet and with ore averaging about $9 to the ton over several feet in width. In the meantime the mill is being kept in operation, and by a process of straight amalgamation sufficient production is being maintained to almost offset the current cost of carrying on the desired development work. Tests are being made with cyanide so as to ascertain the process best suited to adopt in the proposed new mill. A force of about fifty men are engaged.

A contract has been let to continue the shaft on the Boston-Kennedy property to a depth of 150 feet where it is proposed to carry on lateral work. The shaft is now down 100 feet. $10,000 has been subscribed with which to continue on the extra 50 feet and finance the desired amount of drifting.

"Jim" Nelson, owning claims in the township of Baden in the Fort Matachewan district, has organized a new company known as the Thesaurus Gold Mines, for the purpose of financing the operation of his promising group of claims. Mr. Nelson is a practical mining man who has spent many years prospecting, and who has carried on a large amount of real prospect work on his claims.

In connection with the Fort Matchewan Gold Mines (the Otisse property), it is learned that the ore occurs in lenses more or less widely separated, but that they show a width of from 8 to 30 feet at their widest points. It is stated that in that part of the lenses measuring 8 feet or more in width the indicated average gold content is about $11 to the ton and that the proposition would appear to be a commercial undertaking of at least moderate proportions.

BRITISH COLUMBIA LETTER.

Stewart, B. C.

The fourth shipment of ore from the Premier Mine, Salmon River District, has been made to the Tacoma (Wn.) smelter. The shipments average 300 tons and the ore is reported to assay about $275 to the ton. Development are proceeding on the Big Missouri. The tunnel on the Bush Mine is reported to be in high grade ore. The same is true of the Forty Mine. A crosscut tunnel is being driven on the Unicorn. Up the Bear River the crew at work on the Lakeview Mine is in ore. The Indian Mines, Limited, plan to resume development on their four claims situated on the west side of Cascade Creek, opposite the Bush property. Development consists of three opencuts on the croppings and two tunnels. The opencuts expose a well defined vein, when can be followed on the surface for about 2,000 feet. The vein is quartz and appears to follow a wide dioritic dyke which intrudes the greenstone schists. The minerals found include galena, sphalerite, and pyrites. With the report that the old Portland Canal Tunnel Company may be revived interest is being manifested in properties of Glacier Creek back of Stewart. The tunnel was an ambitions scheme started in 1912 to run a 2,000 foot tunnel to tap at depth all ore bodies of Glacier Creek, including those of the Portland Canal Mining Co., The Stewart Mining and Development Co., the Glacier Creek Mining Co., Portland Wonder Mining Co., "O.K." and the Pacific Exploration Co. An early opening of the Salmon River District is expected according to advices from the North, the weather having been mild recently, much of the snow in and immediately around Stewart having disappeared.

Alice Arm, B. C.

More high grade ore is reported to have been struck on the Esperanza, Alice Arm District. The Centre Star has been bonded to O. B. Bush, the original purchaser of the Premier, Salmon River. The property adjoins the Last Chance, now bonded to H. B. Price, of New York, and is close to the Moose, owned by Dave Cameron, who staked the Wolf. It is stated that the consideration was $75,000, there being a small cash payment and an undertaking to commence work before the 1st of July.

New Hazelton, B. C.

On Hudson's Bay Mountain there are a number of promising properties under development. The Mamie, under bond to Seattle capitalists, is attracting attention. J. D. Galloway, District Engineer, reporting in 1917 said of this property that the ore-minerals disseminated through the gangue in bunches and stringers are zinc-blende and aresenopyrite, together with a little chalcopyrite. The main value in the ore is zinc, but the aresenopyrite carried low gold values.

Some silver occurs with the zinc but as a rule the silver content is low. The Victory and Empire Groups, staked by the Simpson Brothers, are under bond to the Skeena Milling and Mining Co., which has started the installation of a concentrator. There also is the Coronado Group, also leased by the last named Company, and which is showing up well, being considered one of the most promising properties on the mountain.

Nelson, B. C.

D. F. Strobeck, one of the pioneer operators of the Ainsworth Camp, and who sold the Florence Mine to its present owners, has returned to take up the development of other properties. He holds a group of mineral claims on Princess Creek and also is interested in the Eden-Crescent Group on Coffee Creek. The Mountain Chief Mine at Renata, B. C., on which the shaft has been extended about 40 feet, still is in ore. In the upper shaft the ore was largely chalcopyrite and with the attaining of depth a considerable percentage of bernite has been shown. Air drills are being used, the Mountain Chief Compressor being one of the few of the district not incommoded by water shortage. Shipping is expected to be resumed shortly. The mill of the Rambler-Cariboo Mines Company has been closed down. The Compressor Plant ceased to be a factor in operation some weeks ago owing to lack of pressure but the mill was continued. However, a late freeze diminished still further the flow of water in the streams and the Company had to discontinue. About the only large mill in the district operated by its own power and still working is that of Clarence Cunningham at Alamo. Here, with the flow of the north fork of Carpenter Creek available, no difficulty is being experienced.

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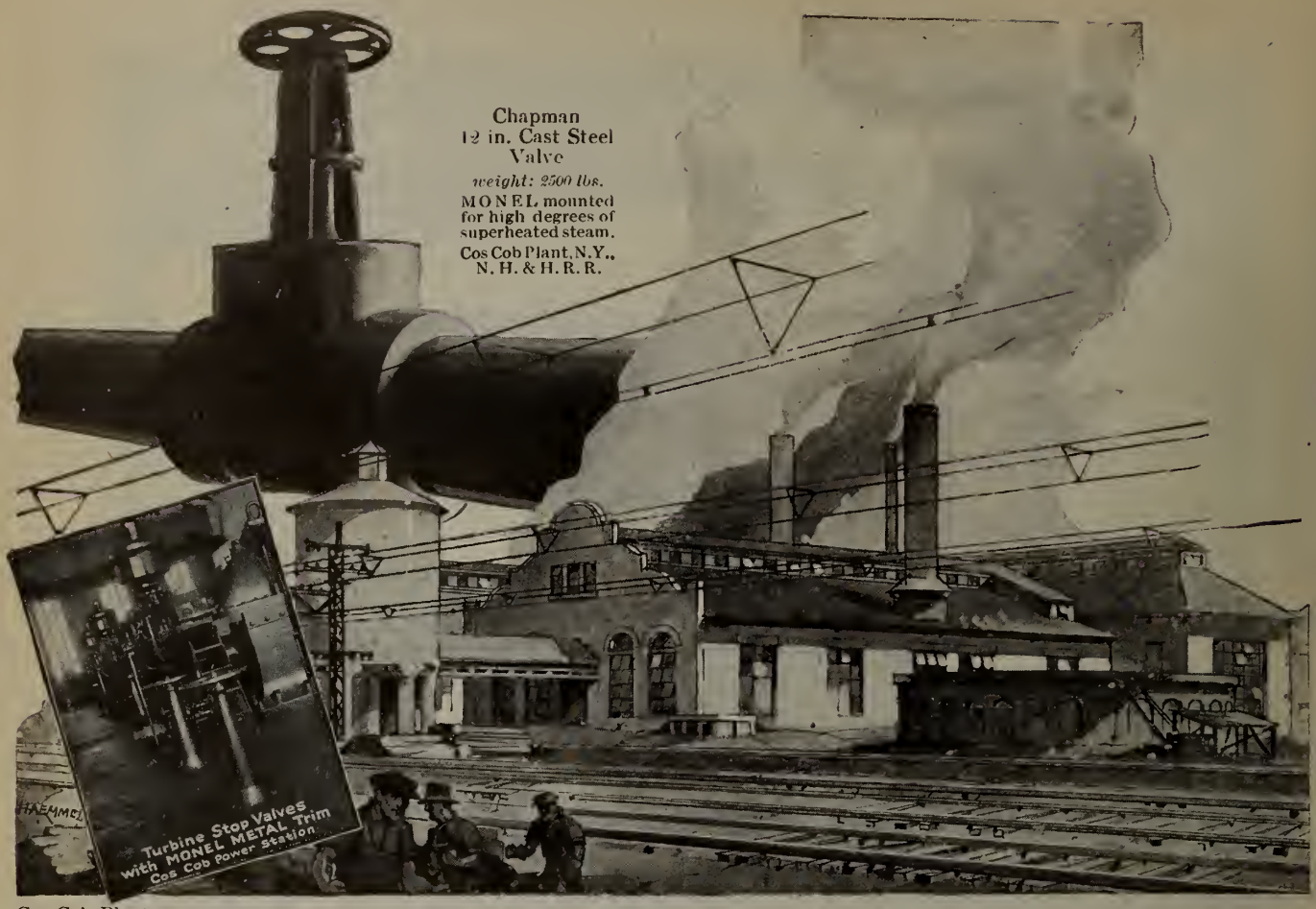

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EDITORIAL

Montreal and Nova Scotia Coal

The Montreal City Council recently adopted a resolution which, after stating that a large portion of the coal used in Canada is imported from the United States at prices which are continually increasing, with frequent shortages occurring which may become permanent, requests the federal government to encourage by all possible means the intensive operation of Canadian coal mines. Such a policy, it is urged would remove the danger of interrupted or inadequate coal supply, and would provide much additional employment. This resolution is encouraging as an indication of the tardy realization by the general public of Canada's mendicant and defenceless position in regard to coal supply. As the Montreal resolution rightly suggests, Canada's regrettable position in assuming inability to be self-supporting in coal supply, is entirely needless, and is due to an ill-informed public opinion, which, it is most pleasing to observe, is in process of correction. The vicinity of Montreal alone is annually purchasing three million tons of bituminous coal from the United States that could and should undoubtedly be supplied from Nova Scotia. As the recipient of a large tonnage of coal from the United States, instead of being the distributing centre for a similar quantity of coal from Nova Scotia, Montreal is not only paying out money at high exchange rates unnecessarily, but is missing the revenue which it would earn from the distribution of Nova Scotian coal, and from the disbursements made by ocean-going vessels using the Port of Montreal.

Causes and Results

The report of the Deputy Minister of Mines for the year 1919 shows that Ontario mines produced 505,963 oz. gold valued at $10,451,688 and 11,383,905 oz. silver valued at $12,913,316. The producing companies are for the most part operating at Cobalt, Porcupine and Kirkland Lake. Most of them made profits on the year's operations and are expected to make profits this year. Gold and silver mining has become in Ontario a flourishing industry. The chief producers can present reports that will please the shareholders. Most of the producing corporations are now in very satisfactory circumstances and able to finance exploratory work on other properties than their own and thus possibly continue mining operations after the properties which they were formed to operate fail as sources of ore.

It is well to note that these successful corporations and their substantial treasuries are the result, not the cause, of the development of mineral deposits. The producing mines were not discovered or developed by work done with money supplied by long established mining corporations. The early history of each of the mines that has been the source of wealth of the big corporations is the history of individual efforts of men who were ready to venture their money and time in an efforts to make mines out of prospects. The speculators made the mines. After preliminary development they formed corporations in which they kept substantial interests and then sold part of the stock to the public. These corporations, at the time of their organization, had to depend for their life on very doubtful sources of income. They were speculative enterprises. It is true that some of them have reached a stage of development which permits the owners of shares to breathe easily; but the fact remains that the men who took up the Nipissing, Hollinger and other great properties and found the money to develop them were taking chances that would cause a great outcry from corporation shareholders if taken by directors on behalf of a corporation.

It is true that our mining corporations are in a splendid position to undertake the development of new discoveries, and it is to be expected that some will do this. Many of them have already spent considerable sums of money in the search for new properties and a few have had some success. The most notable success has been in cases where the corporations undertook development of properties adjoining or near their own. When it is borne in mind that the producing companies have organization and experience in their favor, it is reasonable to expect that activity in developing new properties will become more and more the work of big mining corporations. The fact remains, however, that up to date they are the effect and not the cause of development of new fields—R.E.H.

INSTITUTE NEEDS PRESS BUREAU.

The annual meeting of the Canadian Mining Institute was a success in many ways, but it evidently did not attract much attention on the part of the public. Topics of interest to thousands of people were discussed and yet the local newspapers presented very poor reports of the meeting. It may be taken for granted that the press is ready to publish information about mines and mining that is likely to interest the general reader. Whose fault is it that full accounts of the more important discussions were not published each day of the meeting? It seems to me that the fault lies with the Institute rather than with the newspaper publishers. The reporters find it difficult to obtain desired information and so they spend little time at the meetings and the publishers are not even aware that important discussions by well informed persons are taking place.

The average reader of newspapers would find little to interest him in a purely technical mining or metallurgical paper, and the press is well advised in giving little space to the papers of this class. Many of the items on the program, however, were of such a nature that any enterprising newspaper publisher would be pleased to present full accounts of them to his readers.

It would seem desirable that the Institute should take steps to see that its meetings be more adequately reported in the newspapers. To accomplish this the Institute should advise the publishers of the fact that good copy is obtainable at the meetings, and should see to it that it is obtainable. Press notices calling public attention to items of general interest should be sent out freely by the Institute during the week preceeding the meeting, and summary accounts of papers presented and discussions at each session should be prepared by the Institute to form a basis for the reporters' daily stories. It is hardly to be expected that the ordinary daily newspaper reported will be able to present a good account of an Institute meeting if he is not given more help than has been the custom in the past. We have been leaving publicity for Institute meetings too much to chance. Is it not worth while to have organized publicity?—R.E.H.

We congratulate the "Engineering and Mining Journal" on its feat in reporting the Toronto Meeting of the Canadian Mining Institute, ending on the 11th, in its issue of the 13th March. Not only was the Institute Meeting reported, by using the telegraph wires, but the issue of the 13th contained articles on the Dolly Varden Mine in British Columbia, and on the Mandy Mine in Northern Manitoba, of which Mr. Spurr, the Editor of the "Engineering and Mining Journal" was one of the discoverers. While the "Canadian Mining Journal" is not unaware of importance of the "Engineering and Mining Journal" as a competitor in the correct reporting of Canadian mining news, it would we consider, be ungracious not to express pleasure at the quick publicity given to the Toronto Meeting, and the compliment to the growing importance of Canadian mining implied in the large amount of space devoted to description of Canadian mines and Canadian mining problems. Particularly pleasing is the editorial statement that: "Canada's record in the mining "and metallurgical industry is one to which she can "point with pride, for it is largely through the efforts "of her own men that progress has been made. Her "technical schools, such as McGill, Toronto, and "Queen's, about which we hear little on this side of "the line, have produced some brilliant men." Might we, however, suggest that the three universities named regard technical education as only one part of their activities.

IRON ORE BOUNTIES.

At the Annual Meeting of the Canadian Mining Institute the Minister of Mines for Ontario said that the Provincial Government had not committed itself to granting a bounty on iron ore, and did not feel disposed to take this course. He expressed the belief that when it became really necessary that domestic iron ores should be mined, the value of the large deposits of ore in Ontario would become apparent.

The point made by Mr. Mills lies entirely in the question as to when it becomes "really necessary" to develop our own iron-ore deposits. There is a school of thought in Canada which conceives that we should draw to the fullest extent upon the resources of the United States for the purpose of conserving Canadian resources, and the people who hold this viewpoint usually have in mind coal and iron. The fallacy in their argument is a little elusive, but we do not think it represents the most robust type of Canadian thought. Iron ore deposits, particularly those of the type found in Ontario, are not like a reservoir ready and waiting to be tapped. Their development will in any case be a slow process, and much work must be done, both in the prospecting field, in the laboratory and in the full-scale experiments of the iron and steel works of Canada, before these deposits will be in a position to yield ore on a commercial scale.

As we understand it, those who are requesting a bounty desire it to be paid upon the quantity of pig-iron or steel made in Canadian furnaces from domestic ores, and, as been previously pointed out in "Iron and Steel," unless the proposal to develop Canadian iron ores is economically sound, it will not succeed, and the amount the Government would be required to disburse would in such event be negligible, whereas if the bounty were earned, the resultant impetus to industry would be such as to far outweigh and thoroughly justify the cost of the bounty.

The Minister of Mines suggested that the offer of the British Columbia Government to pay a bounty of

three dollars per ton on pig-iron produced in that province from British Columbia ores had not evoked the response it should, but the offer has had one beneficial result, namely to arouse interest in the subject, and, as a direct result of that offer, there is now proceeding in British Columbia precisely that process of preliminary investigation which yields exact information, and which must always precede any worth-while commercial undertaking.

It is also fair to point out to those who believe in reserving our resources by taking immediate advantage of more advantageous conditions existing in the United States, that the possession of undeveloped resources is in the actual effect equivalent to non-possession of such resources.

There already exists in Ontario a pioneer enterprise in the beneficiation of siderite, namely at the Helen Mine. The Algoma Steel Corporation has proved the presence of immense tonnages of siderite, and has also proved the commercial possibility of its utilization by beneficiation. For its work in this direction, the Algoma Corporation deserves the thanks of Ontario.

Coming as he does from Port Arthur,, where the question of beneficiation of iron ores is a live question, the Minister of Mines is probably well acquainted with the reasons urged for a bounty on iron ore, or as we believe it should be put, a bounty on pig-iron, and we trust that Mr. Mills's very definite statement that the Ontario Government does not favour such a course is not the last word on the matter. The whole question of the development of the iron ores of Ontario is worthy of study. That Canada should provide from domestic mines only 4.6 per cent of the ore fed to Canadian blast-furnaces is not a condition that should be perpetuated longer than is unavoidable.— From "Iron and Steel of Canada".

THE LEGAL STATUS OF WORKMEN'S COMPENSATION BOARDS.

The Manitoba Court of Appeal has reversed the judgment of Mr. Justice Mathers holding the Workmen's Compensation Board to be a Court, and the appointment of its members by the Ontario Government to transgress the prerogative of the Federal Government in the appointment of judges. It is stated that a further appeal will be lodged with the Supreme Court of Canada.

The wide powers given to Workmen's Compensation Boards are disliked by lawyers, as witness the report of the Law Reform Committee of the Ontario Bar Association that the Workmen's Compensation Board of Ontario is "one of the most autocratic institutions in the Province, and absolutely independent of all government jurisdiction except by special legislative enactments."

It was doubtless the deliberate intention of those who framed the Ontario Act to make the Compensation Board an entirely independent body, charged with the duty of making decisions not subject to judicial review. This is a logical sequence to the acceptance of the root principle of workmen's compensation as viewed in Ontario, to wit, that compensation for injuries arising in and out of the course of employment is an inherent right of the workmen, not to be questioned, and, in the intent of the Act, merely assessable as to amount of compensation payment. The scale of compensation being laid down by the Act, it is held that the function of the Board is merely to disburse the sum prescribed in the schedule. As trustees for the proper disbursement of prescribed compensation payments, the Compensation Board is also charged with the collection and custody of funds raised by statutory assessment on the payrolls of employers coming within the scope of the Act. These duties of Compensation Boards so completely dispense with the necessity for outside legal assistance that to those who have not accepted this root principle of workmen's compensation the self-contained status of Workmen's Compensation Boards presents an autocratic aspect.

It should be pointed out, however, that there are two aspects to the unreviewable nature of the Compensation Board's decisions. The Board may award compensation in cases where the employer may consider it unjustified, but may also refuse compensation to workmen claiming injury at work. If the workmen cannot prove his case he can make no appeal from the judgment of the Board, and it is understood that this is one aspect of the unappealable nature of the decisions that is objected to.

Criticism is also made of the fact that the Ontario Compensation Board—and this is true of other Boards —handles its own investments without government oversight.

There is a good deal to be said in favour of governmental audit and accounting of the accumulated funds of Compensation Boards, as these funds will in the course of years reach a very large maximum aggregate. Any such government oversight should, however, we believe, be in the direction of further safeguarding of these funds as intact accumulations of securities, and should not contemplate any merging of the funds into the general treasury of any province, nor, to anticipate a future probability, in the Treasury of the Dominion of Canada.

While, as an effective, equitable and economical method of administrating workmen's compensation, the Compensation Boards can hardly be bettered, it cannot be gainsaid that there is something repugnant to the tested traditions of British judicial bodies, or of administrative bodies charged with quasi-judicial functions, that these should not be subject to review, writ of error, or superior accounting of trust monies. Discussion of these unusual powers of the Compensation Boards is likely to grow with the growth of their duties and the funds entrusted to their care, two certainties of the future.

THE WABANA IRON ORE DEPOSITS.

The description in this issue, by Mr. R. E. Chambers, of the sinking of the submarine slopes of the Nova Scotia Steel and Coal Company, at Wabana, Newfoundland, is of timely interest. These slopes have achieved the maximum penetration of the unique submarine iron-ore deposit, and Mr. Chambers's detailed account of the successful completion of the haulage slopes will appeal to such readers of this periodical as are engaged in the mining end of the iron and steel industry, but will more particularly interest those concerned with the operation of steel works in Canada because these slopes have definitely proved the existence and accessibility of a seam of iron ore, at a distance exceeding two miles from land, averaging from 17 feet to 30 feet in thickness.

The Wabana deposit has no parallel. As a coal seam, the mineral which is above all others distinguished by its regularity and persistence of deposition over large areas, the Wabana deposit would be notable for these last-named characteristics; but as an iron-ore deposit we believe it to be unique. As to the probable extent of the deposit, nothing can be said except that the probability of its continuance beyond the known limit of mining is conceded by all who have studied the deposit. It may also be added that the limit of mining has not been tested, and is therefore unknown. Col. Thos. Cantley, before the Mining Society of Nova Scotia put this aspect of the Wabana deposit with precision is stating that "The volume of ore is so great "as to present a new feature in mining, to this extent, "that it will make practically no difference, not only "to this generation, but to several generations to come, "as to what rate of extraction is carried on at Wa-"bana."

There is excellent reason to believe that the recent interest taken by large British ironfounders and shipbuilders in the steel incorporations in Nova Scotia was attracted more by a desire to acquire the Wabana iron-ore deposit than by any other reason, although additional reasons are not lacking either in number or cogency.

When large United States' steel interests commence in an impressive manner to undertake the concentration and beneficiation of the comparatively lean magnetites of the Eastern Mesaba range in Minnesota, the implication is fairly plain. The marketability of lean iron-ores is first-hand evidence of the scarcity of richer ores. The Wabana deposit is gradually coming to be recognised as one of the most impressive reserves of iron-ore of high iron-content remaining in the temperate zone.

The relative value of an iron-ore depends to a large extent on its accessibility and geographical position. As a point of distribution of iron-ore to be used within the British Empire, the position of Wabana could not be bettered. The rapidity and moderate cost with which Wabana ore could be delivered in British ports by the use of modern freighters of large capacity and quick steaming capacity is obvious, if modern unloading plants were provided in Britain.

A good deal has been mooted about the Imperial character of the motives which are said to actuate those who desire to consolidate the control of the Wabana ores, and while these motives have no doubt played their part in bringing Wabana to the attention of British statesmen following the visit of the Dominions Royal Commission to Wabana in August 1914, we venture to believe that what is really actuating the British enquiries is a realisation of the intrinsically valuable business asset that possession of the Wabana ore deposit will be to any combination of ironfounders and shipbuilders that require iron ore in very large tonnages.

Some idea of the height of the ore-seam at the point where it is tapped by the haulage slopes may be obtained from a photograph accompanying Mr. Chambers's article which shows a mechanical loader, electrically driven, but of the familiar type of boom and bucket that is chiefly associated with a railway steam-shovel, working two miles from shore.

The whole production of the Scotia slopes is today loaded into the mine cars by mechanical shovels of several types, with a negligible exception of the tonnage handled by four pairs of men.

No man has had more to do with the discovery and development of the Wabana iron-ore deposit than Mr. R. E. Chambers, and we believe the readers of "Iron & Steel" will welcome his authoritative and first-hand account of a unique engineering achievment in an ore deposit that stands alone.—From "Iron and Steel of Canada."

INSTITUTION OF MINING AND METALLURGY WAR MEMORIAL. GIFTS OF MALACHITE REQUESTED.

The Institution of Mining and Metallurgy has decided to raise a fund of about £4,000 for the purpose of "commemorating the services of members of the In-"stitution in the Great War, and perpetuating the "memory of those who made the Great Sacrifice."

As already announced in the "Journal," Lt. Col. Peter N. Nissen, D.S.O., has prepared a design for the figure, which has been accepted, and he will model the figure and the friezes. These will be executed in bronze, and the pedestal base in malachite, with four silver-alloy plates upon which an appropriate inscription and the Roll of Honor will be engraved.

The Council states that it has been fortunate in receiving gifts of specimens of malachite to be used as parts of the base-pedestal, but these are insuffricient for the purpose, and it is suggested that members who may possess specimens should place them at the disposal of the Council.

The Sinking of Wabana No. 3 Slopes, Newfoundland

By R. E. CHAMBERS.*

(Published concurrently in "Iron & Steel of Canada")

During the year 1919, there was completed at Wabana, Newfoundland, a pair of slopes, the construction of which means much to the steel industry of Nova Scotia, as it assures to the Nova Scotia Steel and Coal Company a permanent supply of iron ore of enormous extent. This ore had been previously opened up by slopes, driven for a distance of 4,000 feet through the sub-marine ore of the Dominion Company into the areas of the Scotia Company, and for a further distance of 3,000 feet into the Scotia areas, these being termed the No. 2 slopes. But according to the agreement made between the two Companies the No. 2 slopes were to be surrendered at the close of the year 1918, and the ore from the Scotia submarine areas was to be mined through a new set of slopes to be completed by that time. Although a very formidable undertaking extending over several years, these slopes were completed at the time specified and are now producing 1200 tons of ore per day.

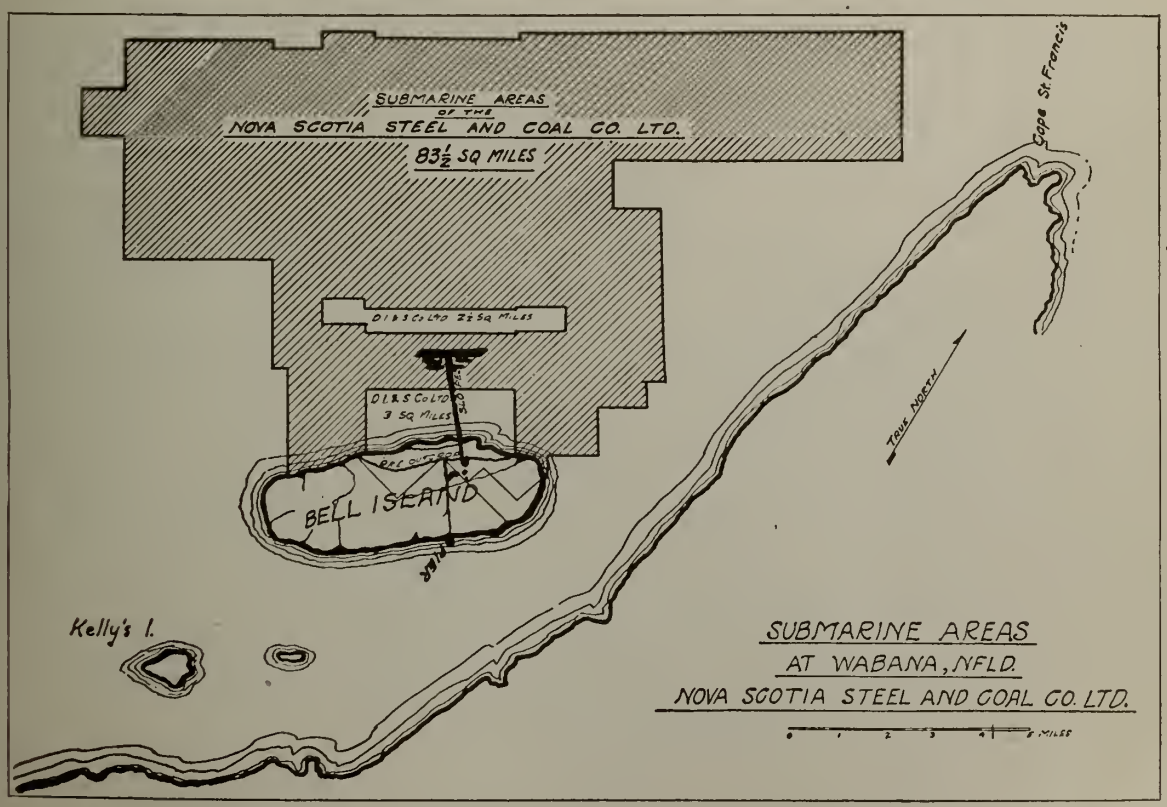
The construction of the No. 2 slopes was described in an article published in Vol. 12 of the Journal of the Canadian Mining Institute. It is to the second set now known as the No. 3 slopes of the Nova Scotia Steel and Coal Company, that the present reference is made.

* Mining Engineer and Director of the Nova Scotia Steel and Coal Co., New Glasgow.

Briefly, the work consisted in driving two parallel slopes, each two miles long, and each with a cross section of 10 ft. by 17 feet at an average grade of about 13 per cent from the main level of the Scotia submarine mine to the surface near the outcrop of the lower bed of ore. The total time occupied was not phenomenally short being about 5 years. The work was, however, much delayed during the period of the war by shortage of labor and other drawbacks, being for certain periods entirely discontinued.

The speed of driving for certain monthly periods, while labor was plentiful, was more creditable. The average advance over monthly periods was over 12 feet per day in the West slope and over 11 feet per day in the East slope. While for level tunnels this is not a record, yet when the large dimensions of the slopes, the descending grade of 13 per cent, the handling of a considerable quantity of water, a somewhat faulted ground and other adverse condiions, are taken into consideration, the speed above referred to is rather exceptional. It is not, however, with the object of claiming any record, that this is written. But having been asked for a description of the work. there are two principal reasons which appear sufficient for endeavoring to comply.

First:—To emphasize the fact that the completion of these slopes assures to the Nova Scotia Steel and Coal



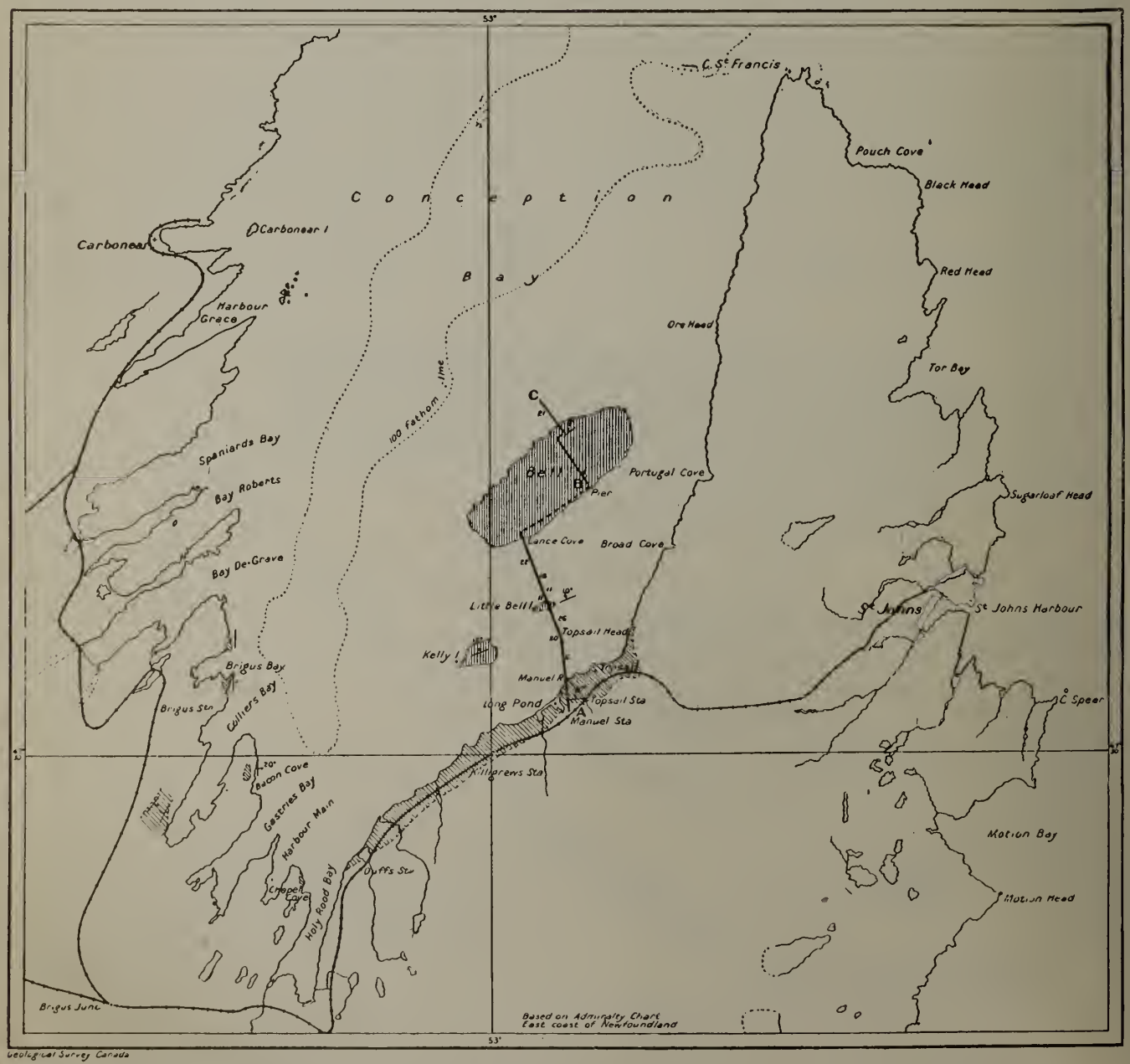
General Plan of Submarine Areas of Iron-ore at Wabana, Nfld., showing approximate position of slopes and workings.

Company an ample supply of ore for the future. The ore has been found to extend to the farthest working yet reached. These workings are two miles to the dip from the outerop of the bed, and the slopes are among the longest known, yet the ore extends below their deepest point. During the past 24 years the blast furnaces of the Scotia and Dominion Companies on Sydney Harbour have been supplied and several millions of tons exported in addition, from an area of about two square miles of the ore field.

The submarine holdings of the Scotia Company cover an area of about 83 square miles, and of the Dominion Company 5½ square miles. The same geologieal eonditions are believed to extend over the greater part of these areas. The Scotia slopes are now working at a capacity of 1200 tons per day; with improved labor conditions this can be mueh inereased. While the ore beds vary in thickness over different parts of the field, the thickest section known is in the submarine mine of the Scotia Company two miles from the outerop. Attempts to reduee to exact figures the ore tonnage of this field are neeessarily connected with uneertainty, but it is evident that in the enormous area of the Scotia Company, above referred to, there is an ample supply for all their future requirements. The geological eonditions peculiar to the ore field are believed to extend to the dip a much greater additional distance than the slopes are now driven, and the evidences indieate that on the strike the ore will extend for many miles, placing the Scotia Company in a most favorable position for ore.

This result has not been obtained without much effort in many fields.

In many, we may say most cases, such investigation has been unproductive, but in the case of the Wabana deposit and some others which warrant future eonsideration, the result has fully justified the energy and the somewhat large sums of money expeeted in ex-



Position of Bell Island with reference to Mainland. — White Areas are Pre-Cambrian, Perpendicular Hatching denotes Ordovician, and Cross Hatching denotes Cambrian rocks.

ploration, development work and equipment. The Scotia Company is now in the happy position of being independent as to the future ore supply for themselves, and if required, for others, and in the opinion of all mining experts who have studied the question, of owning one of the largest iron ore mines on the North American Continent and its outliers.

Second: The successful construction of these slopes, apart from the element of luck, which continued most favorable, was largely due to the faithful and energetic efforts of the mining staff under me during the period in question, and I wish to give some public recognition of this service. During the several years in question the work was followed with undiminished energy and intelligence by the various heads of departments and the staff generally. It is not practicable to give a full list of those to whom credit is due. This would include the members of the office, mechanical and surveying staffs and many of the workmen, but I would like to mention the following names, and hope others taking a less prominent part, but who performed their duties faithfully, will pardon the omission and understand that with 200 men engaged in the work, it is not practicable to publish all.

Staff Connected with No. 3 Wabana Slopes.

1. A. R. Chambers, in general charge.*
2. C. B. Archibald, in charge locally.
3. F. Burrows, late resident manager
4. L. McLean, underground manager.
5. T. Gray, Asst. Underground Manager.
6. C. Main, Mechanical Superintendent.
7. R G. Watson, Mechanical Superintendent.
8. Wm. Lindsay, Mechanical Department.
9. Wm. McGrath, Mechanical Department.
10. Thos. Blackwood, Sinking Foreman.
11. M. J. Murphy, Sinking Foreman.
12. J. B. Gilliatt, Chief Surveyor.
13. John Harvey, Heading Boss.
14. John Gunn, Heading Boss.
15. Fred Droken, Heading Boss
16. Fred Noftall, Heading Boss
17. Reid Proudfoot, Accountant.

The number identifies the persons shown on the accompanying photographs.

The improved efficiency in driving these slopes in comparison with other similar work previously done is attributal to two principal causes, viz.:

A system of tramming was adopted, by which the muck at the face was more quickly disposed of after blasting. The crosscuts, which were located at about 1200 feet intervals, were driven at an angle of about 30 degrees with the centre line or slopes instead of at right angles, as in the previous slopes. This enabled a hoisting engine of large capacity stationed at the surface deckhead to tram from both the East and West Slopes with very little delay of trips. Smaller electric engines did the tramming at the immediate faces, and assembled the trips for the longer hoist to the deck. By fans of ample capacity connected to 18-inch spiral rivetted pipe extending below the last crosscut driven, an ample volume of air was supplied to the working faces, enabling work to be resumed at a comparatively short time after blasting, and helped to maintain the energy and efficiency of the workmen.

View of Dockhead, Ore Bins and Picking-Belt House at No. 3 Scotia Slopes.

Bonus System of Payment to Workmen.

Another factor, which contributed largely to increased efficiency was a well adjusted bonus system. All foremen and laborers underground received an advance in their wages varying up to 75 per cent, according to the advance made per week. This bonus system was largely responsible for the continued interest and effort on the part of all concerned, and contributed much to the successful completion of the work. There being a time limit, it was necessary to excavate from both ends, necessitating very careful surveying to ensure the proper connections. In the final break-through the error was found to be so small as to be inappreciable.

Rate of Progress.

The cross section of the slopes is 10′ x 15′ inside timbers, which necessitated about 11′ x 17′ of excavation. The total length driven in the West Slope is 11,233 ft. and in the East Slope 10,755 ft. The best week's work in the West Slope was 83 feet for the week ending April 15th, 1918 and in the East Slope 81 feet for the week ending April 8th, 1917.

The best months advance for the West Heading was 344 feet in April, 1917, and for the East Heading 285 feet in, October, 1916.

The total excavation for both slopes was 127,613 cu. yds. with an overbreak of 11,315 yards or 8.8 per cent.

Power Plant.

A most important factor in work of this description is a careful preliminary study of the plant required and it is false economy to endeavor to save on this item. Fortunately in this case, the Mine having been in operation for many years with a large accumulation of various machines, the purchase of such new material was not necessary, but even in cases where new purchases are necessary, machines of ample capacity should be secured for drilling, hoisting, pumping and ventilation.

The followng is a brief resume of the plant required and used for this work and for help in the preparation of which acknowledgment is made of the assistance of the officials at the Mine.

The regular mining plant supplied the requirements for Boilers, Electric Power, Compressors and some other items, and it being impossible to separate the two services the whole plant is referred to in the lists of those three services.

Boilers.

Steam was obtained from boilers of the general mining plant consisting in part of 3 batteries (6 boilers) Sterling water-tube boilers, 231 h.p. each, 1 boiler 200 lbs. pressure 100 degrees superheat with chain-grate stokers.

At the central air-plant, 1 batttery (2 boilers) same dimensions hand fired, and 1 battery (2 boilers) at the old submarine or No. 2 Slopes.

Electric Plant.

Electric power also from the general mining plant consisted of 2 Brown-Boveri, 3 phase, 60 cycle, 500 K. W. generators, 6,800 volts, driven by Belliss & Morcom triple expansion condensing engines.

Main Slope Ore-Car. Makes the trip of two miles in five minutes with 20 tons of ore.

View of Break-through of the Slopes. This took place in No. 3 West, at 7,500 ft. down from the surface, or two-thirds of distance.

Another View of Deckhead, etc., at No. 3 Slopes.

Air Compressors.

1 Walker duplex Cross Compound 3,500 cubic feet per minute capacity.

1 Nordberg duplex cross-compound of 2,700 cu. ft. per minute capacity.

1 Reavell electric Single-Stage, 4 cylinder of 500 cu. ft. per minute capacity.

1 Sulivan electric of 625 cu. ft. per minute capacity.

Hoisting Engines.

In the early stages of sinking a Lidgerwood 10 x 12 steam hoist converted to an electric with 52 H.P. Westinghouse motor at the West Slope and one of similar capacity at the East Slope were sufficient. As the face advanced however, it was necessary to install a 112 H.P. single-drum Lidgerwood at the West Slope freeing the one previously in use, for handling the rock to the waste dump on the surface.

Subsequently a 50 H.P. electric hoist was set up near each face for handling and assembling the trips. Still greater depth necessitated an electric hoist with 2-112 H.P. motors at the surface and before the completion of the slopes it was necessary to still further supplement this by stage hoisting with an additional engine of the same type installed at No. 4 Crosscut.

Ventilation Plant.

Very careful preliminary study was given to this as a result of which a 48″ Sturtevant fan was installed at the air shaft to produce a circulation of 15,000 cu. ft. of air through the Slopes and lowest crosscut; the upper crosscut being of course, built off as the lower was connected.

In driving below the lowest crosscut by installing between each face and the lowest crosscut a 20 H.P. electric fan of 5,000 feet capacity each, connected by spiral rivetted pipe of 15 inch and 18 inch diameter, it was found possible to advance the faces 1,200 feet beyond each crosscut before driving the following one. Pressure fans were used because the heavy current of air blowing from the end of the ventilation pipe was found to sweep the working face and clean the atmosphere much more quickly than the exhaust method.

This installation enabled the dynamite smoke to be cleared from the faces promptly after blasting, permitting work to be resumed with a minimum of delay.

Drills.

At the start the U. D. Sullivan piston drill was sufficient. As the work advanced however and some quartzite bands of extreme hardness were encountered, it was necessary to change to the D. R. 6 water-tube bit, self-rotating hammer drills. These latter proved eminently satisfactory and while somewhat expensive in maintenance were a very important factor in the successful completion of the work.

Pumps and Pipes.

Although it was expected that much water might be encountered in these slopes, this was fortunately not realized, the quantity being considerable but not excessive. In anticipation of contingencies however, a pretty complete installation of pumps was made and without going into particulars of their location, etc., they consisted of the following:

4 No. 6 Cameron Pumps.

1 18 x 18 x 29 Jeansville Pump.

2 10 H.P. 2 Stage Allis Chalmers Centrifugal Pumps. and as spares,

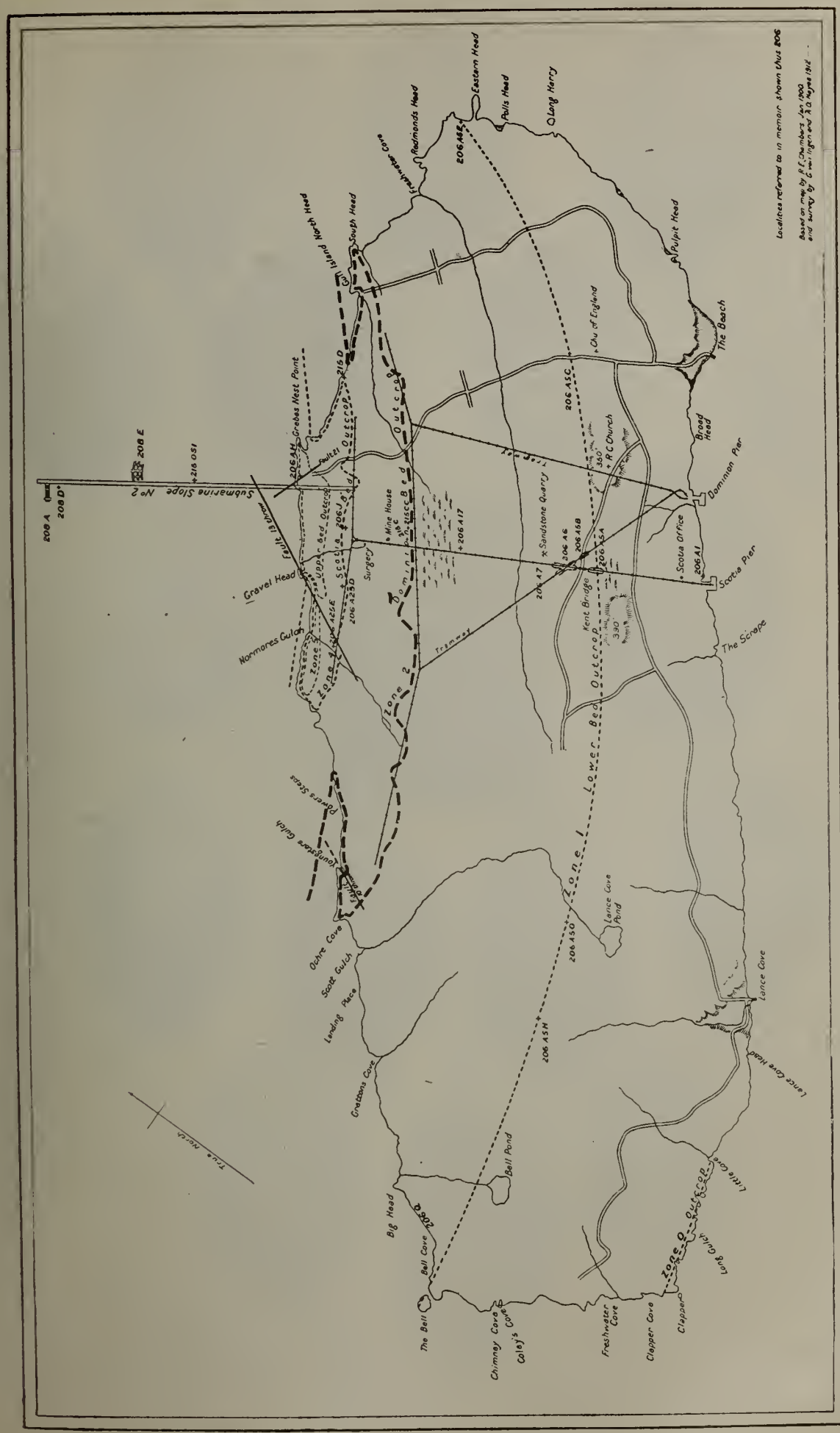
1 No. 6 Cameron.

1 12 x 15 x 13 Knowles Sinking Pump.

Two 8″ pipe lines were carried along as the slopes progressed, these being supplemented by the necessary branches and extensions of smaller diameter.

In event of meeting a very large flow of water, which it was proper to provide for, a grouting machine

Surface Stripping on the Dominion Ore-bed, showing regular dip of seam, and characteristic cubical fracture of ore.



Outcrops of Ore-Beds on Bell Island.

capable of injecting cement grout against a pressure of 600 lbs. per square inch was constructed, and kept ready for emergency near the work. This machine was similar to those used in the New York underground tunnels of New York city and was under the supervision of a specialist in this line from there, who spent some time at Wabana.

Tramming.

Perhaps of first importance in any work of this kind is an efficient system of tramming.

Cars of 30 cubic feet capacity running on 30 lb. rails with track of 3 ft. gauge in trips of 5 or 6 cars handled by the capacious engines above referred to, resulted in prompt removal of the muck after each blast and did the work under this heading in a satisfactory manner.

Protection from Runaway Cars.

Sampson Posts and other swinging gates were installed above the working faces for the protection of the miners at the face, and also a trailer used behind each trip. The gates and posts were promptly moved ahead as the face advanced, the result being a comparative freedom from accidents from this cause.

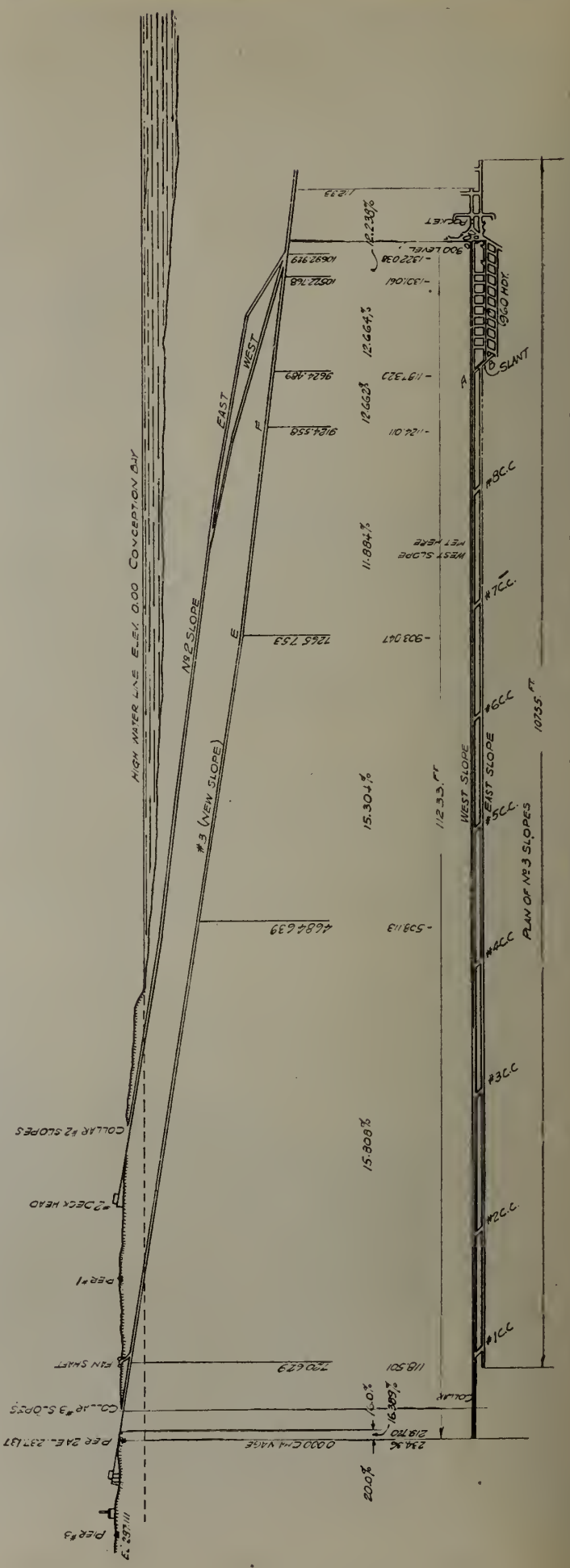
Surveys.

In a recent issue of the Canadian Mining Journal, James Purves, described a very creditable survey of slopes constructed at Princess Colliery, Sydney Mines, very similar to those under discussion.* The length of both was about two miles, but the angle of inclination 5 per cent at Princess and 13 per cent at Wabana. The principal difficulty encountered at Princess was from unstable or shifting ground, the conditions being not quite as bad as near the Pitch Lake in Trinidad where a line of stakes run straight at night is a series of curves the next morning, but having the same difficulties in a lesser degree. This difficulty made the result achieved by Mr. Purves very creditable.

The ground was firm enough at Wabana but probably the distance of carrying the survey rather greater, being at the time of the connection of headings, on account of the slopes being driven from both ends about four miles. The surface or descending end of the slopes were started on the produced centre line of the old No. 2 Slopes, a base line was then established and its alignment produced over the surface and down No. 2 West Slope to the main level in the submarine workings. A traverse by way of the levels and submarine workings and a slant excavated for the purpose to a point on the desired centre line, about 9,000 ft. from the surface, from which point angles were turned to the proper course, and the uphill driving commenced resulted successfully.

Grades and alignment were carried by plugs driven into holes in the solid roof. After about five years of excavation, the downhill and uphill headings finally met with the following result.

Error in alignment, ...	0.10 feet
Error in elevation, ...	0.217 feet
Error in chainage, ...	0.062 feet



Plan and Section of the No. 3 Slopes.—Nova Scotia Steel & Coal Co., Wabana, Newfoundland.

* See Canadian Mining Journal, p. 804, 1919.

Members of Staff connected with Sinking of No. 3 Slopes.
See page 243 for index to names.

The greater error of elevation over alignment was to be expected from the necessarily short sights in a slope of 13 per cent inclination.

Method of Working.

The length of shifts was 10 hours commencing at 7 a. m. and 7 p. m.

Blasting was done in the intervening hours between shifts.

The method of drilling and blasting was similar to that employed in driving No. 2 Slopes, which was described in Volume 12, of the Journal of the Canadian Mining Institute.

The shifts were commenced by the preparatory work of cleaning back the muck from the face and connecting up air and water lines. This accomplished the routine work of drilling, mucking and timbering as far forward as practicable without interfering with the work at the face. was rushed till the accumulated pile from the previous blast was sent to the surface.

The blasters now took charge as soon as the shift men were hoisted to the surface. After blasting and a reasonable time allowed for the smoke to clear away, the face was examined for missholes, loose rock taken down by the face cleaners, and after the place being reported safe, the same routine followed by the succeeding shift.

The regular timbering was kept advanced as near to the working face as possible, which in practice was found to be 60 or 70 feet. Where required temporary timbers were put in in this intervening distance, but usually the roof was firm enough to stand up till the regular timbering force working behind the excavation made it secure.

The very effective type of haulage successfully used for the first time in these slopes is of special importance to the steel industry of Cape Breton inasmuch as it points to a solution of the haulage problems arising from the moving of submarine deposits of coal at increasing distances as the working faces recede from the shore.

Thew Electric Shovel, Loading Iron-ore into Mine-car in the Scotia No. 3 Mine at Wabana, Newfoundland.

MR. RICHARD BROWN, M. E.—1805-1882.

MR. RICHARD HENRY BROWN, M.E. — 1838-1920.

An Appreciation by THOS. J. BROWN, Sydney Mines, Nova Scotia.

On the 9th day of February in this year, at his home in Halifax, after a few hours illness, died Mr. Richard Henry Brown, at the age of 82 years. The names of Mr. Brown and his father, Mr. Richard Brown, have been so long and so creditably associated with coal mining and its kindred interests in this province, it is appropriate that your paper should record these few appreciatory remarks. It is a very remarkable fact that these two gentlemen, father and son, should have had control of the affairs of the principal, and at one time, the only company engaged in the mining of coal in this province, for the extraordinary span of 74 years, and it is also a remarkable coincidence that each gentleman served exactly the same length of time, 37 years.

The father, Mr. Richard Brown, F.G.S., F.R.G.S., was born at Lowther, Cumberlandshire, England, on May 2, 1805, and came to Cape Breton as the agent of the General Mining Association of London in the year 1827. In June of the year 1864 he resigned the position of agent and manager in favor of his son Richard Henry, and returned to London, England, where he died on the 30th of October 1882. He married Sibella daughter of Captain Barrington, of the 60th Rifles. Their children were two daughters, Margaret and Sibella, and four sons, Richard, Charles, David and Henry.

Mr. Brown, aside from being a practical mining engineer and expert, was a great student of geology and history and was closely identified with such noted authorities as Sir Charles Lyell and Sir William Dawson, the two famous geologists of those days. He added many valuable papers to the engineering and geological literature of his time and some rare geological specimens and fossil remains were through his efforts supplied, and added to the English and Canadian collections. As the result of his geological research work in Cape Breton, he wrote a "History of the Coal Trade of the Island of Cape Breton," a book filled with the most accurate information which is still used as a reference book on the subject, and those who have occasion to refer to the book are amazed at the amount and the accuracy of the information it contains, particularly when it is remembered that the information about the outcrops, thickness and quality of the various coal seams was collected when the country was a wilderness and the means of travel very limited. The attention he gave to a study of the Island's history, the attachment he had for the place of his adoption, the interest he manifested in the youth of Cape Breton, caused him to write a "History of the Island of Cape Breton." This he did after his retirement to England, and the work which he dedicated to the youth of Cape Breton is an interesting and invaluable one.

He was the first man in Cape Breton to see and appreciate the value of the Island's under-sea coal measures. His faith was manifested in a decision to sink a shaft at the water's edge for the purpose of winning the coal underlying the sea. This was pioneer work, and the engineer who undertook to advise the company to sink this mine through strata filled with sea water for the purpose of mining coal under the sea, must have been an engineer of remarkable foresight and courage, and such undoubtedly was Mr. Brown. The undertaking was proceeded with, and after eight years of many difficulties and dangers, the work was completed. The Winning is what is now known as the Princess shaft of the Nova Scotia Steel and Coal Company, and has produced coal uninterruptedly from the year of its opening to the present time. To his son was left the task of completing the work. It became necessary owing to the sea breaking into it, to line the shaft with metal to keep the water back and the successful completion of this work was considered an engineering feat of considerable consequence in those days. The son was also called upon to face the problems of the extraction of coal under sea. They were many and serious, but the plans and intentions of the one were ably executed by the other, and mining engineers engaged in this field of work today willingly pay tribute to the courage and foresight of the Browns, both father and son.

Richard Henry Brown, M.E., was born in London in the year 1838. His early education was received at the Collegiate School, Windsor, N. S., and subsequently he attended the engineering department in the St. Lawrence Scientific School at Harvard University. He spent some years as a student of mining in the Seaton collieries in the north of England and served under the celebrated mining engineer, Mr. Thomas E. Forster, of Newcastle-on-Tyne. On the first of July, 1864, he succeeded his father as the agent manager of the General Mining Association in Cape Breton. In addition to the management of Sydney Mines, Mr. Brown has also the management of the Lingan and Victoria collieries, which were then operated by the Association. He continued in the management of Sydney Mines for the Association until they sold out to the Nova Scotia Steel & Coal Company, in the year 1900, and continued as manager for the new company until they got nicely underway, when he decided to retire to Halifax to spend his declining years.

Mr. Brown was the first mayor of the town of Sydney Mines, and unopposed held the position until his duties began to interfere with his duties as manager, when he retired in favor of others.

He married Barbara Davidson of Pictou, and their family are one son, Richard now engaged in business at Sydney Mines, and four daughters, Annie the late wife of Dr. Lewis W. Johnstone of Sydney Mines, Margaret, Elizabeth and Lilian, living at their home, Kent street, Halifax.

The names of the Browns, both father and son, will always be associated with the coal industry of Nova Scotia. They were both remarkable men of untiring industry and unfailing integrity. Their word was their bond and they built up for the English interests they so long and ably represented in this country, a wide reputation for honesty and fair dealing.

Consistently throughout his whole lifetime, Mr. R. H. Brown was an exceptionally good living man. He had very high ideals and was scrupulously honest and upright in all his dealings. He never failed to be solicitous for, interested in and thoughtful of the sick and needy. He was notably open and honest in all his dealings and absolutely incapable of deception.

At Sydney Mines a few days ago when the many old friends of the late Mr. Brown gathered around his remains to pay him their last tribute of respect all felt they were parting with an old friend, who in his particular sphere of life had industriously striven

to do his duty, and had gone to his reward leaving after him the proud record of having been a good Christian citizen, a loving, thoughtful husband and parent and an honest straight-living, God-fearing man.

Note:—The Editor is very glad to publish the foregoing account of the life of the Browns of Sydney Mines, prepared by Mr. T. J. Brown, General Superintendent of the Nova Scotia Steel and Coal Company at Sydney Mines. Mr. T. J. Brown, it may be mentioned, is not a relative of the two gentleman whose life he has detailed, although by a curious coincidence his name has continued the long tradition in the management of the Sydney Mines collieries.

THE GOWGANDA RAILWAY PROJECT

Editor,
Canadian Mining Journal.
Sir:—

Mr. F. B. Macaulay, in your issue for February 25th, forgot to tell us, that Uncle Samuel is a member of, what I believe, is termed the Pan American Union, composed of the South and Central American countries. These countries are known to possess partly developed and undeveloped mining, agriculture and range land as well as timber. May not Uncle Samuel insist in getting paid in gold, from John Bull & Sons, and devote his trade, money and gambling spirit, towards developing the South American countries?

Canada today needs every man and every dollar she can secure for the purpose of developing her natural resources and it is safe to say, that had it not been for the American gambler, Canada would have had no nickel from Sudbury, no coal from the Crow's Nest, no gold and copper from Rossland and Boundary, in fact mighty little of anything, but an unexplored wilderness in possession of the Hudson Bay trapper.

The history of Canadian development shows that John Bull & Sons is more apt to invest in a hole in the ground, from which Uncle Samuel has shipped ore, than to risk irrational development. There is to be admitted, that now and then, there is an exceptional case in which John Bull & Sons shows pluck. One of these instances referred to is the history of development of the Miller-Lake O'Brien at Gowganda. To offset that, however, we have the faint heartedness of the Province of Ontario, which during the last ten years has failed to muster sufficient courage to build twenty-seven miles of railway into what undoubtedly will prove a second Cobalt, namely Gowganda.

During the last five years, newspapers, periodicals and patriots, have carried on a useless and today, it is beginning to be realized, an unprofitable agitation and demonstration against the Aliens in Canada.

Prohibition of trade, wholly or in part, with the country to the South of us, is likely to prove equally unprofitable.

Without the men, who are willing to risk their capital, and the men to carry on the work, the minerals contained in the Canadian rocks are of no service.

L. O. HEDLUND.

Gowganda, March 5th 1920.

We think that Mr. Hedlund has misunderstood Mr. Macaulay, who did not desire to discourage the United States capitalist from bringing his money into Canada. What he wished to discourage was sending Canadian gold out of Canada. When Uncle Sam's sons invest money in Canada, as so many of them have done and are still doing, they become members of the firm of John Bull & Sons, and the trading is all done within the family. As to the "exceptional cases in which John Bull and Sons shows pluck" we leave that to our readers. During the past six years the firm has incurred heavy liabilities, yet when we read in one issue of the daily paper that the old man has occupied Constantinople and has sent warships to the United States with $40,000,000 in gold, we surmise there's life in the old dog yet.—Ed.

PORT ARTHUR NOTES.

Robert Wachman, President of the Wachman Mining and Milling Co., Ltd, Dryden, Ontario, is in Port Arthur superintending the shipment of six cars of machinery, from Kawene, on the Canadian National Railway, to the Company's property, situated seven miles south of Dryden. On arrival at the mine, this machinery will be installed in their new 20 Stamp Mill, now nearing completion. It was originally intended to have the Stamp Mill in operation on May 1st. It is found that this will be impossible, and it is now the intention to begin dropping the stamps on June 1st.

Fifty men have been employed during the winter. Camps are all completed, and a wharf is now under construction.

No. 1 shaft is down 53 feet. The vein has widened to 8 feet of solid quartz, carrying average values of $20.60 per ton. No. 2 shaft is down 27 feet, bottomed in rich spectacular ore, a quantity of which is now on exhibition at Dryden.

J. I. Carmichael, M.E. of Winnipeg, has recently reported on the property for the shareholders. Prof. Kay, of the University of Iowa, has just completed an examination, and has made a highly satisfactory report, remarking that it has a great future.

The main vein has been uncovered for seventy feet, south from shaft No. 1 visible gold shows for practically the whole distance.

The Contact Bay Mining Co. (formerly Rognon) are opening up three properties adjoining the Wachman. They are down 110 feet. At the 100 foot level a drift is being pushed north in the direction of the Wachman, in which they have encountered an ore chimney, averaging $70. per ton. This is a continuation of the Wachman vein, and crosses both properties.

The Iowa-Canadian Mining Co. are opening up three properties about four miles from Contact Bay. At present they are employing 12 miners, this force will be largely increased in the near future. There are four parallel veins on their lands, with a dip that indicates they will come together at a reasonable depth. Carefully taken channel samples taken from the surface show an average of $55.60 per ton, over the four. Test pits put down at the top of a hill show the vein to be 4 feet in width. Pits sunk at the bottom of the hill show the vein to be 8 feet in width.

Visible gold is found in all of these veins.

All the necessary sinking and hoisting plant has been purchased at Gold Rock, and will be immediately installed.

NORTHERN MANITOBA MINES.

By R. E. HORE.

Activity at Flin Flon This Year.

It was announced last week that the copper deposit at Flin Flon Lake, Manitoba, would be developed this summer by Col. W. B. Thompson and associates. Additional information is given in the Mar. 13 number of "Engineering and Mining Journal", to the effect that W. J. Judson, C. F. Ayers and a certain mining company are associated with Col. Thompson in the deal. The price is said to be $1,500,000, payable in cash at the end of one year. It is understood that the prospective purchasers have agreed to spend $200,000 on the property. The plant at the Mandy mine has been purchased and $60,000 worth of equipment and supplies is being taken to the property.

The Flin Flon is situated in the Pas district Northern Manitoba. The Manitoba-Saskatchewan boundary line crosses the ore deposit; the greater part of the known ore is in Manitoba, but Saskatchewan will become a copper producer when the Flin Flon is in operation. It is not unlikely that the work done this year will result in big undertakings later. A railway 80 miles long will give the necessary transportation facilities. Water-power can be developed at Birch Rapids on the Sturgeon river or at Island falls on the Churchill river. The size of the ore deposit is such that large scale operations will be possible, and a smelter that will treat 2,000 tons daily is spoken of.

That a project of this nature will mean much for Manitoba is obvious. By encouraging such projects our governments will help to bring about a better balance of industrial activities in the Prairie Provinces. The announcement that the Flin Flon project is finally well under way, should prove encouraging to other enterprising persons, for Northern Manitoba is a very promising field and there is now firmer ground for believing that the governments concerned will not be unappreciative of the desirability of establishing mining industries in the province which do not own the minerals within their borders.

Discovery of the Mandy Mine.

The Mandy mine in the Pas district Northern Manitoba has been an important factor in drawing attention to the mineral possibilities of the Prairie Provinces. From this property there has been mined about 25,000 tons of high grade, 19 per cent. copper, ore during the past few years. Operations have been discontinued but are likely to be resumed when the transportation facilities are available. It is estimated that there is 200,000 tons of mixed copper-zinc-iron ore blocked out in the mine. If the Flin Flon property is developed and a smelter built, the Mandy mine will be heard from again.

As this is Manitoba's first producing copper mine, the story of its discovery and development is of special interest. This story is told by Mr. J. E. Spurr in the March 13th number of "Engineering and Mining Journal". Mr. Spurr has been identified with the enterprise from its birth and he gives an intimate account of the events leading up to the discovery.

Appreciation of Government Assistance.

The need of continually calling on governments to take action that will help to bring about more rapidly the development of our mineral resources is well recognized. It may not be out of place, however, to state that public commendation of what our governments do for the industry is also desirable. It is therefore with pleasure that I read Mr. J. E. Spurr's statement that in the development of the Mandy mine, the Manitoba Government "was very liberal and helpful". This statement is both courteous and well deserved and would be less noteworthy if it were less exceptional.

Criticism of our governments policies effecting mining is intended to be constructive, and it is commonly taken for granted that the good features of mining laws in Canada need no publicity. A little commendation is nevertheless desirable.

INTERNATIONAL MINING CONVENTION

Seattle, Washington, U.S.A., April 7th to 10th 1920.

When the very successful International Mining Convention was held in Vancouver in March 1919, the Seattle delegates anticipated a return visit to the Convention of 1920 in that City reciprocating by British Columbia mining men the large attendance of visitors from across the line at Vancouver, and indications are that this hope will be fulfilled.

The Official Call is now issued, and the object of the Convention is stated to be to bring together from around the "Rim of the Pacific" those interested in mining and its allied interests. Among subjects to be ventilated are the following:

GOLD.—The American Mining Congress is sponsor for a bill which is to be placed before the U. S. Congress immediately asking for a bonus of ten dollars per oz. on all gold mined. An address will be given by Mr. John Clawson, formerly with the Chemical National Bank in New York, and now with the Union National Bank at Seattle. Another banker, Mr. Crawford of Portland, Or., will address the Convention. Mr. Crawford originated the resolution asking for a bonus on gold that was passed by the American Bankers' Association at Chicago in 1919. It is hoped that a talk on gold from the miner's standpoint will be given by Governor Emmet D. Boyle, of Nevada, who fathered the Pittman Act regulating the price of American silver. There is no subject more discussed in mining conventions today, and less understood, than the status of gold and gold-mining, and a lively discussion may be anticipated.

IRON AND STEEL.—Many facts regarding the manufacture of iron and steel on the Pacific Coast will be presented, and discussion is also likely to be animated on this question, which greatly interests the North-West at this time.

Addresses are expected from C. P. Bowie, of the U. S. Bureau of Mines, on Petroleum, by Dorsey A. Lynn, also of the Bureau of Mines, on the needs of the mining industry; on electro-metallurgy, by O. C Ralston, and by Mr. T. A. Rickards with regard to mining investments. The Minister of Mines for British Columbia is expected to speak with regard to British Columbia iron resources. Prof. Joseph Daniels will speak regarding the Coal Resources of the North-West, as to which he is very well informed. Mr. J. G. Ralston, hydraulic engineer, of Spokane, will speak on the water powers of the North-West, and will explain the effect upon the public of the recent legislation of the Congress of the United States on water-powers.

It is announced by several Seattle hotels that Canadian money will be received at par.

An exhibition of minerals will be feature of the Convention, and arrangements are being made for suitable entertainment of the visitors. The address of the Convention Headquarters is 1316, L. C. Smith Building, Seattle.

Our Northern Ontario Letter

THE SILVER MINES

In the midst of world amazement at the lightning-like social and political upheaval throughout the German Empire, interest in silver during the past week or so showed a slight decline, and resulted in a considerable recessions in quotations for the metal. The slump in the opinion of Canadian silver mine operators, is but temporary, and when the concrete results of the present new wave of added destruction in old Europe emerge, the demand for silver is believed likely to be renewed afresh and to be intensified.

Mindful, also, of among other things of the official statement made by Chang Kung-chuen, Vice-Governor of the Bank of China, that the appetite for silver in the Far East is indeed proving to be insatiable, and that hoarding is now more general than ever, the silver producers of the Cobalt district do not regard with any undue alarm the fluctuating quotations. To the contrary, there appears to be a more deeply rooted belief that with the world literally flooded with paper currency, the demand for the precious metals may not yet have reached the peak, and that another sustained upward swing in quotations is not at all improbable.

During the past week or so practically no bullion has been shipped from the big silver producers of Northern Ontario. In the meantime, production is proceeding at full blast, and the vaults which but yesterday, so to speak, were looted clean of their precious contents on account of the high quotations for silver bullion, are being rapidly refilled during the present period of but only a slight decline in prices.

Added evidence of the general prosperity in the Cobalt field is this week's official statement by the McKinley-Darragh Mines, as well as by the La Rose Consolidated, covering operation during the year 1919.

For the twelve months ended December 31st, last, the La Rose produced 289,317 ounces of silver, the value of which was $356,124, or an average of $1.17 an ounce, as compared with an average of 99.83 cents an ounce in 1918. The surplus at the end of the year amounted to $514,424, compared with $456,046 in the previous year. Of its entire surplus, the La Rose holds $372,834 in cash, call loans and Victory Bonds. Also, since the report was issued, development work on the Company's University property has been quite favorable, and the general outlook for 1920 is good.

The Mc-Kinley-Darragh in 1919, in spite of last summer's labor strike, added upwards of 200,00 ounces of silver to ore reserves. Production for the year amounted to 767,798 ounces, against which 970,021 ounces in new ore was developed. Ore reserves at the beginning of 1920 are estimated at 1,077,411 ounces, as compared with 852,754 ounces at the beginning of 1919. Current assets are $579,100.30, while the net surplus, after providing for a dividend of $67,430.76 at the beginning of this year, amounts to $365,601.92. The average cost amounted to a little under 72 cents an ounce, while the average price received amounted to close to $1.11 an ounce.

Following is a summary of production and costs since the company first commenced operations:—

Ounces Recovered toDate

Year.	Ozs.
1906-7	749,216
1908	718,068
1909	1,297,326
1910	2,356,006
1911	2,654,177
1912	2,717,383
1913	2,214,036
1914	1,396,540
1915	1,107,815
1916	925,779
1917	908,756
1918	904,543
1919	767,798
Tot. to Jan. 1, 1920	18,995,443

Costs and Profits Compared

		Ave. Price Received	Total Costs.	NetProfits Per Ounce
Years	1906-7	0.59	$0.2614	$0.3286
Year	1908	0.52	0.2341	0.2859
,,	1909	0.5131	0.2263	0.2868
,,	1910	0.5405	0.1705	0.3700
,,	1911	0.5416	019479	0.34681
,,	1912	0.6166	0.1859	0.4307
,,	1913	0.5919	0.2233	0.3686
,,	1914	0.54385	0.31325	0.2306
,,	1915	0.50785	0.28710	0.22075
,,	1916	0.67364	0.40730	0.26634
,,	1917	0.8320	0.5709	0.2611
,,	1918	0.99724	0.6842	0.31304
,,	1919	1.1065	0.7113	0.3872

During 1919 the Right-of-Way Mine was not operated profitably. The directors have advanced personally to date $21,000. The profit and loss account shows a balance atdebit of $12,661 at the end of 1919, as compared with the balance at credit of $514 at the beginning of the year. Current assets total $9,049, while the current liabilities amount to $16,443.

Negotiations in connection with the proposed merging of the Adanac and the Victory Silver Mines have taken a more favorable turn and now offer fair promise of being concluded successfully within a reasonably short time. It is stated that operations on the Hylands property of the Victory Company is now practically assured, either as a result of completing the merger or with the support of Buffalo capital. The basis of the proposed new merger is to organize a new company with an authorized capital of $3,000,000, made up of 3,000,000 shares of the par value of $1. each. Of this, 1,000,00 shares would go to the present Adanac shareholders, 1,000,000 to the owners of the Victory Silver Mines, and leave 1,000,000 shares in the treasury, to be sold at some subsequent date for the purpose of financing operations.

The Oxford-Cobalt Company, with property in Gillies Limit about one mile south from the Kerr Lake Mine is arranging to commence sinking at an early date. A small circular letter has just been sent out, dealing with the promising ont look at the property and offering shares for sale. It is stated that a five-inch vein on the property has been found to contain 25 ounces of silver to the ton.

In the Gowganda district, attention is centering with renewed interest on the Castle property of the Trethewey-Cobalt Company, from which it is intimated that a carload of ore may be sent out within the next few weeks. While various reports in circulation greatly exaggerate the true physical condition of the mine, it is learned that the result of work has been extremely satisfactory, and that a considerable tonnage of high grade ore is already assembled ready for shipment, and that it is quite reasonable to expect such a shipment to be made before the spring break-up. The proceeds from such a car could then be used in connection with work of developing additional ore and assembling further high-grade for shipment at such time as transportation facilities appear to warrant it .

During the week ended March 19th, the Coniagas was the only company to ship ore from Cobalt. Three cars were sent out by the company, consigned to the Coniagas Reduction works at Thorold.

The total ore contained in the three cars amounted to 194,458 tons.

THE GOLD MINES

Now that the mining companies of Porcupine have made a similar announcement to that of the Kirkland Lake Companies in connection with increased wages, the general belief is that mine workers will be attracted to the gold mining districts in increasing numbers. The new wage scale adopted, place the mine worker on a similar basis as at Cobalt when the price of silver averages between $1.20 and $1.30 an ounce. At Cobalt the muckers, etc., are paid $3.25 a day plus a bonus of 25 cents a day for each ten points to which silver advances above 80 cents an ounce, so that with silver at $1,20 an ounce the bonus amounts to $1 extra, making a total of $4.25 for each eight-hour day worked. The scale to machine runners is $3.75 a day plus a similar bonus as to the muckers, making a total of $4.75 a day. Compared with this, the announcement is made, both at Porcupine and Kirkland Lake that muckers, etc., will be paid $4.25 a day and machine runners $4.75.

The changed policy of the Porcupine companies in regard to their wage schedules is commented on favorably by mining men in general. The departure from the former flat rate of $4 a day to all underground workers is regarded favorably. The system of classification of labor is generally believed to be preferable, and the present return to such a policy is welcomed. Early difficulties have arisen, however, but they promise to be adjusted satisfactorily. For instance, without former classification, it was inevitable that in making the change the more skilled labor would receive a greater increase than the unskilled and that some dissatisfaction would be expressed by the latter.

The mill at the Porcupine Crown Mine has been set in operation and with half a year's broken ore available no difficulty is expected in getting up to full capacity.

Last week's statement in the "Journal" showing official fignres in conection with the tonnage treated and the gold produced by the Dome Mines has aroused considerable favorable comment in mining circles.While it is recognized that in recovering $6.87 a ton, a higher grade ore than the mine's average was being treated, yet it is thought that when mill capacity is increased another 1,000 tons a month, the lower average mill-heads may still leave a total net profit almost eqnal to that being realized while operating on high heads but on about two-thirds of mill equipment. It would perhaps be only fair to suggest that shareholders would do well to take into accounnt the fact that the average gold content in the Dome's ore as estimated in latest reports is $5.10 per ton, and that it may be possible that costs will rule high for some time. Should this be true, it might not be well to figure on more than $1.50 profit on each ton treated, should this prove to be the case, the mill running at full capacity of from 40,000 to 45,000 tons a month would result in producing from $200,000 to $225,000 gross monthly, or a monthly net profit of between $60,000 and $70,000. In order to pay dividends at the rate of 20 per cent annually, it is only necessary to realize net profits of $66,666 monthly. Thus in dealing with the Dome on this ultra-conservative basis, the shareholders of the company would appear to have reasons for being exceedingly confident.

At Kirkland Lake, April 15th is the probable date on which the Wright-Hargreaves Company will commence the construction of its big cyanide mill. James Grant has been in the service of the Company for the past several months, having designed the mill the chief parts of which have already been transported to the mine. The reduction plant is to have a capacity for treating at least 200 tons daily, and will be similar to that of the Lake Shore. Continuous counter-current decantation will be the process. The mine itself is highly developed, there being upwards of a dozen faces from which ore may be drawn.

The Ontario-Kirkland will continue its main shaft from the present depth of 300 feet to about 500 feet at which point it is proposed to establish another development level. . The ore body developed at the 300-feet level will be developed to as great a depth as possible, during the course of which it is planned to erect a new mill. The aggressive and business-like way in which the Ontario-Kirkland (formerly the Hurd claims) has been developed has been one of the outstanding favorable features in connection with the Kirkland Lake Camp.

It is estimated that the combined current output from the Lake Shore, Teck-Hughes and the Kirkland Lake is at the rate of between $90,000 and $100,000 a month. Following the completion of the Wright-work with the Tough-Oaks mill, it is believed that this Hargreaves mill together with the resumption of production may be doubled.

The Miller Independence Mines will probably turn on electric energy this week, following a number of unfavorable delays, and from now on the work of developing the mine will be speeded up considerably. A contract for some 300 feet of lateral work at the 500-feet level has been let, and rapid progress is expected, both at the depth and on development work that is also to be carried through an incline shaft from surface(and following the ore body in which gold tellurides occur.

The Peerless Company is making good headway in continuing its shaft to the 250-feet level. The recent report that a five-foot vein had been encountered at a depth of about 160 feet has been officially confirmed, but it is learned that the mineralization was not as heavy as that at first reported.

The Better 'Ole Mining Syndicate has been formed with object in view of developing a group of claims in the Sesekinika Lake district, in the township of Maisonvelle, adjoining the Murray-Mogridge property. The syndicate is capitalized at $100,000, made up of 2,000 share of the par value of $50 each. It owns 320 acres of territory, and includes the two Ashly claims which were staked six or seven years ago. Nothing was done on the property during recent years owing to the owner being overseas, but it is to be proposed to carry out sinking operations. A feature in connection with the new syndicate is that Captain Bruce Bairnsfather, the clever cartoonist who turned the grim tragedies of war to fun, and whose work became famous in many countries, is a member of the Better 'Ole Mining Syndicate.

MINING PERSONALS

Ernest C. Johnson, president of the Marathon Mill and Machinery Works, Chicago, as well as the Johnson Engineering Works is spending a few days in the mining districts of Cobalt, Boston Creek, Kirkland Lake and Porcupine. Mr. Johnson is the inventor of the Marathon Grinding Mill.

Mr. Hubbell, representing the American Cyanimid Company, Niagara Falls, Ont., was a business visitor in Cobalt this week, and returned south last night.

Wm. Gowans, of the staff of the Eastern Mining and Milling Company, at Eastman, Que., some 25 miles from Sherbrooke, is visiting at his home in Haileybury. Mr. Gowans declares that excellent progress is being made on the copper property of the Eastern Mining and Milling Company and that the mill is treating about 140 tons of ore daily.

T. J. Flynn, of the Port Matchewan Gold Mine is in Haileybury on business.

OFFICERS AND OBJECTS OF THE ONTARIO MINING ASSOCIATION.

An organization to be known as "The Ontario Mining Association" was effected in Toronto on March 9th, 1920.

The object of the association will be to foster the development of the industry and to co-operate with the Mines Department of the Ontario and Dominion Governments.

By collecting and consolidating data and statistics relating to the industry the Association will be in a position to supply authoritative information hitherto unavailable in the hope that the people of Ontario may gain a more reasonable and keener appreciation of the importance and problems of the industry.

The following is a list of the Officers and Directors:

President: A. D. Miles, Toronto; 1st Vice-President: A. F. Brigham, Porcupine; 2nd Vice-President: Col. R. W. Leonard, St. Catharines; Directors: C. W. Corless, Sudbury; C. D. Kaeding, Porcupine; H. H. Kee, Cobalt; H. Park, Cobalt; F. L. Culver, Kirkland Lake; Mr. Cowie, Sault Ste. Marie; W. A. Carlyle, Ottawa; G. H. Gillespie, Madoc; A. J. Young, Toronto; G. C. Bateman, Toronto; J. P. Bickell, Toronto, Alex. Fasken, Toronto; Secretary-Treasurer: B. Neilly, Toronto.

These Directors represent the following branches of the Mining Industry:

(1) Porcupine, Kirkland Lake and Boston Creek gold districts.

(2) Cobalt and Gowganda silver district.

(3) Nickel, Copper Mining, Smelting and Refining Industry.

(4) Iron and Sulphur Ore Mining.

(5) Silver smelting industry.

(6) Non-metallic production from Eastern Ontario.

Practically all producing mines, as well as a large proportion of the more important properties under development in the Province, are already members of the Association, making it apparent that the Ontario Mining Association will represent the Mining Industry as a whole.

A permanent office is being established in Toronto.

THE MINING SOCIETY OF NOVA SCOTIA.

Glace Bay Meeting, May 4th and 5th 1920.

The Council has made such arrangements that, with the co-operation of the Members in the matter of papers and attendance, will insure a very successful Meeting.

A smoker will be held on Tuesday evening, for which a very attractive program has been arranged.

The Dominion Coal Company has invited the Members to be their guests at a luncheon, at the Glace Bay Hotel on Wednesday.

The Committee desire, that all who intend to submit papers should send a copy to the Secretary before April 15th., so that they may be printed.

Full program will be forwarded prior to date of Meeting.

We feel assured that all Members will be amply repaid for any effort which may be made to be present.

PROVINCIAL GOVERNMENT OF MANITOBA TO EXAMINE DAUPHIN OIL DISTRICT.

Investigation of the Dauphin oil fields by the provincial government may be undertaken in the immediate future, according to an announcement made today by Hon. George A. Grierson, minister of public works.

Representatives have been received by the government from the Dauphin board of trade asking for an investigation of the oil shale in the district, in order to find out if it is present in commercial quantities. Mr. Grierson said that he had communicated with Commissioner R. C. Wallace, of Northern Manitoba, and Hugh McNair, of the Public Utilities Commission, asking them to report on the possibilities of oil in this district.

Should the report from these experts be favorable the government, he said, will dispatch a drill to the district to test for oil. The drill will be capable of boring to a depth of 1,000 feet. The report will be based on a geological survey of the Dauphin district.

JAPAN IS POSSIBLE MARKET FOR BRITISH COLUMBIA COAL.

The Japanese Consul at Vancouver, Mr. H. Ukita, states that British Columbia coal, even under high freight charges now current, could be sold in Japan and realize a substantial profit. During 1919, says Mr. Ukita, Japan consumed 27,000,000 tons of coal, at a price equivalent to $22,00 a ton.

THE HEDLEY GOLD MINE RESUMES OPERATIONS.

The Hedley Gold Mining Co. has resumed operations after several months inactivity. G. P. Jones, General Superintendent, states that the intention is to work the property to the capacity of the plant henceforth. The mine is situated on the Nickel Plate Mountain at an elevation of 5,800 feet and has been in operation for over 20 years.

BRITISH COLUMBIA LETTER.

The Metal Mine.

H. J. Bush, at one time owner of what now is the Premier Mine, and a prominent mine operator of British Columbia, recently returned from England and is authority for the statement that the Selukwe Gold Mining and Finance Company has taken a third interest in three properties controlled by Messrs O. B. and H. J. Bush and associates. These properties now are administered by the Bush Mines, Ltd., the B. C. Silver Mines, Ltd., and the Salmon-Bear River Mining Co., Ltd. It is understood that a single company to be known as the British Canadian Silver Corporation will be formed to take over the three first mentioned and that the Selukwe Gold Mining & Finance Company, which will subscribe the working capital, will take shares in the new Company. These three holdings are said to embrace about fifty claims from which some high grade ore has been taken but which have yet to be developed.

Roy Price, formerly in the employ of the Granby Consolidated Mining and Smelting Co., is behind a project which is to be given a trial in the development of the Salmon River District of Portland Canal, B. C. and which, although unique in Canadian mining operations, is pronounced by those most competent to judge, to be eminently practicable. It is the use of one or more hydroplanes from Hyder, Alaska, or Stewart, B. C. for the transport of light supplies to the properties now under development in that locality. There is nothing, it is pointed out by those who have been over the ground, impossible, or even formidable, in the undertaking. From either Hyder or Stewart there is straight flight up the broad Salmon River Valley to Long Lake, the distance by air line being probably little more than eighteen miles. There are no mountains of extremely high altitude to cross along this route so that the press reports of the character of the task are not warranted. From Long Lake there is a trail to the Mineral Hill and other properties which at present, is rather rough for about a mile but from that point is in fairly good condition, so that the distribution of freight from Long Lake to the different operating properties would be a comparatively simple proposition. On return trips it would be possible to the hydroplanes are a success in this field, to bring to tidewater such high grade ore as might be available for shipment. Lieut. Ernest O. Hall, of Vancouver, B. C., a Canadian aviator with overseas experience, is one of those interested and with him is associated Test Pilot E. Hubbard, of Seattle, Wn. The former states that a Seattle firm has contracted to deliver by April 15th one specially designed flying boat and two more of the same model by May 15th next, and if these are satisfactory three more will be built for delivery on or about June 15th. Each plane will have a carrying capacity of approximately forty cubic feet. Owing to the shortness of the summer season in the north the aviators are not figuring on more than 100 days suitable for their work but by making frequent trips they, and the mine operators, are said to be confident of their ability to transport by air, not only all light freight needed in the camp, but a large proportion of the year's output from the mines. Lieut. Hall and Pilot Hubbard have announced that they will take off from the Sound City in the first hydroplane completed about April 15th and that the 600-mile trip up the Coast will be made with only one stop, the place selected being Ketchikan. The planes will have a cruising radium of 450 miles.

The strike which has been interfering with operations at the Premier Mine is reported to be settled, an advance of 50 cents a day being granted the workmen, together with other concessions among them the undertaking to employ a competent cook.

In the Marmot River section of the Portland Canal Mining Division there has been little mining during the past several years outside of assessment work but, with the intense activity along Salmon River and with high silver prices and a market promising to maintain its stability, an improvement is looked for this season. The Montana Group of Claims, situated in this locality, having been acquired by the Stirling Mining Co., which concern also has taken over the Grand View Group of four claims. The ores of both carry silver lead values. The Kay-Bee-Bird Group, also of Marmot River, is reported to be bonded to a Vancouver syndicate.

Alice Arm, B. C.

A. J. T. Taylor, president of the Taylor Mining Company, accompanied by C. M. Rolston, the Company's vice-president, and G. Nutter, representing the Mineral Separation Company of London, England, is visiting the Alice Arm District. The party propose making a survey of the scene of this year's operations in connection with the Dolly Varden Mine. Plans no doubt will be considered with reference to the additions to mine plant, railroad equipment, etc., which the company intends to install at an early date.

Travel to northwest British Columbia and southwest Alaska, which includes the camps of Salmon Arm and Alice Arm, has reached the proportion of a rush in the last few weeks. The Grand Trunk Pacific northbound vessels from Victoria, Vancouver, and Seattle have been crowded. Sleeping accommodation is at a premium for some weeks ahead. Residents of Vancouver who witnessed the departure of the last G. T. P. boats were reminded of the Klondyke rush, miners and prospectors, with little more than blankets, and asking only for deck space, are hurrying to the new fields in order to be ready to get into the hills as soon as the winter breaks.

Barkerville, B. C.

The Lightning Creek Gold Gravels and Drainage Co., operating near Wingdam on Lightning Creek, Cariboo District, has been unsuccessful in its last attempt to reach bed rock according to reports from that section. The timbers of a fine new shaft have been carried away, which would appear to mean that the Company's elaborate preparations, heavy expenditures in special equipment, etc., have gone for nought. In 1918 J. D. Galloway, mining engineer, told of the undoubted possibilities should the efforts being made to reach and operate at bed rock be successful. He explained that portions of the channel had been broken into by means of bed-rock drifts from the shafts which were sunk in the rim-rock," but in each case the great pressure of water and gravel encountered when the drift broke into gravel has been more than could be handled."

A Vancouver Syndicate is reported to have succeeded in development operations on the leases of the Antler Creek Gold Mines, Ltd., bed-rock having been reached and good pay found.

Trail, B. C.

Ore receipts at the Trail Smelter of the Consolidated Mining and Smelting Co. for the week extending from the 22nd to the 29th of February incl. were 6.004 tons.

For the first week in March they were 3,538 tons, bringing the total for the year up to 57,384 tons. Shipments from the Rossland Mines of the Consolidated Company ceased with the opening of March, which was to be expected in view of the announcement that for a time these properties were to be subjected to development.

A dividend of $261,936 has been declared by the Consolidated Mining and Smelting Co., payments to be made on April 1st to shareholders of record on March 10th. The pending payment will increase the total dividend disbursements to $6,567,211.

Simultaneously with the dividend announcement comes the statement that the Company has broken ground at Trail, B. C., for a large new concentrating mill, and has considered the construction of another at Kimberley, B. C. for the treatment of the ores of the Sullivan mines. The Trail Mill will dress the ores of the Rossland Mines. If the report regarding the latter is authentic it means that the management has decided definitely in favor of Trail as against Rossland as a site for the new installation.

Kimberley, B. C.

The action of the Consolidated Mining and Smelting Co. is advancing the wages of employees 50 cents a day has brought the strike at Kimberley to a close, the miners' union having, as a result, declared hostilities at an end.

Nelson, B. C.

Representations were made some weeks ago by the Associated Boards of Trade of Eastern British Columbia to the British authorities regarding the granting of an imperial preference to Canadian metals. A reply has been received through J. Henry, secretary to the Canadian Mission in London. He states that there undoubtedly is a large market in the United Kingdom for zinc and lead, there having been imported in 1918 a total of 217,610 tons of lead of a total value of over £7,000,000. Zinc imports aggregated 94,226 tons of a total value of £4,000,000. "The only question" Mr. Henry observes "is whether British Columbia can send lead and zinc to this and European markets at competitive prices." It is added that J. J. Warren, president of the Canadian Consolidated Mining and Smelting Company, spent some weeks in England last summer studying this question. Mr. Henry close as follows: "I should perhaps add that in the case of zinc the British government has entered into an agreement with the Australian government by which the available surplus of zinc in Australia for the next ten years has to be placed at the disposal of this country. I pointed out the fact to Mr. Warren and he was endeavouring to find out how far this would affect the supply of zinc from other parts of the Empire."

L. A. Biggar, a Montreal metallurgist, is visiting the Kootenay District. He is acquiring information as to mining conditions, having in mind the establishment of an ore testing and sampling plant.

Kamloops, B. C.

A company has been formed, known as the B. C. Silica and Talc Company, Ltd., for the development of a group of claim situated seven miles northeast of North Bend. The silica of this property, judging from a sample presented for assay, is exceptionally high grade. The assay return was 99.4. The Company was incorporated last December with a capital of $250,000, divided into 25,000 shares.

Slocan, B. C.

Operations on the Evening Star Mine, Dayton Creek, have been suspended pending the arrival of weather conditions that will permit the pumping of water. The underground workings have been flooded

Cowichan, B. C.

The "Hill 60" Manganese Mine of the Cowichan District, Vancouver Island, B. C., is being placed on a basis that will permit uninterrupted production. An aerial tramway, designed by Major A. W. Davis, Vancouver, B. C., is being installed. It is a two-bucket balance tram, having a capacity of thirty tons in eight hours, and is costing about $10,000. About six towers carry the cable to the mountain face, whence the wire runs for a span of 3,600 feet to the Esquimalt and Nanaimo Ry., the total length of the cable being 4,750 feet. Bunkers are being constructed both at the workings and at the railway. Since last Spring about 500 tons of manganese ore have been shipped to the Willrowe Alloys Co. of Tacoma, Wn. As to development the open cut now discloses a twenty-five foot face of fifty per cent manganese ore. While the ore body has not been extensively explored what already has been shown, together with the exceptional indications, are considered very satisfactory by those interested.

Vancouver, B. C.

The International Mining Convention to be held at Seattle, Wn. from April 7th to 10th is attracting much attention among Canadian mining men and there is no doubt that there will be a large attendance from British Columbia. It is assured that Eastern British Columbia will send both delegates and an exhibit of the ores of the Kootenays.

Victoria, B. C.

Paul Billingsley, of Seattle, Wn., representing the Anaconda Copper Mining Co., and H. H. Townsend, an American mining engineer, passed through Victoria recently, paying their respects to Hon. Wm. Sloan, Minister of Mines, en route to examine some of the provincial mining prospects.

The Collieries.

If reports received from Alberta are correct it is likely that the coal operators of British Columbia will have competition on the local market shortly. Alberta interests are said to have arranged for the shipment of coal from that Province to the Pacific Coast, it being proposed to undersell the product of British Columbia by a considerable margin.

Judgment has been handed down in British Columbia in favor of thirty-four coal miners and general employees who sued the Merritt Collieries, Ltd., Diamond Vale Collieries Co., Ltd., et al for wages said to be owing them. The plaintiffs, whose claims amount to approximately $3,000, sought to enforce mechanics' lien against the defendants under tthe Mechanics' Lien Act and the Mechanics' Lien Amendment Act of 1917. The judge explained that, as a result of the amendment, the men were able to obtain their lien to the extent of 25 days wages and that this charge would be laid against the property precedent to any mortgage on record. Plaintiffs also were awarded the costs of trial. The Diamond Vale Collieries, Ltd., which is chiefly concerned, has not been in operation for some time.

That a seam of high grade coal, twelve feet in thickness, has been discovered on the property of the Harvard Coal Co., East Princeton, B. C, is the effect of a report from that district. Preparations for de-

velopment to the point that shipping will be possible already are in progress. Coal bunkers with a capacity of 200 tons are being constructed and it is expected that production will be commenced early next month, between 30 and 40 men being employed. H. G. Duerfeldt, the president of the Company, and Dr. Wymond Miller, one of the heavy stock holders, both are residents of Spokane, Wn.

The Telkwa Collieries, situated on the Grand Trunk Pacific Ry. near Prince Rupert, B. C., have been shipping all winter but it is not expected that much coal will be hauled after the snow leaves the ground. Probably work during the summer months will be confined to development.

The Vancouver Island coal trade has fallen off to some extent recently. Such, of course, is to be expected during the "between season" period when the winter domestic demand is on the decline and before the bunker trade has become brisk. In the Pacific Northwest the warmth of Spring is beginning to be felt and people are not so particular about keeping full the home bins, there being no danger of further cold snaps. What the forthcoming season is going to bring to the coal dealers in bunker business remains to be seen but it is feared that the exchange situation is likely to have so serious an effort on mercantile trade of the Pacific that the collieries of this Province will experience its influence in an unpleasantly lethargic market. However, conditions are not yet bad although the mines are not as active as was the case throughout the winter months. Last month (Feb.) the Canadian Collieries (D) kept their men at work at the three Comox Mines for 17 days, at Extension for 22½ days, and at South Wellington for 23 days. The Canadian Western Fuel Co. operated its properties at Nanaimo, Harewood, Reserve and Wakesiah for 24 days. This also applies to the collieries of the Granby Consolidated Mining and Smelting Co., at Cassidy's, the Pacific Coast Coal Mines, the Nanoose-Wellington Collieries, as well as to the Coalmont Collieries in the Nicola-Princeton Field.

The production of the Companies named during the month of February was as follows:

	Tons.
Canadian Collieries (D) Ltd. (Comox)	28,515
Canadian Collieries (Extension)	18,377
Canadian Collieries (S. Wellington)	6,450
	53,342
Canadian Western Fuel Co (Nanaimo)	23,615
Canadian Western Fuel Co. (Harewood)	18,756
Canadian Reserve Fuel Co. (Reserve)	9,379
Canadian Western Fuel Co. (Wakesiah)	5,063
	56,813
Granby Consolidated Mining and Smelting Co.	14,419
Pacific Coast Coal Mines	8,752
Nanoose-Wellington Collieries	2,488
Vancouver Nanaimo Coal Co	1,441
Coalmont Collieries	280
Telkwa Collieries	325

THE LATE HENNEN JENNINGS.

By Alexander Gray, Montreal.

The death of Mr. Hennen Jennings on March 5th., at Washington, D. C., where he had resided since his return to America from South Africa, is more than a loss to mineral industries and mining scientists; it is a misfortune of world-wide effect, in that he no longer can speak for whatever will dignify and exalt mining.

Other noted mining engineers may have been more in the limelight. None, however, wielded more widespread influence and commanded more confidence and capital. Economically perfect; uninfluenced by other than the soundest bases of valuation; gifted with a rare judgment reinforced with experience acquired on two continents; implicitly trusted by financiers of Great Britain, Europe, America and South Africa; he was the corner stone of the "Corner House", as Wernher, Beit, Eckstein, were known. Throughout the years, until his voluntary retirement, he was Consulting Engineer to the group of mining capitalists which even now controls a greater part of the world's gold production. No other group, company or firm, contributes as much gold as the Central Mining and Investment Company—which succeeded to certain Wernher, Beit, Eckstein interests—and that distinction is largely the result of Hennen Jennings's thoroughness in the mastery of facts and management. Wernher, Beit, Hermann Eckstein and now Hennan Jennings—have responded to the last roll call. The quartette represented the greatest degree of integrity in mining finance. More gold was produced under the aegis of Hennen Jennings than that of any of his contemporaries. Scattered along the Witwatersrand — exhausted outcrops, partly exhausted first row "deeps" second row "deeps"—and deeper "deeps" all the properties taken over and operated by the "Corner House" passed under the actuarial scrutiny of Mr. Jennings—a scrutiny that was implacable—unless the sampling, and structural conditions dictated affirmative decisions. There was no appeal to his principals from a Jennings adverse opinion. It was said of him that "he sampled his firm into everything worth having—and sampled them out of everything they ought not to be in"—and no finer eulogy need be bestowed upon him.

Nor did Mr. Jenings confine his distinguished abilities to mining affairs. Where mining was the paramount industry—as it was in the Transvaal—inevitably he was foremost in advocating whatever would conduce to the prosperity of the industry and the people it employed. At the time of the historic Raid when "Dr. Jim", made his Falstaffian attempt to capture the Kruger domain, Mr. Jennings was involved, along with Rhodes, John Hays Hammond, and others. He never shrank from a duty.

During the World War he rendered notable service at Washington, insisted that gold production must be increased; urged special inducements to that end. "One blast upon his trumpet" had more influence than what gets into the Congressional Record. At the moment when metal mining has to contend with grievous hindrances that legislators and leaders do not comprehend, the mineral industries can ill afford to lose him. Harvard, two years ago, honored itself by conferring upon him the degree of Master of Arts. Canada knew him better by reputation than by contact.

When the Secretary of State for the Colonies, the

Right Honorable Joseph Chamberlain, visited South Africa in 1902, Mr. Hennen Jennings was chairman of the committee of Consulting Engineers appointed by the Transvaal Chamber of Mines to prepare a descriptive and statistical statement of the gold mining industry of the Witwatersrand. Among his colleagues were Dr. Hatch, Fred. Hellmann, George Hoffmann, W. L. Honnold, Sidney J. Jennings, Sam. C. Thomson, H. H. Webb, George E. Webber, and Pope Yeatman. The document formulated was a masterpiece in graphic detail and textual lucidity. It was characteristically Jenningsesque, the social and economic aspects of the gold industry being reviewed as Mr. Jennings knew how to review them. Glacing over that document, I am prompted to cull the following in order to impress upon those who think capital invested in Canadian mines can await the pleasure of labor and politicians:—

"The vital importance to mining of the factor of time is easily demonstrated. In any ore deposit there is a certain unalterable amount of ore, and any profit obtained from exploiting it is more valuable the quicker it is made available for further investment.

"If we could assume the output, its value, and cost of production to be constants, and that the deposit would yield, say, 10 millions tons of ore which would give a profit of 15 shillings a ton, if it were exhausted in equal yearly amounts, in

"100 years an owner would receive 100 annuities of £75,000 each.

"Or if in 50 years an owner would receive 50 annuities of $150,000 each.

"With so speculative an investment as mining, 5 per cent. compound interest would certainly be demanded. The 'present value' of the investment on

"The 100 years basis would be £75,000 x 19,8479095 =£1,488,590.

"The 50 years basis would be £150,000 x 18,2559246 =£2,738,380.

"If, by lowering working costs, and bringing under exploitation, say, double the foregoing assumed tonnage (or 20 million tons) of ore, which would yield a profit of, say, only 10 shillings a ton, the calculation would work out at

"For 100 years 100 annuities of £100,000 each, or

"For 50 years 50 annuities of £200,000 each.

"The present value of which, taking the previously assumed factors, would be in the former instance, £1,904,790, and in the latter instance, £3,651,185. **The necessity for activity to attract more capital is thus very clear.**

Mr. Jennings had the true perspective—and always adhered to the truest practice.

ECHOES OF THE TORONTO MEETING.

The new Minister of Mines of Ontario made a good impression when he addressed the Institute at the opening session and at the banquet. He has capable men on the staff of the Mines Department and he seems disposed to consult them. It was news to many that he had as a young man worked for some time in a coal mine. He has as a resident of Port Arthur a proper appreciation of the desirability of encouraging capital to develop mineral resources of Northern Ontario. If he uses his opportunities to good advantage, he may prove an important factor in improving relations between labor and capital.

Mr. H. E. T. Haultain has found someone whom he can agree with fully in matters relative to the Canadian Mining Institute's future. He says that Mr. Mathewson presented his ideas admirably in his speech at the banquet.

Mr. J. W. Evans made a big step up in the estimation of members at the smoker on Tuesday evening. He is in danger, however, of being referred to hereafter simply as the father of his talented daughter.

The moving pictures of scenes at the Nipissing mine were remarkably good and should help to give those who see in them some intelligent idea of the mining, handling and treating of ore at Canada's greatest silver mine. The underground views, in view of the difficulties of mine photography, do great credit to those who made them.

Col .Penhale was his old self as chairman of the smoker. His running mate G. G. S. Lindsay would have contributed largely to the fun if he had been able to be present.

Mr. E. P. Mathewson carried off the individual championship in the college yell contest. The superiority of McGill, Toronto or Queens remains undecided and there is some doubt as to whether the individual champion did not outpoint the class entries.

The excursion to the International Nickel Company's refinery proved a very popular one and Mr. Miles and his aides received many congratulations. Members of the Institute have always been courteously received at Copper Cliff and Creighton and have been shown everything of interest there. The extension of this courtesy to include the new refinery was quite in keeping with the old policy of Copper Cliff, but owing to the secrecy which has shrouded the Orford works the refinery proved unusually magnetic.

Mayor Church made a hit with the visitors from Montreal and New York and received invitations to run those cities if he ever gets tired of his present job.

Mr. Bradley Stonghton is more than ever popular with the members. His talks always do a great deal towards improving the happy relations between American and Canadian mining engineers.

The Institutes owes his thanks to the acting secretary, Cyril W. Knight, who took over the duties on short notice and under unusually difficult conditions. He was ably assisted by his fellow workers,—the technical staff of the Ontario Bureau of Mines,—and succeeded so well that comparatively few of the members were aware of the fact that he had had so little time to familiarize himself with the work ordinarily done by the Institute officers and staff.

The "status of the engineer" discussion, although well introduced by Mr. McEvoy, did not bring out expression of opinions. Apparently most of the members are content to leave things as they are. If a serious attempt is made by others to bring about a close corporation control of engineers, there will doubtless be no uncertain negative vote by mining engineers. The meeting expressed its approval of the steps taken by Council to prevent status legislation that does not meet with the Institute's approval.—R.E.H.

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ENGINEERS OF THE NORTHWEST TO HOLD CONFERENCE IN SEATTLE, APRIL 6-7, 1920.

Of great interest to all technical men is the conference of engineers of the Pacific Northwest, which will be held in Seattle on April 6th and 7th of this year. The purposes of this conference are to bring the engineers of the Northwest together to discuss all problems pertaining to engineering interests and to organize a permanent annual conference, the conferences to rotate as to place of holding same. It is suggested that Portland be the next one, the Spokane etc. At this coming conference it is also planned to arrange for a propaganda in suport of the Jones Reavis bill, which is coming from congress to create a National Board of Works Department in the United States government. This department to take over all the engineering and construction departments of the different departments of the government as they now exist, and place them under the one head. This conference coming just before the Mining Convention will no doubt bring many engineers to Seattle who will attend both of the events.

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EDITORIAL

Legislation Prescribing the Status and Practice of Engineers

In this issue will be found a prècis of a draft act, now before the British Columbia Legislature, the short title of which is cited as the "Engineering Profession Act." The draft act is the result of consultation between technical societies in British Columbia, and is understood to have been amended in accordance with representations made by members of the Canadian Mining Institute resident in British Columbia.

The specification of the practice of a professional engineer by the Act is very comprehensive, including as it does the civil, railway, hydraulic, steamship, electric, sanitary, mining, metallurgical and chemical engineer; the mine surveyor, the geologist, the petrologist; the "development of rocks, minerals (including coal, petroleum, natural gas, and other fluid substances of value)," and "all other engineering works." Definition of "engineering work" savors of an attempt to set bounds to the infinite. If "engineering" as it is sketched in the interpretation clause of the draft act does not comprehend the entire sum of human knowledge, it goes more than halfway. Take for example the phrase: "Investigations relating to the "examination, surveying, exploration and develop- "ment of rocks, minerals, rock structures, geological "processes and the application of geology to practi- "cal problems of the industries, arts and engineering." In this all-comprehending phrase there must be included the prospector, the ordinary mining engineer, the chemist, the metallurgist, the mineralogist, the petrologist, the paleobotanist, the paleontologist, and speculative and practising geologist in all his infinite variety.

Frankly, we do not believe that legislation of this comprehensive, and therefore necessarily unspecific character, can be enforced in practice. The powers which would reside in the Council of a Professional Association such as the Act proposes would be immense, but very indefinite. Because of the wide sweep of distinct professions which the Act attempts to take in under the generic term "engineering," the powers given to the proposed Association would be much wider, and not comparable with those given to professional associations such as control the medical, dental and simlar professions. In these cases, the limits of professional qualification are nicely and exactly drawn, but what chiefly recommends the conference of special powers upon the professions of which the medical profession is the best example is that they deal in matters of health, extending almost to powers of life and death. In the case of engineers—using the wide-open definition of the draft Act, it cannot be urged that matters of public health, or the preservation of human life, are so intimately concerned. Where the public safety is touched in engineering performance and design, the existing laws contain all that is necessary, inasmuch as the safety of bridges, dams, factories, ships, electric transmission and grain elevators are all most carefully provided for in public regulations of long standing. In the case of mining, statutory regulations exist in every province, providing for the safety of appliances, and requiring certification of the competency of mine officials. In questions of public safety, therefore, the functions of a Professional Association such as is suggested by this draft Act, would duplicate public statutes of great variety and very long establishment.

As concerns the expenditure of public and private monies, the situation is different. It is well known that much money has been foolishly expended through incompetent direction, but is this a question that permits of statutory regulation? To attempt it trenches upon sumptuary legislation, and, no matter what Statutes are enacted, he that pays the piper will always call the tune.

The objects of the Association proposed—that is to say, the attainable objects—therefore resolve themselves into the raising of the status of the "engineer," or in other words, a desire to secure his more definite recognition by the public, and to raise his emoluments. This is an understandable, and, within proper limits, a laudable aim.

It is, however, open to the gravest question whether compulsory regulation by statute is the best manner in which to effect the aim mentioned, with which aim, we desire to emphasise, no fault can be found. The question is, nevertheless an open one.

We would suggest, however, that there is no question as to the unwisdom of attempting to regulate the engineering profession under an interpretation so wide, and at the same time, so impracticably indefinite as that prescribed in the British Columbia Act.

When the Act was introduced into the British Columbia Legislature, after having had a stormy passage through the Private Bills Committee, it met the severest criticism from Premier Oliver, and Mr. J. H. Schofield, the Member for Trail, B. C. Mr. Schofield said the Act was bitterly opposed by prospectors, miners and smeltermen. The Premier expressed his most determined opposition to the Act, as drafted, basing his viewpoint on a belief that practically trained men had often succeeded where scientifically trained men had not. Mr. Anderson, who introduced the Act, said the text did not warrant the construction put upon it by the Premier.

This reception is probably typical of the criticism that will be levelled against any legislation seeking to enforce a close corporation for "engineers," and it is significant that the criticism levelled against the draft act was based upon its wide interpretation of what constituted engineering practice.

We believe the formation of an association of professional engineers, such as is proposed by the draft act under discussion is unworkable because of the fundamentally erroneous conception of the possibility of comprising within the scope of one incorporated body all the ramifications of the activities of the engineer. We also believe that this conception, if persisted in, will limit the usefulness of the engineer by attempting to set bounds to the boundless.

It is suggested that the manner in which the engineer can gain that public recognition which is his undoubted right is through the strengthening of existing professional societies, each functioning within the limits of its own specialized activities. When our professional societies have so arranged their own internal affairs as to be able to place upon their members the stamp of professional competence and rectitude, and to discipline unworthy members; and have educated the public to accept the society stamp as a guarantee of those things that are desirable in an engineer, then, and not till then, have our societies any right to ask governments to attempt that which, so far, our professional societies have not yet found it within their ability to compass.

There are one or two details in the British Columbia draft act that should not have been included, namely the provision that the Secretary of the Associations should be bonded for one thousand dollars, and the power which it is proposed to grant to the Council to suspend a member who should have been convicted of a criminal offence. The definition of "crime" is capable of even less exact determination than the scope of the qualifications and the practice of the engineer. The indelicacy of the provision as to bonding the Secretary should be sufficiently obvious.

Mr. Theo. Denis, the Superintendent of Mines for the Province of Quebec, writes to the March "Bulletin" of the C. M. Institute on the effect of engineering legislation in Quebec, and as his point of view deserves consideration by mining men in other provinces, the letter is re-published in this issue.

Mr. McEvoy's designedly neutral and philosophical examination of the trend of engineering status legislation did not evoke at Toronto the discussion it was desired to bring about, a matter, we believe, for regret. The Council of the Institute, as the President clearly explained, is fully awake to the circumscription of the liberties of the mining profession that is threatened by ill-considered legislation, should such legislation when enacted, be found operable. In the impossibility of defining the indefinite will probably reside the strongest safeguard of all.

AN EQUAL CHANCE.

R. E. HORE.

In view of the present activity of some engineers in pressing for the legislation designed to bring about corporation control of the engineering profession, I would draw attention to a part of President Herbert C. Hoover's inaugural address at the recent meeting of the American Institute of Mining and Metallurgy, Mr. Hoover declared:

> "For generations the American people have been developing a social philosophy as part of their democracy. This philosophy has stood this period of test in the fire of common sense; it is in substance, that there should be an equality of opportunity—an equal chance—to every citizen. This view that every individual should, within his lifetime, not be handicapped in securing that particular niche in the community to which his abilities and character entitle him is itself the negation of class. Human beings are not equal in those qualities. But a society that is based upon a constant flux of individuals in the community, upon the basis of ability and character, is a moving virile mass; it is not a stratification of classes. Its inspiration is individual initiative. Its stimulus is competition. Its safeguard is education. Its greatest mentor is free speech and voluntary organization for public good. Its expression in legislation is the common sense and common will of the majority. It is the essence of the democracy that progress of the mass must arise from progress of the individual. It does not permit the presence in the community of those who would not give full meed of service."

An other paragraph from Mr. Hoover's speech that is particularly interesting in view of the strong present tendency towards organization along class lines is the following:

> "If we cling to our national ideals, it will mean the final isolation and the political abandonment of the minor groups who hope for domination of the government, either by "interests" or by radical social theories through the control of our political machinery. I sometimes feel that lawful radicalism in politics is less dangerous than reaction, for radicalism is blatant and displays itself in the open; unlawful radicalism can be handled by the police. Reaction too often fools the people

through subtle channels of obstruction and progressive platitudes. There is little danger of radicalism ever controlling a country with so large a farmer population, except in one contingency. That contingency is from a reflex of continued attempt to control this country by "interests" and other forms of our domestic reactionaries."

Mr. Hoover's remarks about his own country are applicable also to Canada. Class organizations are properly regarded with distrust by the community, for in them self interest dominates. They become most dangerous when they conceal their activities under a cloak of professed public service.

When one class organizes to make itself more strongly felt as an influence in public affairs, the elementary and expected result is that other classes will in self protection take similar steps. Such organizations may be regarded as necessary so long as the others exist and their formation is easily justified, as a natural defensive move. If such organizations make their weight felt for the good of the community and are willing and satisfied to make progress with the community and not at its expense they are desirable institutions and will live. In proportion as they do not, their life is likely to be short and uninfluential.—R.E.H.

Good Advice by the Grain Growers' Guide

Seeing that the metropolitan newspapers which are held in much repute and have large circulation in the farming districts do not endeavor to protect the rural capitalist against accepting at face value the advertisements of mining stocks and oil flotations that appear in these newspapers, but, on the contrary deliberately throw temptation in his way for the sake of the advertising revenue, the "Grain Growers' Guide" of Winnipeg, which boasts a circulation of 76,000 copies weekly, has commenced a counter propaganda, the forceful nature of which may be judged from the cartoon herewith reproduced.

There is now going on in the technical press, and elsewhere, a not disinterested controversy which implies that many mines which are today in the dividend-paying class were floated by the sale of stock of small par value, attractively advertised through the newspapers. This may well be the case, but does not make it any less the part of unwisdom in the farmer to invest his money in mining or oil stocks on the strength of a newspaper advertisement. The cobbler should stick to his last, and it would anyway be difficult to find a more paying investment than farming in these days. The "Grain Growers' Guide" will have the approval of all who have the best interests of mining at heart in advising the farmer not to sink his money in ventures about which he knows just enough to make his knowledge worse than ignorance.

How to Entertain the Agent Who Peddles Worthless Mining Stock

—From "The Grain Growers' Guide".

The Anthracite Supply Available to Canada

Combination of Decreasing Reserves, Increasing Populations in United States and in Canada, Increasing Per Capita Consumption in Both Countries; and Relatively Greater Rapidity of Anthracite Exhaustion in Fields nearest to Canada calls for Immediate and Continuous Attention of Canadian Government—Within Thirty Years Wyoming Anthracite Supply available for Canada is threatened by Exhaustion of Mines—As Canada has least claim on Anthracite Supply, and is situated furthest from Source of Supply she must initiate precautionary measures—Canada's Coal Supply is Paramount Factor in National Independence and Commercial Survival

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The writer of the article which follows desires publication to be made anonymously, but we may state that the article was written at our special request, made because of the special qualifications for dealing authoritatively with the anthracite supply of Canada possessed by the author, who has a thorough knowledge of the problem of Canadian coal supply, obtained in Canada, combined with an equally complete knowledge of the anthracite mines of the United States.

Our coal-mining readers will appreciate correctly the condition of the anthracite reserve of the United States when the mining of such thin seams of anthracite as are described in the article has become an accepted commonplace; and will not fail to deduce from the facts presented the conclusion that Canada must in the future draw its anthracite supply from a reserve which is rapidly becoming smaller and more difficult to mine, and therefore increasingly expensive to produce and transport to distant markets. It should not be forgotten that as coal becomes increasingly costly to mine, the cost of its transportation increases in a proportionately greater ratio.

Anthracite shipments reached the record figures of 77,062,787 tons in 1917, and 75,894,217 in 1918.* Of this amount, approixmately 6,640,923 tons (8.6 per cent) were produced from "Banks" and "Washeries," leaving a fresh mined shipment in 1918 of 69,253,294 tons. To obtain the actual mined tonnage, the fuel consumed at the mines and preparation losses have to be added, approximately an average of 25 per cent, so that the anthracite coal fields may be considered as being depleted in round numbers at a rate of 90,000,000 tons annually.**

The country has just passed through several years of unprecedented industrial activity, which has helped to keep the demand at an unusually high mark, and although there may and quite possibly will be a reaction, during which production will fall, such an ebb and flow in consumption is just what has taken place in the past, the ultimate result having been a consistent and persistent growth in the market at the rate of approximately 20 per cent in each of the last three decades.

The demand for domesic sizes will certainly be maintained as long as the growth of the population increases; consumption of steam sizes follows the rise and fall of activity in industrials, and the clash of consumption as to time and period of demand is the cause, not only of occasional scarcity of certain classes of fuel, but a source of loss to the operators. Domestic coal cannot be produced without a sale or storage of steam sizes, nor can steam fuel within economic limits be disposed of without a production of domestic sizes. The population increase in the three states of Pennsylvania, New York and New Jersey, where almost 60 per cent of the anthracites produced is consumed, was from 19,315,892 in 1910 to 23,324,287 in 1917.

Fresh mined production fell off in 1918 over 1917 2,000,000 tons, but it increased to the extent of 8,000,000 tons in 1917 over 1916.

Year.	Total Shipment.	Bank Coal.	Fresh Mined Shipments.
1909.....	61,969,885	3,694,470	58,275,415
1910.....	64,905,786	3,296,318	61,609,468
1911.....	69,833,801	3,171,678	66,662,123
1912.....	64,667,248	3,155,150	61,512,098
1913.....	70,758,312	2,090,170	68,668,142
1914.....	69,947,357	1,719,547	68,227,810
1915.....	68,179,474	2,492,639	65,686,835
1916.....	67,060,356	3,133,609	63,926,747
1917.....	77,062,787	5,413,139	71,649,648
1918.....	76,307,687	6,640,923	69,666,764

This increase took place in face of the loss of men to munition industries, and then the army, and the difficulty of obtaining necessary material for the extension of plant and development work. From 1910 to 1918, approximately 10 per cent of new collieries were opened, and the present production has been brought about partly by this new development and partly by the expansion of existing operations. The limit to existing capacity has perhaps not yet been reached, but it is possibly not more than ten million tons away.

Wyoming Field of Greatest Interest to Canadian Consumer.

Hard coal is sold under the trade names of Wyoming or Lackawanna, Lehigh and Schuylkill, corresponding roughly to the three great natural divisions of the coal fields. From the point of view of the Canadian consumer, the Wyoming field is of peculiar interest and importance. It is the most northerly of the three and nearest to the Canadian market; the transportation systems which serve it connect naturally and directly to export points to Canada, and undoubtedly by far the largest tonnage that reaches the

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* From the Coal Trade, 1919—Error or misprint of 500,000 in grand total.

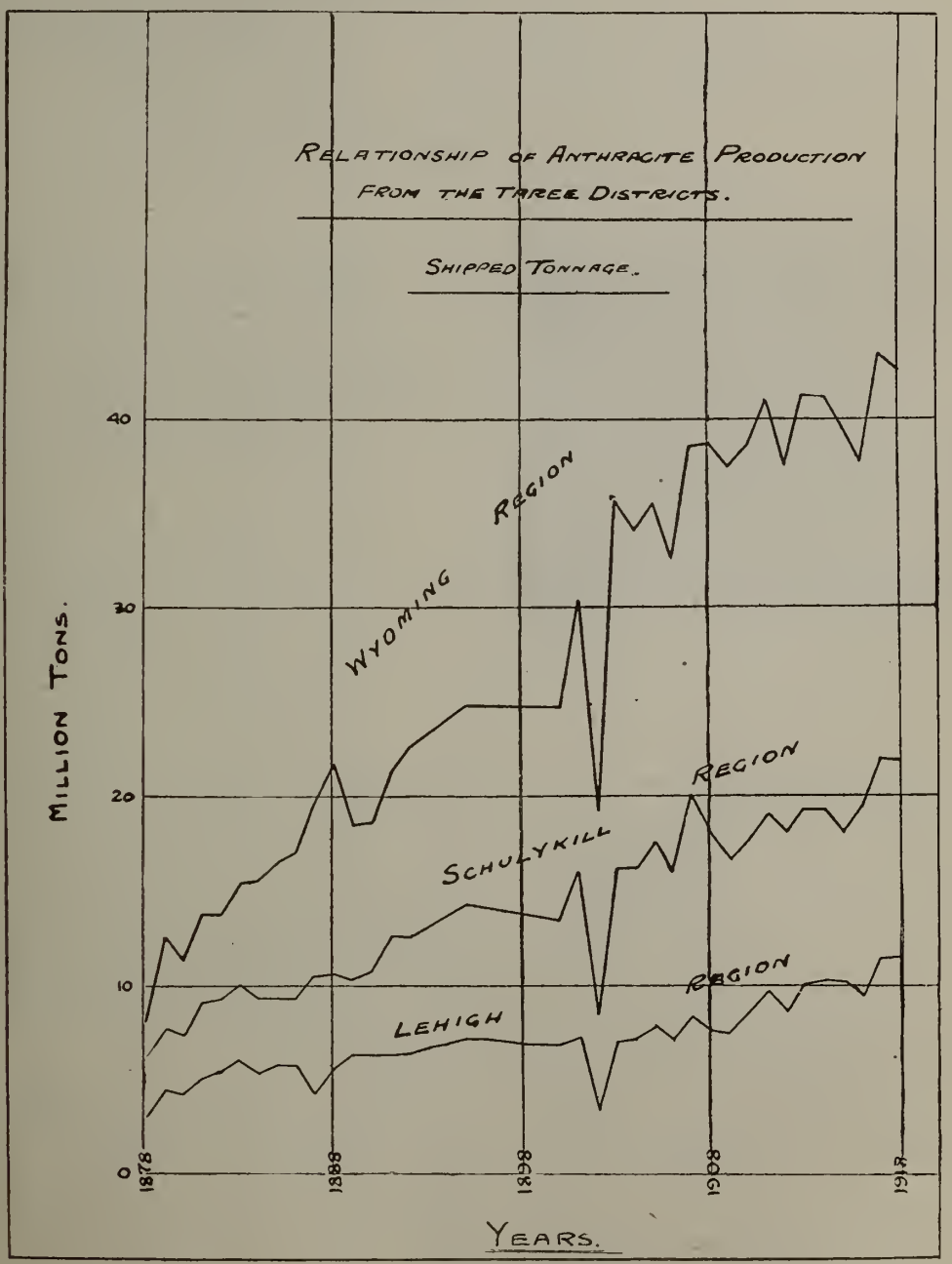
** 1913, 91,525,000; 1914, 90,821,000; 1915, 88,995,000; 1916, 87,587,000; 1917, 99,612,000; 1918, 98,826,000; 1919, 86,200,000 (estimated by U.S. Geo. Survey).

Dominion originates in this field, this being particularly true of eastern middle Canada, where exists the Dominion's greatest consumption.

To originate all the tonnage for this market from either the Lehigh or the Schuylkill districts would not only lengthen the transportation considerably, and necessitate much cross hauling, but of much more importance, however, than a resulting increased cost and probable irregularity of delivery to the consumer, will be the new distribution factores entering into the questions of production and demand, when the time comes that through decreasing activity in the Wyoming field, the Canadian demand, and other trade previously supplied from that area, begins to fall on the other districts.

In the natural sequence of trade, supply and demand, those markets most convenient to the new producing centres, linked to them by strategic transportation routes and presently being supplied from them, will be attended to first. In this connection it is interesting to note that the estimates of unmined anthracite based on figures prepared by William Griffith and published over twenty years ago, show the percentage of control of future supply to be arranged as follows. This arrangement has not materially altered to date:

Delaware, Lackawanna & Western	6.55
Delaware & Hudson Co.	2.29
Erie & Wyoming Valley R.R.	1.82
Erie R. R. Co.	.77
New York, Ontario & Western	.28
New York, Susquehanna & Western R.R. Co.	.54
Delaware, Susquehanna & Schuylkill R.R. Co.	1.38
*Pennsylvania R.R.	6.24



SHIPMENTS OF ANTHRACITE OVER PAST FORTY YEARS FROM THE THREE PRODUCING DISTRICTS.

Central Railroad of New Jersey	17.30
Lehigh Valley R.R. Co.	16.87
Philadelphia & Reading Ry.	42.25
Uncontrolled tonnage	x3.71

* Hanna interests.
x Published in The Coal Trade, 1919.

Condensed, this table shows that the reserve adjacent to transportation roads serving the Wyoming, as compared with the other districts, to be as below:

	1896. P.c.	1920. P.c.
Wyoming	12.25	10.40
Lehigh Schuylkill	84.03	85.88

While there is plenty of reserve to take care of any demand, the same or greater than today which may exist when the Wyoming field falls off, the conditions under which that reserve exists are decidedly interesting. Over 50 per cent is in the Schuylkill field where the majority of the coal above water level has been extracted. This basin is, roughly, 4,000 feet in depth at its centre, the veins pitch steeply both ways, are contorted and broken, water is extremely heavy, the pressure of the strata is great and gas exists in considerable quantities. In a word, the problems of mining, timbering, ventilation, pumping and transportation are here intensified and extreme. Only collieries with very large territorial capacity, with huge daily production and demanding collosal expenditures are going to produce a return on the capital invested. Naturally, exploitation under such conditions will be slow and it is quite within reason that as long as the present fields can cater to approximately the present demand, this development will not take place until such a condition arises that instead of increasing production, the one field will rise as the other falls. Some of the greatest future mining engineering problems in America will have to be solved in the operation of this field, and while the engineering talent will be equal to the task, it still remains to be seen whether finance will be able to play its part with equal courage.

The original tonnage distributed between the three districts, has been calculated as follows:

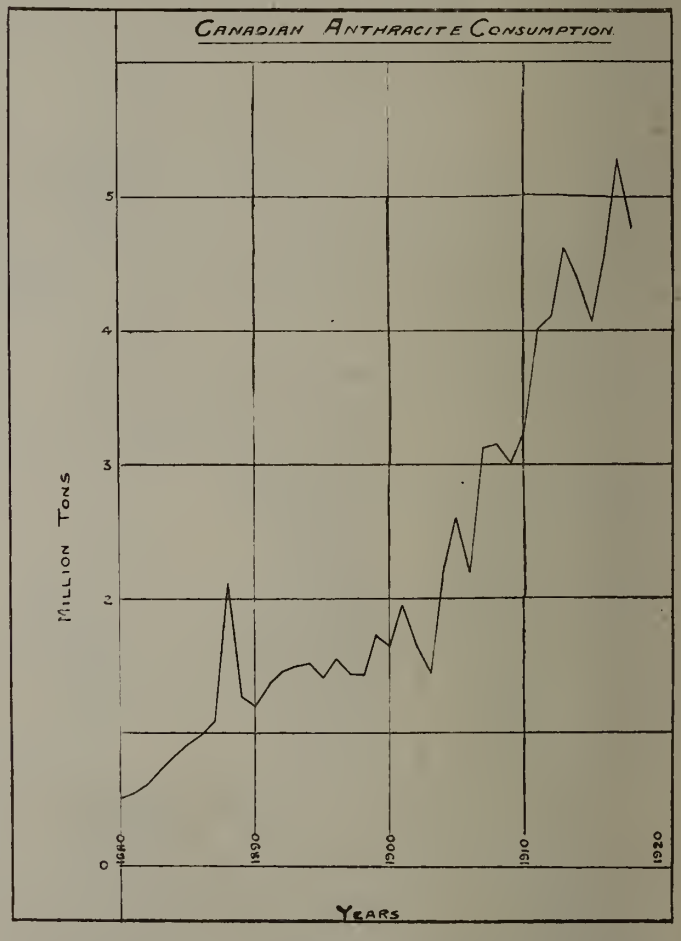
Wyoming	5,700,000,000
Lehigh	1,600,000,000
Schuylkill	12,200,000,000
	19,500,000,000 tons†

The veins in the Wyoming Valley proving more readily accessible, the depth of the basin not being relatively so great, the beds more regular and less disturbed and heavy dumping not presenting itself, mining in that district early attained a lead over the other areas, to the extent of providing since 1875 an approximate average of 57 per cent of the total coal produced.

† 21,000,000,000 tons; Marcus R. Campbell, U.S. Geo. Survey, 1917.

Report of the Commission appointed to investigate the waste of coal mining with the view to the utilizing of the waste.—Commonwealth of Pennsylvania, 1893.

In common with all other coal fields, much coal was irretrievably lost in the early days of hard coal mining, and the consequent recovery was extremely poor. As the greater proportion of the production was from the Wyoming region, it follows that the loss of coal was there at its greatest. In the remaining tonnage, and in the Schuylkill District, where the largest untouched reserves exist, the future recovery will be high. Poor mining practice resulting mainly in taking too large a proportion of coal in the first mining, brought about "squeezes" destroying over large areas not only the remaining available coal in that vein, but also affecting similar areas in veins above and rendering beds below tender and difficult to mine. On the other hand, some territories considered unminable and abandoned, have since been re-mined, not only once but three times; and while this has a tendency to balance the other losses, there is still a large percentage



of coal that will never be recovered, being required for protection of bridges, rivers, towns and cities, destroyed by fires, crushed beyond all possible chance of recovery and left as barriers against water troubles from adjoining territory.

The Commissioners on Waste in Coal Mining, sitting in 1890-1893, reached the conclusion that since the commencement of production possibly not more than 30 per cent of the coal originally in the mined out areas has been shipped and they consider that this possibly may be raised, on account of re-working culm banks and recovering areas considered lost, to 40 per cent.[1]

In an estimate of the Wyoming field by William

[1] Commonwealth of Pennsylvania sitting in 1893.

Griffith, figures relative to the life of this field are stated as follows:[2]

Original reserve	5,057,808,560
Total shipments to 1892	383,244,241
Loss in preparation	76,648,478
Total production	459,892,709
Balance untouched	4,597,913,186
Future recovery	50 per cent
Balance minable	2,298,906,593

which at the then rate of production of 24,000,000 tons annually showed that the basin would be exhausted in 95 years. Since 1892, 1,320,744,581 more tons have been taken out, which on the same calculation would leave a present minable reserve of 1,638,534,302 tons, and that in turn at the now existing rate of extraction, which quite possibly may be exceeded for a few years, will give a life of 32 years. In other words, during the 27 years (1892-1919) the life of this field has been reduced 63 years.

The report of the Commission of Waste on Coal Mining, of which Mr. Griffith was latterly a member, started out with an original estimated reserve of 5,700,000,000 tons for the Wyoming District. The U.S. Geological Survey reports a shipment to date of 1,243,863,982 tons. At the time the Commission was sitting, the average recovery of coal was given as 45.6 per cent, and that coal sold at Collieries and used as fuel was 10 per cent. As the prediction as to the sale of "Bank" coal has been verified, an increase in recovery is justifiable which makes the total ratio of shipped tonnage to mined over tonnage that it represents, say approximately 40 per cent, giving an extraction of 3,100,000,000 tons, and leaving a balance of unmined coal of 2,600,000,000 tons.

Modern practice makes the difference between shipments and production approximately 25 per cent, to which has to be added the percentage of recovery in mining, in this case estimated at 80 per cent. Much coal considered unworkable is now being recovered in re-mining, and the return in the newer sections of the territory will practically be over 90 per cent. This gives a marketable tonnage of 65 per cent of the present reserve, equal to 1,560,000,000 tons, which would allow the field a life of 31 years.

[2] Colliery Engineer, 1892.

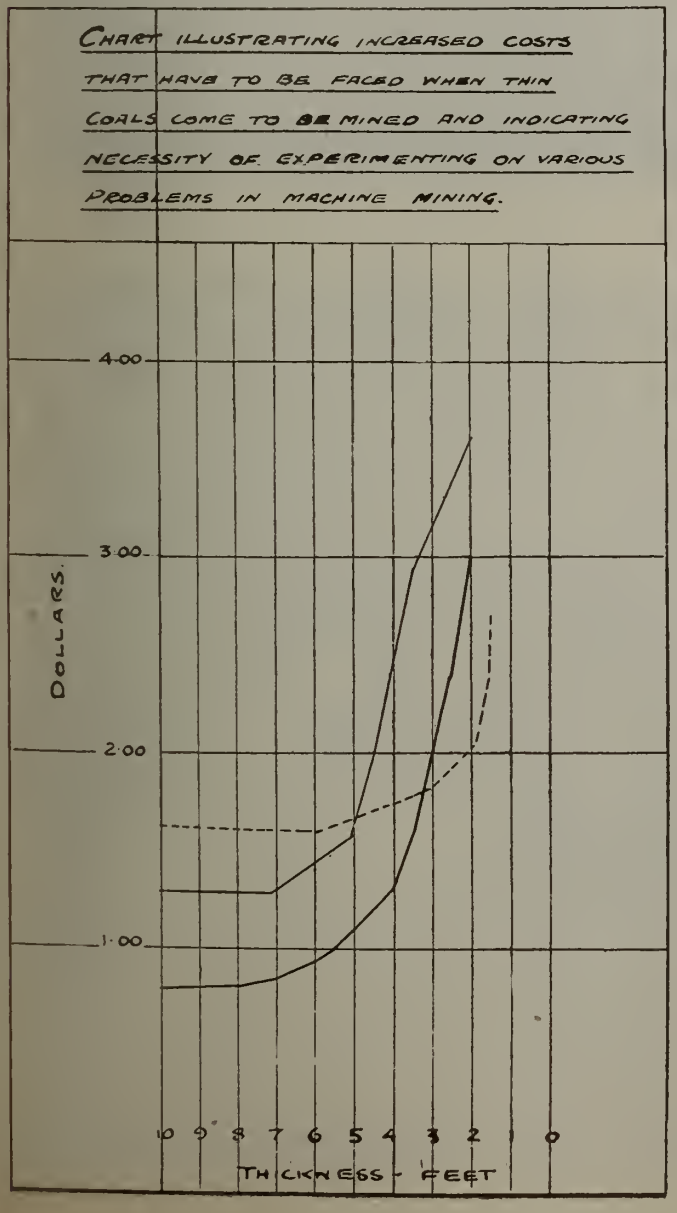


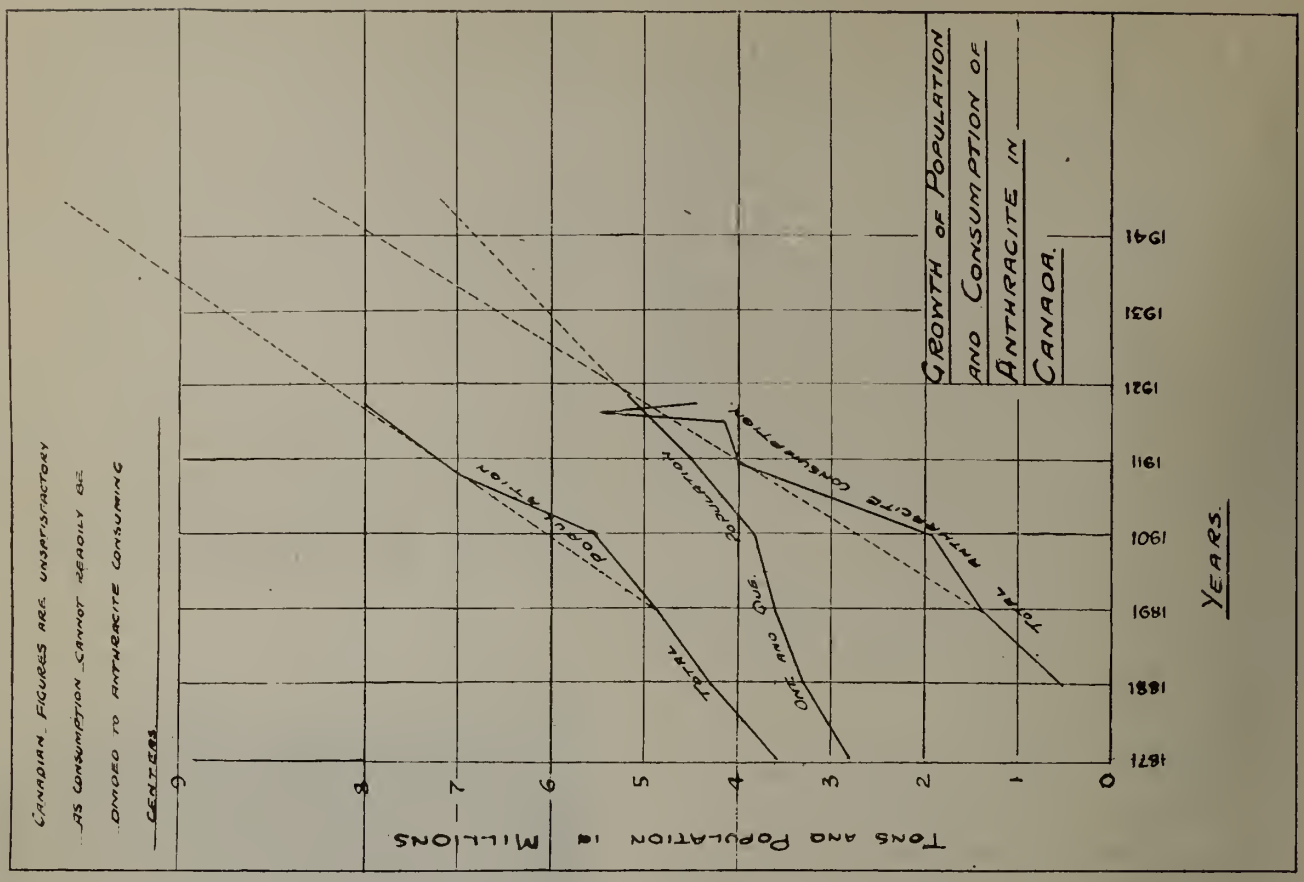
CHART ILLUSTRATING INCREASED COSTS THAT HAVE TO BE FACED WHEN THIN COALS COME TO BE MINED AND INDICATING NECESSITY OF EXPERIMENTING ON VARIOUS PROBLEMS IN MACHINE MINING.
4·00
3·00
2·00
1·00
DOLLARS.
10 9 8 7 6 5 4 3 2 1 0
THICKNESS - FEET

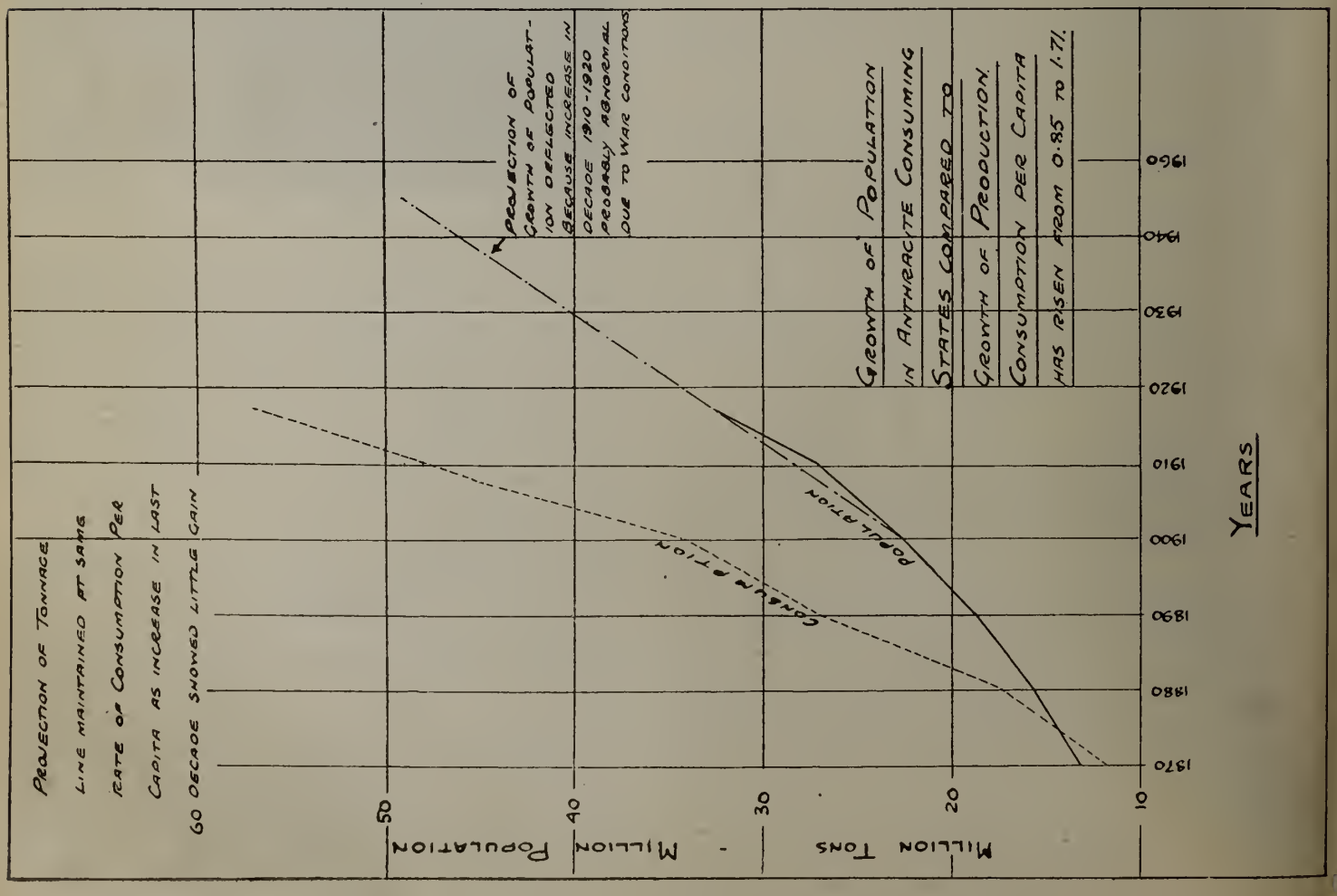
A CULM PILE.

Lest these calculations and statements be misunderstood, it might be well to elaborate them in another direction. Consider Canada in twenty years, now with a population of 5,147,000 (estimated 1918), in the anthracite consuming centre. Unless all past history is to be falsified, she will continue to grow and on a reasonable estimate based on past expansion, should reach to in 1940 a population of 6,800,000, requiring an anthracite consumption of 5,100,000 tons for Ontario and Quebec, which she must have by reason of the severe winters.

Growth of Consumption Exceeds Rate of Growth of Population.

Consider also that that part of America which consumes the greatest tonnage of anthracite is also going to grow , and that it, too, must have fuel. Figure that out and we get a total demand about 1940 of 110,000,000 tons (shipments). If this is averaged at 115,000,000 tons production, then the period of production from the Wyoming field, should it continue to supply over 50 per cent of the demand, would not be 32 years, but 14 years. There is also the further factor that the growth of consumption exceeds the growth of population, or in other language, the


Growth of Population and Consumption of Anthracite in Canada.
Canadian figures are unsatisfactory as consumption cannot readily be divided to anthracite consuming centres.
Tons and Population in Millions
Years.
Population
Total
Anthracite Consumption
Ont. and Que.
Anthracite
Ont.
1871
1881
1891
1901
1911
1921
1931
1941


Growth of Population in Anthracite Consuming States compared to Growth of Production. Consumption per Capita has risen from 0.85 to 1.71.
Projection of Growth of Population Decade 1910-1920 probably abnormal due to War conditions
Projection of Tonnage Line maintained at same rate of Consumption per Capita as increase in last 60 decade showed little gain
Million Tons - Million Population
Years
Consumption
Population
1870
1880
1890
1900
1910
1920
1930
1940
1950

CONVEYING ANTHRACITE DOWN A CHAMBER.

LOADING AT THE FOOT OF THE CHAMBER. NOTE THINNESS OF SEAM.

consumption per capita has increased steadily. In 1871 it was only .72 in the anthracite consuming states, now it is 1.95 at its highest. In Canada it is still only a little less than one-half that of this side:

Again, if we assume that a 100 million is about the production capacity of existing operations, this leaves 19,000,000 a year to get from fresh ventures and is equivalent to an investment of $76,000,000 distributed over 20 years. In the present attitude of labor, the condition of the country in general, the situation of the coals in the Schuylkill region, the railway position. and other matters of national importance, that capital is not going to be spent just now—it will wait a more favorable period.

Thirty Years Will See Great Decline in Production of Wyoming Field.

While these latter calculations as to tonnage to be produced will never be attained, they probably help to show that it is not unreasonable to consider thirty years as making a very considerable change in the productive capacity of the Wyoming field, and the end of that period will witness a tightening of the flow of fuel to Canada. This does not imply in the least that the life of the Wyoming field is going to stop abruptly in thirty years—no district ceases mining so suddenly; but it does indicate before the thirty years have swept past, that production in this field is going to steadily and rapidly decline, and in so doing accentuate the difficulties of placing dependence on this fuel as the only source of heat in a country with the climate of Canada.

WOODEN CRIBS USED IN LONGWALL MINING IN THIN SEAM OF ANTHRACITE.

There are, of course, at least two factors that will operate before the rise in production, which the growth of population predicts is even approximately attained. Production cannot continue to increase indefinitely, and the economic substitution of another fuel for anthracite must eventually take place and is, to some small extent, already being tried. The question of future production has already been touched on in regard to present capacity, and costs of new developments, while there is also a limit to the territory or land area on which new mining can take place.

Of the possible substitutes, only two appear to have any chance of univesral application as opposed to mere local solutions, coke and oil. The consumption of coke as a domestic fuel is growing, and will increase. Oil fuel has played an important part in power production, and has now invaded the domestic field as indicated by the introduction of oil fuel into the heating plants of some of the large New York buildings. Inasmuch, however, as the production of oil is only about one leap ahead of the consumption, and as it has its own field of activity to provide for, a steadily growing one, oil fuel does not yet appear over the horizon as a rival to hard coal in the average domestic anthracite market.

It is to be noted that neither of these sources of relief can so far be considered as possible for Canada. Oil, because the Ontario production is too small to be an important factor and of admittedly uncertain future while other sources imply importation like anthracite or a long haul from presently unknown western fields. Coke, because this possibility has not been given proper study as part of a sufficiently broad and national investigation of the fuel problem.

The normal distribution of domestic sizes of anthracite produced is calculated below:

	% of normal distribution	1918-1919 allotment	% of distribution 1918-1919
Penna., N.Y., N.J.	58.9	29,375,784	54.0
Maine, R.I., Conn., Mass., Vt., N.H.	15.5	10,331,000	19.0
Ala., Ark., Dela., Dist. of Col., Md., Fla., Ga., Ky., La., Miss. N.C S.C., Okla., Tenn., Va., and West Va.	2.4	1,938,970	3.4
Ill., Ind., Iowa, Kan., Mich., Minn., Mo., Neb., N.D., S.D., Ohio, Wis., Colo., Cal., Ida, Mont., Ore., Wash. and Wyo.	11.8	5,761,945	10.6
Railroad Fuel	7.0	2,481,754	4.5
Exported to Canada	4.4	3,602,000	6.6
Miscellaneous Exports		51,930	0.8
Army & Navy Camps & Cant.		600,000	1.1
Total	100.0	54,345,783	100.0*

*Coal Trade 1919.

This proportion has been steadily maintained for a number of years prior to 1916. Total Canadian exports are given below:—

		% of Total Shipments
1913	4,154,386 Tons	5.8
1914	3,830,244 "	5.4
1915	3,540,406 "	5.2
1916	4,165,652 "	6.2
1917	5,350,817 "	6.9
1918	4.435,593 "	5.7

Anthracite exported to Canada is distributed from this side as follows:—

	1917	1918
Buffalo District	2,911,208	2,483,761
Dakota District	14,344	3,165
Duluth Superior District	4,862	1,092
Michigan District	826	11,451
Ohio	96,736	34,976
Rochester	643,161	648,171
St. Lawrence	1,551,859	1,356,842
Vermont	127,821	21,497
Total	5,350,817	4,560,955

and it is received in Canada through these districts:

	1917
Nova Scotia	71,263
New Brunswick	100,555
P. E. I.	5,147
Quebec	1,664,095
Ontario Central	2,963,940
Western Ontario & Manitoba	443,016
Saskatchewan	71,514
Total	5,319,530

from which it appears that there is approximately the following relationship between exports and imports:—

Vermont supplies New Brunswick(P.E.I., and Nova Scotia, largely water shipments from New England ports.

St. Lawrence supplies Quebec and the western part of New Brunswick.

Buffalo supplies Central Ontario and part of the head of the lake shipments.

	Total	Buffalo	Dakota	Duluth Superior	Mich.	Ohio.	Roch.	St. Lawrence	Vermont
Novia Scotia	71,263								71,263
New Brunswick	100,555							60.144	55,411
P. E. I.	5,147								5,147
Quebec	1,664,095						172,389	1,491,715	
Cent. Ont.	2,963,940	2,493.061					470,881		
West. Ont. & Man.	443,016	508,147							
Sask.	71,514		14,344	4,862	826	21,484			
Total	5,319,530	3,001,208	14,344	4,862	826	21,484	643,161	1,551,859	131,821

The consumption per capita of domestic sizes in America is given below, to which the figures covering the same period for Canada is added:

	1916—1917		
	Population	Consumption	Consumption Per Capita
Connecticut	1,719,623	1,952,900	1,14
Delaware	234,710	223,503	0.95
Dist. of Columbia	345,856	517,760	1.49
Maine	646,588	556,683	0.86
Maryland	1,292,091	933,889	0.72
Massachusetts	3,939,561	5,027,993	1.27
New Hampshire	403,886	314,945	0.78
New Jersey	3,255,407	4,961,622	1.52
New York	11,187,798	14,169.809	1.27
Pennsylvania	8,981,082	6,815.650	0.76
Rhode Island	573,583	664,008	1.16
Vermont	296,426	316,850	1.07
Average			1.15
(Estimated)	1918	1917	
Quebec	2,326,000	1,664,095	.71
Ontario	2,821,000	2,963,940	1.05
Manitoba	619,000	443 339*	72
Average			.83

* Includes head of the Lakes.

Canada's consumption in that area where the population is greatest, and when other sources of fuel for this purpose are not presently available is, therefore, not yet equal to that of the heaviest anthracite consuming community of America.

Canada is the Last Applicant at the Final Source of Fuel.

These deductions point to these considerations: that Canada being the most distant market, the most indirect to reach, the last applicant at the final source of this fuel, will in all probability witness in future years many a recurrence of the situation of 1917-1918, when coal was scarce and hard to get. When the united demand is moderate and the production going well, Canada will be supplied, but when the demand is heavy and production low, Canada will again be a participant at the interesting function of allotment of fuel supplies; a fact which must inevitably be a detriment to her economic and social development. That drawback takes place and is present in a period in her history when expansion is not long past mere commencement. And on top of these statements, it has to be remembered that Canada can only ask for consideration; she has no voice in any proposals developing or conserving production for her future necessities, no control over efforts to expand this industry; no means to compel any change in policy, and no authority to force her needs. While nothing brought forward in these papers need be accepted as a definitely established fact,—rather the figures are to be conceived as illustrating the future by the light of the past, still the importance of this fuel question to Canada cannot be comfortably explained away by the fact that there is enough coal in the whole of the anthracite fields to last two hundred years. Rather the position should be that by virture of this situation and the geographical position of Central Canada to her own fuel supplies, it is essential that Canada earlier than any other market should promptly initiate the means, conduct the experiments and plan the campaign to reach complete or some measure of independence in this direction. The little problem should be handled as a national question and not by way of a variety of efforts at local relief. What ever is being done in the latter direction should be welded in as part of a larger programme.

Modern Methods of Extraction Prevail in the Wyoming Field.

These facts, figures and fancies on the present and future importance of the Wyoming field to the Canadian market, and the trend of the Canadian consumption arouses considerable interest in what is being done to offset the future decreasing life, and so prolong the capability of the field to maintain a maximum of production. Progress along these lines largely centres on modern efforts to attain maximum recovery, the mining and operation of the thin veins, and the utilization of coal at present going to the culm dump.

In the estimates quoted above, no veins under 30 inches were included. But since that date, beds down to 24 inches are being mined. Ultimately, it is possible that this present limit will be carried down to 18 inches. Unfortunately beds between the limits of 24 and 18 inches cannot be left untouched as a small future reserve, because not only of their physical situation in the general stratification of all the properties, but also because of the economic question of cost.

In all these fields, thin veins alternate with thick veins, consequently in mining out these thick veins, there comes a time when the robbing of thick coals becomes retarded by the presence of an overlying coal. A decision has, therefore, to be reached as to whether this thin coal shall be mined or abandoned. As the coal becomes thinner, it becomes easier to make this decision because the ultimate possibility of mining such a bed is then more remote.

The extraction of a 24 inch coal is, comparative to the operation of neighboring thicker veins, not presently an economic success. The cost of mining a thin coal increases rapidly with the decrease in thickness, and the greatest proportionate increase is below the 30 inch limit. Mr. H. M. Chance compiled a curve of anthracite costs illustrating this point, which is reproduced below.* A similar chart for soft coal mining in Canada appeared in 1913. Both show clearly that the proportionate rise in cost is due to decrease in vein size. To Mr. Chance's curve, an addition has been made representing the variation of costs due to thickness under conditions that are more recent than those depicted in 1909. At that date machine mining in the anthracite region was only in its infancy, while today it is, and must become more so, a very important factor in thin coal production. The additional dotted line indicates roughly that despite the increases in wages and materials, the application of machine mining has kept the balance of the cost of thin coal mining quite comparable with the previous calculated figures.

Thin Seams Should be Mined To-day.

Out of the recognition of the approaching exhaustion of the fields, the principle has been evolved that a proportionate tonnage of thin coal to the relative tonnage of thin coal still in the ground should be mined. This is a sound economic policy in any coal mining field, and had it been recognized years ago, the extra cost of mining these coals, so as to avoid a loss of minable coal and obtain release of underlying veins, would not have been felt. The sooner any company whose operations are so great as to be inevitably bound up with the progress of the field and whose life will approximate that of the field itself ,recognizes this, a guarantee is obtained that the costs of production will be maintained at the lowest average figures. This may be mining for posterity, but coal being a natural resource which should be conserved as much as possible, this is the proper plan to follow.

Modern methods of extraction present a vast change for the better. Twenty or thirty years ago, or somewhat earlier, a larger percentage was extracted in the first mining and thereafter the bed abandoned as exhausted. This resulted in small pillars which later crushed, gave rise to squeezed territory affecting large areas of often unworked coal. In cases where it was at all possible, these old areas have been re-entered and worked over again. Under more enlightened management, the tonnage extracted in first mining has been considerably reduced, large pillars left behind, more regularity and design exhibited in the work, and where the robbing of these pillars was some time away in the future, or they were to be mined under improved surface property, the chambers were filled with mine rock, or flushed with culm or ashes. Under such conditions, very little coal is lost and recovery will be at a maximum.

The preparation of anthracite for market is a science fully comparable to the metallurgical problems encountered in the concentration of many base metal ores. As the coal is mined it comes to the breaker with a varying percentage of waste material, according to the character of the vein being mined and the carefulness or otherwise of the miner. The coal beds range in quality from those of pure coal to those containing large percentages of intermixed material. Such veins can be cleaned either by the miner in the mine, or in the breaker. Where the foreign material is in the form of a layer of rock that separates readily from the coal, the miner in most cases separates the rock

* Engineering and Mining Journal, July 20, 1909. (see page 269 of this issue.)

A MODERN ANTHRACITE BREAKER.

by gobbing it in his chamber, but as the veins become more intermixed with slate and "bone," it becomes more economical to clean it in the breaker. Very careful attention is paid to the amount of foreign material sent out by the miner in the care of coal. Standard discipline is well maintained.

In the preparation of this fuel, the following dimensions show the standards, round and square, utilized in screening the coal:—

	Through		Over	
	Square	Round	Square	Round
Grate	4"	4*"	2¾"	3-1/8"
Egg	2¾	3-1/8	2	2¼
Stove	2	2¼	1-3/8	1-9/16
Nut	1-3/8	1-9/16	3/4	7/8
Pea	3/4	7/8	1/2	9/16
Buckwheat	1/2	9/16	1/4	5/16
Rice	1/4	5/16	1/8	3/16
Barley	1/8	3/16		3/32

The allowable percentages of foreign matter are approximately as follows:—

Broken	3%	Chestnut	15%
Egg	4%	Pea	18%
Stove	7%	Buckwheat	20%

Competition and demand in normal times control the percentages of waste, and also the percentage of over and under size in the different classes of fuel as marketed. In former days it was difficult to find a market for pea coal, and much of it went out to the dump. Then it became saleable as a steam fuel, and latterly is well established as a house fuel. This process of extending the usefulness of the various sizes of fuel is still going on, and buckwheat, once entirely unsaleable, has now passed into the steam class of fuel, and is encroaching on the domestic market, home furnaces being now available to burn this size.

Culm Piles Becoming Valuable.

Far-sighted operators long ago foresaw the coming utilization of the smaller sizes, and in many cases carefully dumped that material separate from the breaker and mine refuse. This has at different times given rise to absurd statements of millions of tons lying available on the surface not being utilized and inferentially, if not directly stated, being held for higher prices. The truth is that the domestic consumer who most commonly believed such statements, would not have purchased and even if purchased, would not have known how to burn the small sized material these banks contain. These coal piles are now rapidly disappearing, and as each successive scarcity of steam sizes appears, there is a fresh activity in their disposal. The improvement in preparation and utilization of the finer sizes is still going on until now the question of culm is receiving attention. Ultimately as already stated, instead of a loss of about 25 per cent of coal in preparation, this will be reduced to an unavoidable loss of 10 per cent, and the whole of the coal mined with either be used at the colliery or marketed.

Utilization of culm has taken place through direct consumption in dust burning boilers, or conversion into briquettes or coking. Direct consumption as dust will doubtless come in the future; it is already successfully established in certain phases of the copper industry. As practiced as a direct steam raiser, certain difficulties are experienced still to be removed in practice and, mostly brought about by the scouring action of the anthracite dust.

Briquette production has been going on for a number of years on a modified and successful scale, and will increase in the future; while still another method employs a coke oven process in the production of anthracite coke. In both coke oven work and briquetting, the troublesome question has been the reduction of the ash, and it is in accomplishing this that the preparation process has adapted still other features of the metal mining industry. Normally the percentage of ash in culm will range from 20 to 60 per cent, consequently any fuel made from this material would be unsaleable unless the ash contents would be reduced. To accomplish that, coal mining has borrowed from metal mining and introduced the Dorr thickener and classifier as a means to that end. It also appears as if the concentrating table would ultimately be used for a further reclamation of culm. The Dorr opera-

LOADING FROM A LONGWALL FACE. NOTE AGAIN THE THINNESS OF THE SEAM.

tion so far as applied to the anthracite fields has been productive of some interesting results.

While considerable progress has been made, and more will yet result, in this direction, the field for conversation is now somewhat limited and, this work however interesting and necessary, will not materially alter the situation. The production of culm is small, work in the direction of thin coal mining does not offer any great inducement for expansion, mining recovery is as high as it ever will be, and such improvement as is possible in breaker practice will not contribute materially to a better outlook. The initiative in all this work and its expense has been entirely borne by private enterprise, and it is disheartening to realize that the amount so expanded is considerably more than the Canadian Government has publicly allocated for any investigation of the fuel problem of the Dominion. Mr. F. W. Gray, now the Editor of this Journal, presented in a recent bulletin one phase of this question. In this paper is presented another portion of the tale, and one that emphasizes and carries with it the same lesson, viz.: that the future fuel supply of Canada and its population, is a subject large and important enough to justify the continued attention of the Government and should not be taken up and side-tracked as crises from varying causes rise and disappear. It is a problem greater and of more Dominion wide economic importance than much of the work now being undertaken by numerous Government Departments.

STRIPPING AN ANTHRACITE SEAM

ROCK ROAD OR "CUTTING SIDE" LEADING TO A LONGWALL FACE.

DATA ON MACHINE MINING PERFORMANCES - WYOMING ANTHRACITE FIELD

	Pillar Robbing Jackhammers Conveyor Loading		Chamber Mining Mining Machine Hand Loading			Chamber Mining Jackhammers Conveyor Loading			Chamber Mining Machine and Conveyor			Longwall Mining Machine and Chain Conveyor			Longwall Mining Machine and Conveyor Loading		
	MX.	AV.	MX	AV	MX	AV	MX	AV	MX	AV	MX	AV	MX	AV	MX	AV	MX	AV
Thickness Vein	49″	33″	55″	72″	60″	29″	33″	42″	33″	37″	36″	49″	31″		22″	31″	38″
Thickness Coal	40″	36″	48″	72″	46″	29″	33″	42″	33″	27″	36″	43″	31″		22″	22″	28″
Length Face of Chamber	250′	400′	350′	500′	400′	250′	250′	250′	250′	250′	250′	300′	220′		200′	200′	190′
No. of Jackhammers	2	1	—	—	—	1	1	1	—	—	—	—	—		—	—	—
No. of Scrapers	1	1	—	—	—	1	1	1	1	1	1	1	1		1	1	1
No. of Machines	—	—	3	1	1	—	—	—	1	1	1	1	1		1	1	1
Men Drilling	—	—	—	—	—	—	—	—	—	—	—	—	6		—	—	—
Men on Machine	—	—	—	—	—	—	—	—	—	—	—	—	4		—	—	—
Men Loading	—	—	19	10	8	—	—	—	—	—	—	—	13		—	—	—
Total Men Employed	9	7	33	15	13	7	7	7	9	9	9	10	23		12	12	9
Grade	6°	3°	4°	2°	1°	6°	4°	8°	0°	4°	0°	4°	3°		8°	2°	3°
	MX	AV	MX	AV	MX	AV	MX	AV	MX	AV	MX	AV	MX	AV	MX	AV	MX	AV
Tons per 8-Hour Day	60	46	38	29	214	195	105	100	71	66	37	29	43	35	53	49	40	33	35	25	47	32	55	40	106	76	47	30	50	32	50	32
Tons per Man per Day	6.4	5.1	5.4	4.2	6.5	5.9	7.2	6.7	5.5	5.1	5.2	4.1	6.1	5.0	7.5	6.9	4.4	3.7	3.9	2.8	5.2	3.6	5.5	4.0	4.6	3.5	3.9	2.6	4.2	2.7	5.5	3.5

STATISTICS OF ANTHRACITE PRODUCTION IN THE UNITED STATES AND CANADIAN ANTHRACITE CONSUMPTION 1878-1918

Year	Production From Wyoming Region	Production From Schulykill Region	Production From Lehigh Region	Canadian Consumption of Anthracite
1878	8,085,587	6,282,226	3,237,449	
1879	12,586,293	8,960,829	4,595.567	
1880	11,419,279	7,554,742	4,463,221	516,729
1881	13,951,383	9,253,958	5,294 676	572,092
1882	13,971,371	9,459,288	5,689,437	638,273
1883	15,604,492	10,074,726	6,113,809	754,891
1884	15,677,753	9,478,314	5,562,226	868,000
1885	16,236,470	9,488,426	5,898,634	910,324
1886	17,031,826	9,381,407	5,723,129	995,425
1887	19,684,929	10,609,028	4,347,061	1,100,165
1888	21,852,365	10,654,116	5,639,236	2,138,627
1889	18,647,925	10,474,364	6,285,421	1.291,705
1890	18,657,694	10,867,821	6,329,658	1,201,335
1891	21,325,239	12,741,258	6,381,838	1,399,067
1892	22,815,480	12,626,784	6,451,076	1,479,106
1893				1,500,550
1894				1,530,522
1895	24,943,421	14,269,932	7,298,124	1,404,342
1896				1,574,355
1897				1,457,295
1898				1,460,701
1899				1,745,460
1900	24,686,125	13,502,732	6,918,627	1,654,401
1901	30,337.036	16,019,591	7.211,974	1,933,283
1902	19,258,763	8,471,391	3,470,736	1,652,451
1903	35,723,258	16,474,790	7,164,783	1,456,713
1904	34,006,009	16,379,292	7,107,220	2,275,018
1905	35,857,897	17,703,099	7,849,205	2,604,137
1906	32,640.693	16,011,285	7,046,617	2,200,163
1907	38,638,452	20,141,288	8,329,653	3,141,873
1908	38,872,295	18,006,464	7,786,255	3,160,110
1909	37,573,467	16,864 147	7,532,271	3,017,844
1910	38,433,227	17,845,020	8,627,539	3,266,235
1911	41,033,354	19,188,300	9,682,147	4,020,577
1912	37,653,164	18,213,960	8,800,125	4,184,017
1913	41,160,906	19,417 385	10,180,021	4,642,057
1914	41,258,463	19,416,586	10,272,308	4,435,010
1915	39,945,344	18,043,709	10,190,421	4,072,192
1916	37,945,335	19,677,476	9,437,545	4,570,815
1917	43,577,769	22 028,055	11,456,963	5,320,198
1918	42,746,038	22,009,607	11,552,042	4,785,160

CANADIAN COAL MEN

Mr. O. E. S. WHITESIDE
President of the Mining Institute, 1920-21

The Canadian Mining Institute has elected Mr. O. E. S. Whiteside to the office of President, a proceeding that is notable in that following Mr. D. H. McDougall, the Institute will have two presidents, in immediate succession who are coal miners in active charge of coal mining. Mr. Whiteside is likely to be a good president, first because of his own qualifications for the position, and second, because of the importance of the section of the Institute's activities that he represents.

The "Bulletin" for March has the following succinct account of Mr. Whiteside's career, from which it will be seen that Mr. Whiteside's purview of the operating and financial of collery management is very wide and practical. The new President's record of labor accomplished on behalf of the Institute also recommends strongly the wisdom of the unanimous choice of Mr. Whiteside for this office. The "Bulletin" states:

"Mr. O. E. S. Whiteside was born at Metcalf, Ontario. His early education was obtained at the Ottawa Collegiate Institute from which he entered McGill University in 1890, securing the Jeffrey Burland scholarship. He graduated with first class honors in natural science in 1894, with the degree of B.A Sc. Later, in 1900, he took his master's degree. After graduation he was employed for a few months in the McGill observatory before going to Alberta where he has been continuously employed ever since although he has found time on numerous occasions to visit the coal mining areas, not only of Canada and the United States, but of England and the continent as well. Mr. Whiteside spent his first nine years in Alberta with the H. W. McNeil Co, Limited, at their Anthracite and Canmore colleries, first as mining engineer and later as general superintendent. In 1904 he accepted an appointment as general manager of the West Canadian Collieries, Limited, at Frank, where he remained until 1908, when he resigned to accept his present position as general manager of the International Coal and Coke Company's mines and works at Coleman.

Mr. Whiteside is a charter member of the Institute and has always taken the keenest interest in its affairs. He has been a member of Council for the terms 1910-12 and 1914-16, and has been closely connected with the activities of the Rocky Mountain Branch, of which he was one of the original organizers. He was also one of the organizers of the Western Coal Operators' Association, which was formed about fourteen years ago, and was elected President of the Association this year.

PRECIS OF PRELIMINARY DRAFT OF PROPOSED BILL RESPECTING THE ENGINEERING PROFESSION BEFORE THE BRITISH COLUMBIA LEGISLATURE.

Interpretation: The practice of a Professional Engineer Within the Meaning of this Act.

"(b) The pracice of a Professional Engineer within "the meaning of this Act embraces advising on, re- "porting on, valuation, laying out and the design, "carrying out, direction of the construction, install- "ation, improvements of public utilities, factories, in- "dustrial works, railways, bridges, tunnels, highways, "roads, canals, harbours, harbour works, river im- "provements, light-houses, wet docks, dry docks, "dredges, cranes, floating docks, ship design and con- "struction and other similar works, steam engines, "turbines, pumps, internal combustion engines, and "other similar mechanical structures, air ships and "aeroplanes, electrical machinery and apparatus, "chemical operations, processes, apparatus, and ma- "chinery, and works for the devolopment, transmis- "sion or application of power, light and heat, launch "ways, marine ways, grain elevators, municipal "works, irrigation works, water works, water purific- "ation plants, sewerage works, sewage disposal warks, "drainage works, incinerators, hydraulic works, min- "ing properties, mining operatios, mining and con- "centrating machinery and apparatus, mine and con- "centrator buildings and structures, oil and gas wells, "mineral deposits, metallurgical works, metallurgical "proceses machinery and equipment, metallurgical "buildings and structures, investigations relating to "the examination, surveying, exploration and develop- "ment of rocks, minerals (including coal, petroleum, "natural gas, and other fliud substances of value), "rock structures, geological processes and the applic- "ation of geology to practical problems of the indus- "tries, arts and engineering, and all other engineer- "ing works, and all buildings necessary to the proper "housing, installation and operation of the Engineer- "ing works embraced in this section.

"The execution as a Contractor of work designed "by a Professional Engineer, the supervision or the con- "struction of work as a foreman or superintendent "or as an inspector, or as a roadmaster, trackmaster, "bridge or building master, or superintendent of main- "tenance shall not be deemed to be the practice of a "Professional Engineer within the meaning of this "Act."

Provision for a Close Corporation.

All persons registered as Professional Engineers under this Act, shall constitute the Association of Professional Engineers of the Province of British Columbia, and shall be a body politic and corporate, with perpetual succession and common.

Association is given power to hold real estate, within specified limits, to pass by-laws not conflicting with the Act for governance, discipline, admission, etc.

Who May Practice.

Only such persons as hold membership in the Association, or license from the Association to practice. Persons having five years previous practice as a professional engineer under the definition of the Act, and residing in British Columbia at the date of the passing of the Act. Provision is made to permit persons to practice who come from other provinces of Canada, who fulfill specifications of membership and pay the prescribed fees. The Act does not apply to government employees. Engineers who have been overseas are given full rights of members of the Association.

A provision which it is understood has been asked by representatives of the Canadian Mining Institute, reads as follows:

"Notwithstanding anything to the contrary in the "Act, any person who is not a resident of British Co- "lumbia may practise without license in the Province "for the purpose only of examining of, consulting on, "advising on and reporting on properties and works "in the said Province, in the interests of persons who "are not residing in British Columbia. Such persons "may also superintend operations, directly resulting "under this Clause, for one continuous period of not "exceeding three months, without license, provided "that this privilege of superintendence shall not be "permitted more than once in connection with such "operations."

Powers of the Association.

The Act provides the form of corporate organization and specifies the officers to be appointed. Powers are given to expel members for unprofessional conduct, negligence, or misconduct, or for commission of a criminal offence if convicted by a competent Court. Rules of evidence and procedure are specified. Penalties are prescribed for persons practising as a professional engineer without license.

Provision is made for admission by examination, all of which is given to the discretion of the Council of the association. Provision is also made for joint action in these matters with other Councils of professional associations in other provinces of Canada. The names of licensed engineers will be recorded on a Register, and duly gazetted in the "British Columbia Gazette."

No person may be registered until he is 23 years of age, and has been engaged for eight years in some branch of engineering, except in the case of a graduate of a recognized engineering college, in which case the period is reduced to six years, which may include the term of instruction.

Provision is made for appeal to a Judge of the Supreme Court against refusal by the Council to issue a license to practice.

Within three months of the passage of the Act the Lieutenant-Governor-in-Council shall appoint a provisional Council of the Association consisting of eleven members, who shall elect their own officers.

ENGINEERING LEGISLATION IN QUEBEC

Mr. Theo. Denis writes in the "Bulletin":

The Engineering Institute presented a bill at this present session of the Quebec Legislature, transferring the powers of administration of the "Act Concerning the Practice of Civil Engineering" (1898) from the Council of the Canadian Society of Civil Engineers to a Provincial Board consisting of the members of Council of the Engineering Institute residents of the province, and this has revived attention to the Act in question, the bearing and abitrary powers of which I had no conception until a few days ago. In the original Act the definition of a Civil Engineer is vague, and there has always existed a doubt as to whether or not it includes mining engineers and metallurgists.—One thing certain is that it includes all persons " advising on, making measurements for laying out, designing or supervising

the construction of railways, metallic bridges, wooden bridges, public highways, roads, canals, harbours, river improvements, lighthouses, and hydraulic, municipal, electrical, mechanical or other engineering works." No person is entitled to act as a civil engineer unless he is a "Corporate member of the Canadian Society of Civil Engineers," now the Engineering Institute of Canada.

So that, if I interpret the Act correctly, a mining engineer in charge of a mine a hundred miles from nowhere, a science graduate from a university, a man of eminence as an engineer, who wishes to build a road from his mine to his mill, or who wishes to build a flume for working his placer, is not allowed to design or supervise this work, but must secure the services of a "Corporate member of the Society" to do it. If he should undertake it himself, he is liable to a fine of $200.00 for the first offence, and $500.00 for each of the subsequent offences.

If I am wrong, I would like to be set right. If I am right, then the powers conferred by the old Act of 1898 are arbitrary in the extreme, much more so than any of the other acts respecting liberal professions. For, the medical Act does not fine me if I take quinine or aspirin for a cold without calling in a physician; if I have the nerve to do it I may pull out my own aching teeth without a dentist's permission; I am allowed to make plans for my chicken coop, or for my house without being fined $500.00 by the corporation of architects, but a mining engineer may not design and build a two-foot gauge tramway from his headframe to his dump without incurring a liability to a $200.00 fine for a first offence and $500.00 for a second.

I consider such a statutory measure detrimental to the development of our mineral resources, inasmuch that foreign capital, being timid by nature, is liable, for slim causes, to be diverted into other fields, such as Government bonds, at a time when the cry is that "production, more production and greater production," is the only way out of the complicated anomalous economic situation which the world faces at present. I am of the opinion that steps should be taken to modify the arbitrary terms of the Act of 1898.

Quebec, Feb. 12, 1920 T. C. DENIS.

MANITOBA SAFEGUARDS INVESTOR IN MINING FLOTATIONS.

Amendments to the "Sales of Shares" Act have been adopted by the Local Legislature.

The chief points are that before placing Development Stock on the market a prospectus of the Company must be submitted to the Public Utilities Commissioner for approval. This must set forth the price paid for the property and the amount of Vendor's Stock, and all advertising must conform to statements set forth in the prospectus.

Further, that no Vendor's Stock may be offered on the market until the amount of money has been subscribed by Sale of Development Shares to warrant development of the Mine to a point where there is a reasonable prospect of the mine making a fair return to investors and the permission of the Public Utilities Commissioner must first be obtained thereafter authorizing sale of Vendor's Stock.

Northern Ontario Letter

THE SILVER MINES.

The One Big Union, in Cobalt, has commenced a campaign of so-called "sniping" tactics. The membership is comparatively small, and is composed chiefly of the radical element. Also, it is opposed by the majority of the workers. While probably not able to cause any general labor disturbance, the organization by bending the will of its few fanatical followers may be able to create local disturbances, decidedly limited in their scope.

Wages, hours of labor and general conditions in Cobalt have long since been approved of by the great body of workers. Direct representation is made between the men and the companies by the appointment of workmens' committees at each mine. This being so, it is regarded as being exceptionally remarkable that, having no just excuse for promoting discord, that the O. B. U. executive should have the audacity to attempt such an experiment.

J. Cluney is secretary of the O. B. U. in Cobalt, last summer at a meeting of the workers here he was charged with having been a paid representative of the O. B. U. in Winnipeg at the time of the labor trouble there. He is a man with practically nothing at stake in this country, and one possessing extreme radical views which he constantly attempts to foist upon those who come in contact with him. So radical are his views as to cause not a few labor men to express the opinion that the government owes it to this country to take immediate steps to investigate the matter, and if able to secure proof of offences against constituted order, should take him into custody.

Production from the mines of Cobalt continues quite uniform, although shipments of bullion have been withheld for some weeks on account of the slight decline in quotations for silver. With silver averaging from 10 to 20 cents an ounce above the average obtaining during 1919, t is believed that the margin of profit will be increased to a point where it will not only offset the higher bonus to the men, but will also offset the gradual decline in output and still leave a greater net profit.

The indications are that the La Rose will have a moderately favorable year, owing to continued favorable developments on the Violet property, and new favorable results on the old University mine. The physical condition of the company's several properties would lead to the belief that the current year's earnings would be large, but for the fact that the cost sheet for 1919 showed that it cost the company $1.05 for each ounce of silver mined.

A labor dispute, arising over the discharge of a few One Big Union members who attempted to slow down production at the McKinley-Darragh, retarded development work at that property for a few days during the past week, but production at normal capacity has been continued. The affair only served to temporarily reduce the number of men employed underground, for a few days. At the time of writing, full forces are engaged and those who were discharged have not been reinstated.

The Oxford-Cobalt has purchased a hoist from the Adanac, which it proposes to instal at shaft No. 2. The plan of operation is to sink a shaft to a depth of 200 feet, at which point lateral work will be carried on. The promoters of the enterprise appear to

be confident of being able to provide the necessary money for development work.

In discussing he project light narrow gauge railways from Elk Lake to Gowganda, one of the gentlemen involved in the proposition intimated to the "Journal" that provided the Ontario government grants the charter, the rails to the camp will actually be laid within only a few weeks. It is also learned that the leading operators still evince their desire to have a standard gauge railway, and that some hope is still entertained that the Elk Lake branch of the T. & N. O. Ry. may yet be extended. As to this, however, the belief is growing locally that the Ontario Government may gladly accept the present opportunity to let private interests take up the matter of transportation to Gowganda when by so doing the Government will be unburdened of at least a part of its responsibilities.

At the Kells property, in the township of Corkhill, in the Elk Lake district, the result of underground work to date has been exceedingly favorable. Samples just brought out which are said to come from a depth of about 80 feet, contain several thousand ounces of silver to the ton. The veins are similar in composition to the Cobalt district. Four of these narrow veins occur in close proximity to each other.

Mining Commissioner, T. E. Godson, K.C., will hear at least five mining disputes at his monthly sittings to be held in Haileybury on April 14th. The list is made up as follows:—

George R. Smailes vs. Philip Godson, K.C., will hear dispute in respect of mining claim L.S. 386, situated in Gauthier township, in the Larder Lake Mining Division.

A. P. Orr vs. Capt. Albert Johnston, which is a dispute in respect of mining claim L. 6204 and L. 6205, situated in lot 2 concession 6 in the township of Skead, in the Larder Lake Mining Division.

R. P,. McGregor vs. S. W. Barber, being a dispute in respect of mining claim 18834 situated in the Gillies Limit, in the Temiskaming and Coleman Mining Division.

R. H. Douglas vs. M. P. MacDonald, a dispute involving mining claims M.R. 6087, 6088, 6089, and 6090 situated in the township of Cairo, in the Montreal River Mining Division.

Gibson and Kennedy vs. Smith, being an application for relief from forfeiture in respect of mining claim L. 4575, situated in the Larder Lake Mining Division.

On the White Reserve property, in the Maple Mountain part of the Elk Lake district, it is planned to commence work this spring provided sufficient men can be induced to go in to work. During the past winter it was found impossible to get men who would accept employment at the property owing to it being situated so far from a railway.

A at meeting of the shareholders of the Nipissing Extension Mines, Ltd., held on March 19th the following directors were elected.

Hon. Albert Loenig; A. J. Young; William E. Stevenson; D. Inglis Grant; and Joseph Montgomery.

At a meeting of the directors, held on March 24th, the following officers were apointed:—

A. J. Young, President; William E. Stevenson, Vice-president; Hon. Albert Loenig, Treasurer; Joseph Montgomery, secretary; and Wm. R. Sweeny, Assistant secretary.

Major E. H. Birkett was re-appointed resident manager in charge of operations, and with F. J. Bourne as consulting engineer.

Following is a statement of ore shipments over the T. & N. O. Railway for the month ending February 28th, 1920, in tons of 2,000 lbs. as submitted by Arthur A. Cole.

Silver Ore.

Cobalt Proper.	**Tons.**
1. Coniagas	65.03
2. Hudson Bay	30.32
3. La Rose	118.10
4. McKinley-Darragh	180.36
5. O'Brien	32.02
6. Temiskaming	31,86
	457.69

The above shipments were made to the following Companies;

Canada.		
Deloro Smelting and Refining Co.,	Marmora	219.71
Coniagas Smelter,	Thorold	32,00
United States.		
American Smelting and Refining Co.,	Pueblo	33.03
American Smelting & Refining Co., Perth Amboy		77.80
Pennsylvania Smelting Co.,	Carnegie	95.15
		457.69

Price of Silver.

Feb. 2nd. Highest	134.500
Feb. 24th. Lowest	129,000
Average	131,295

During the week ended March 26th, three Cobalt companies shipped one car of ore each, the total amounting to 231,176 pounds.

Following is a summary:—

Shipper	Cars	Pounds.
McKinley-Darragh	1	82,260
Coniagas	1	88,000
Hudson Bay	1	60,916
Total	3	231,176

During the corresponding period the Nipissing was the only bullion shipper, sending out 80 bars containing 106,624.45 fine ounces.

THE GOLD MINES.

The bill introduced in the House at Washington, having the support of the American Bankers' Association, and having for its aim the placing of a tax on all gold used in the arts, has aroused considerable interest in the gold producing districts of Northern Ontario.

While all measures tending toward a search for some method whereby the gold producing mines could be assisted meets with ready support in this country, yet the latest proposal is accepted with all due reserve. It seems to be the opinion of careful observers that the placing of a tax on gold used in the arts might well lead to complications, and might prove to be attended with expenses totally out of proportion to the advantages which it would bring. Not only that, but goldsmiths would be given added opportunity and temptation to melt down gold coins and possibly add

to the present unfavorable monetary status of the nations. It seems as though humanity will always clamor for gold trinkets. As long as this demand continues, it would not be sound business to have $20 gold pieces minted while for an equal amount of gold the goldsmith would be obliged to pay $30. It seems to suggest the necessity for dealing with all new gold produced.

The proposed new bill would tax the arts $10 an ounce extra for all gold used, and would pay the proceeds to the gold producing companies. It is a plan that conveys the threat that it might only serve to create work for an additional army of office holders and tax collectors whose energies might be wasted in an unproductive occupation, while the real relief for the present economic problem lies in a greater number of hands being employed in producing something. The re-juggling of the world's gold, entailing the use of many men, and with the possibility of the expense of such an organization consuming the large part of the taxes collected does not appear to constitute a solution of the problem which is confronting some of the nations, if not the world.

In Northern Ontario the gold mining industry is on a comparative prosperous footing. Mines that have been closed down from two to three years are one by one resuming work. Those that have continued to operate during the past few years are increasing the scope of their activity, and on the whole the gold mining industry of this country is in a better position than ever before in Ontario's history. Barring unforseen contingencies the year 1920 will not only bring some of the former producers back to their former standing, but will also add new producers to the list. It is a condition about which it is only reasonable that great optimism is being expressed, and also something which would tend to offer encouragement for the application of additional capital in the industry for the development of mines pending the return to normal conditions when the reward for the present improvement in mining methods will be realized. The truth is that economy is being practiced to a greater degree than ever before. It is due in part to greater experience and natural improvement, but is also due in a large measure to the fact that the hardships caused by the war made it absolutely necessary to establish the highest possible degree of efficiency, or go out of business.

The Dome Mines will end a comparatively successful fiscal year at March 31st. Having started up its mill last spring, and having treated a medium grade ore from which $6.87 a ton was recovered during several months of operation, the net profit has been considerable, and has enabled the company to disburse two dividends each amounting to 2½ p. c. or a toal of $200.00. It is now believed that although able to earn fairly large profit, the company will not pay more than 2½ p. c. quarterly until such time as a surplus has been accumulated with which to meet any future emergency. The previous experience in this respect may cause a changed policy.

During 1919 the Davidson mine had only a moderately successful year. While it had been previously officially stated that the mill had been completed and had a capacity for treating 60 tons of ore daily, and that a large tonnage of fairly high grade ore had been blocked out, the figures for 1919 show that the mill treated an average of less than ten tons of ore daily and that the total recovery was but $7.07 per ton, or a total output of $2 under $24,000.

The Teck-Hughes Gold Mines had a fairly successful year in 1919, the output amounting to $169,590.41, as a result of having treated 18,387 tons of ore. This shows a recovery of $9.22 a ton. The achievement is considered favorable due to such having been accomplished in spite of the prolonged labor strike at last summer in the Kirkland Lake camp. It is believed that under present conditions the company will this year be able to pay off a fair amount of the bonds held against it.

At the Kirkland Lake Gold Mines during 1919 the result of work was not so satisfactory it being shown that a total of but $4.97 a ton was recovered from each ton of ore treated. Whether or not this is an indication that former estimates were not accurate, or whether it points to difficulty in obtaining the desired percentage of extraction is a matter of speculation. Opinion seems to lean to the latter being the cause, owing possibly to the presence of tellurides in the ore. A total tonnage of 11,324 tons were treated from which a total of $56,262.59 was produced. The achievement was obviously not a profitable one for the reason that costs in the Kirkland Lake camp have in no case been reduced to below $8 a ton.

On the Bidgood property, situated in the Eastern part of the Kirkland Lake district a contract has been let to sink a shaft to a depth of 300 feet, at which point some 2000 feet of lateral work will be done.

A charter has been granted to the Moffat-Hall Gold Mines, with property in Lebel township. The company is capitalized at $3,000,000, made up of 3,000,000 shares of the per value of $1 each.

A test shipment of ore recently made from the Clifton-Porcupine mine, showed an average gold content of $66.45 a ton. While this is above the average of the ore so far developed, yet it is said to be the average of one of the ore shoots on the property. In the meantime development work is proceeding at the 200-ft. level and a good deal of success is being met with The management states that provided the present favorable results continue, it is expected that plans for a mill will be taken into consideration.

PERSONALS.

Mr. A. G. Burrows and Mr. P. E. Hopkins, geologists of the Ontario Bureau of Mines are making underground studies at Kirkland Lake. They spent the greater part of the last field season in the Kirkland gold area, and are preparing a detailed report and map.

Mr. Balmer Neilly, formerly manager of the Penn Canadian mine at Cobalt and recently appointed secretary of the Ontario Mines Owners Association will move to Toronto shortly and open an office there for the Association.

NEW MONTREAL SALES OFFICE

The Engineering and Machine Works of Canada, Limited, St. Catherine, Ont., owing to the rapidly increasing demands for their products consisting of boilers of all types, horizontal, vertical, locomotive and marine, tanks, plate work of all descriptions, etc., and particularly in connection with their recent and very sucessful venture, the manufacture in Canada of the Keyston Light Traction Excavator, Model 4, have found it necessary to open another Eastern Sales Office in the Birks' Building, Montreal, where inquiries can be more quickly and satisfactorily handled. This is In addition to their Sales Office in the Sun Life Bldg., Sherbrooke, Que.

BRITISH COLUMBIA LETTER.

Victoria, B. C.

The forecasted Bill amending the Placer Mining Act of British Columbia has been presented to the Legislative Assembly by Hon. Wm. Sloan, Minister of Mines, and, as has been prophesied, provision is made for the elimination, by easy stages and in an equitable manner, of accumulated arrears of rentals on Placer Mining Leases, these now being estimated as approximating $350,000.

Because of the standardized value of gold and the increased cost of plant, labour, supplies and every necessity in relation to its production interest in the development of the gold-bearing sands and gravels of British Columbia has fallen off in late years. The annual output of the precious metal from this source has declined. Consequently large sections of the placer mining districts are held under leases upon which the owners, unable to pay the yearly charges, owe considerable sums to the government and for some time have done little or no work.

This is a condition detrimental to the best interests of the mining industry but it is one requiring careful remedial treatment, it being necessary to guard the rights of the license holder who has invested heavily in development, contemplates further development but has been temporarily embarrassed financially and yet to assure that ground tied up by leases likely to continue inoperative shall be thrown open to others anxious to make them productive.

That this problem has been kept in mind by Mr. Sloan in the drafting of the Bill now before the House is quite clear. He has not the difficulty of the situation by providing a simple means of collecting the arrears. They are to be consolidated and the payment spread over a period of years. Besides there is introduced a uniform procedure for the obtaining and the protecting of Placer Lease Titles in the future.

The provisions of the proposed legislation may be summarized as follows:

In respect of leases now in arrear for more than one year's rental the lessee may apply before the 1st of January, 1921, for the consolidation of the annual rentals in arrear and arrange for their payment by annual instalments extended over a period not exceeding ten years. Where the arrears are consolidated, the failure to pay the annual instalment or the current annual rental when due will automatically result in a forfeiture of the lease. Where the lessee so in arrear fails to apply for consolidation and fails to pay the arrears before the first of January 1921, his lease is forfeited.

Provision is made for the issuance of leases, beginning 1st of July, 1920, at a reduced annual rental and reduced annual expenditure for development work. Leases in this new form will contain a provision for automatic forfeiture, if the lessee fails to pay the annual rental or to do and record the annual development work. Reinstatement is permitted within thirty days where the fault consisted only of failure to record the work. Excess development work done in any one year may be recorded so as to count on future development work requirements for the following three years only. Cash may be paid to the Crown in lieu of expenditure on development.

In the case of leases in good standing it is provided that the lessees have the option of applying at any time while the regular charges are paid up to have the annual rental and annual expenditure reduced to the rates under which new leases are to be issued after the 1st of July. If they apply and obtain this reduction the conditions of automatic forfeiture for default. and the privileges of recording excess work and paying cash in lieu of work, which are applicable to new leases, will also attach to these old leases. If they decide not to apply for a reduction of rental and annual expenditure their leases will continue subject to the same provisions to which they now are subject.

Leases which become in good standing through consolidation of arrears, may also be brought under the reduced rates of rental and other provisions applicable to new leases issued after the 1st of July.

Although the foregoing are the chief alterations there is yet another innovation of importance. Heretofore Placer Mining Leases have been issued by the Gold Commissioners, who have their headquarters at different central points throughout the Province, with the sanction of the Lieut.-Governor-in-Council, the authority to issue the same being invariably based on the Gold Commissioner's report accompanying the application. It is now proposed that Gold Commissioners, having full knowledge of all local conditions, shall be empowered to issue such leases without reference to the Lieut-Governor-in-Council, while, as has been indicated, automatic forfeiture is provided for in cases where the lessee fails to observe the covenants and conditions of his lease.

These changes in the provincial law, it is pointed out, are proposed by Mr. Sloan, and supported by other members of the government, not through any lack of confidence in the Placer Mining Fields but because it is recognized that, at least in-so-far as the long exploited placer sections are concerned, the methods of the individual miner has given place, for the most part, to those of the hydraulic or dredge operator. And as the latter has contributed materially to the arrears of rental indicated, it is felt that a reduction in both rental and expenditure rates will have the effect of stimulating and stabilizing the placer mining industry of British Columbia.

The alterations in connection with the taking up and the maintaining of placer leases in the Province are as follows:

Hydraulic lease, $25 in place of $50 per annum and development $250 instead of $1,000 per annum.

Creek lease, $37.50 in place of $75 per annum and development $250. instead of $1,000 per annum.

Dredging lease, $25 in place of $50 per mile and development $250 instead of $1,000 per mile per annum, the value of any new plant or machinery employed to count as money expended on development; and 20 cents royalty to be charged against every ounce of gold recovered.

Stewart, B. C.

Definite information is available regarding development plans on the Big Missouri Group of Mineral Claims, Salmon River Section of Portland Canal Mining Division. There will be started a diamond drilling contract of 12,500 feet. This, together with work to be carried on simultaneously, will cost about $40,000. Two camps will be maintained throughout the season. The erection of a concentrator and of all other necessary equipment is proposed providing the exploration and development for which plans have been laid gives satisfactory results.

Dale L. Pitt, who is known in Pacific Coast mining circles as the ore buyer for the Tacoma Smelter and later a manager for a copper producer at Index, B. C., has been appointed General Manager of the Premier Mine, Salmon River. R. K. Neill, of Spokane, Wn. and Vancouver, B. C. whose place he is taking, retains his

interest in the mine. Mr. Pitt has stated that development will be carried on vigorously, that a concentrator will be installed, water power developed, and a saw mill erected.

Alice Arm, B. C.

The Molybdenum Mining and Reduction Co., of Seattle, Wn., which is interested in one of the best showings of molybdenum in British Columbia, situated in the Alice Arm section, states that a bona fide effort is being made by all concerned to dispose of this property. It has been tied up by litigation for several years, the complications as to title making it impossible to place the property on a producing basis even during the war when prices were high and the Allies were crying out for the metal. The court has fixed the price at $150,000.

Atlin, B. C.

A 50-ton shipment of the hydro-magnesite of the Atlin District, British Columbia has been shipped from Vancouver, B. C. to England. This was part of a 200-ton lot brought from the north in 1914 and which has been held at Vancouver at the command of Old Country parties throughout the period of hostilities. Nichol Thompson, who is handling the business, anticipates that this is but the beginning of regular shipments of magnesite from this province. There is another deposit situated in the Cariboo District and within a short distance from the line of the Pacific Great Eastern Ry., now under construction.

Princeton, B. C.

Construction operations at Allenby and Copper Mountain will be resumed by the Canada Paper Corporation about the 1st of April. It will be possible then to start tracklaying on the new railway from Allenby to the Mine, as the grading will be complete. The bridge timbers are being framed at Princeton and will be forwarded to Allenby for distribution. Both H. R. Van Wagenen, the General Manager of the Company, and Van H. Smith, of Butte, Mont., the Mill expert, have been wintering in the United States. They are expected to return shortly.

Trail, B. C.

Shippers to the Trail Smelter of the Consolidated Mining and Smelting Co. of Canada are being paid, commencing with 1920, everything over 5 per cent on exchange values.

Greenwood, B. C.

The Providence Mine, Greenwood District, continues to ship. Two cars have been dispatched this month, aggregating 75 tons, most of which was taken from the 400 feet level.. The value of this is placed at $14,000. Development now is in progress on the 500 foot level where there is considerable high grade ore in sight.

Grand Forks, B. C.

The Rock Candy Mine and Fluorite Plant of the Consolidated Mining and Smelting Co. has resumed operations with sufficient orders ahead to assure continuous activity for a year or more. The Mill has been closed down for the past few months, although development has continued. The shipments from the decrepitating plant probably will reach about 18 cars a week.

British Columbia Government Proposes Reservation of Iron-Ore Deposits.

The Bill now before the Legislative Assembly giving the Lieutenant Governor in Council power to place a reserve on iron ores deposits, the said power to extend over a period of three years, will be applied to a limitd extent, and the authority so granted will be exercised, not to the detriment, nor in such a way as to inflict any hardship of interference with the prospector of any class of people interested in the mining industry. Rather it will be used for the advancement of the interests of those directly or indirectly concerned in the development of the mineral resources of the Province, as well as for the benefit of the public at large.

To the criticism that the bill will hamper the prospector it may be replied that he had not heretofore and cannot at present benefit materially by reason of the discovery and location of purely iron deposits. Without an Iron and Steel Industry in Western Canada there is not a sufficient market, if any, to make the product of such holdings saleable. That the force of this is recognized by the prospectors is confirmed by a statement voluntarily given to Hon. Wm. Sloan, Minister of Mines, who is responsible for the proposed legislation, by J. W. Mulholland, President of the Prospectors' Protective Association, who says in part:

"The iron deposits of British Columbia have in the past been of no value to the prospector. This class of ore is absolutely useless. By reserving districts which are idle and not covered by mineral claims there should be no reason or ground for opposition, for, if we have a Steel Plant in the Province, it would furnish a market for ores which are now being held by the prospectors of this Province and which would remain idle until such time as this market is created. Considering the benefits which this Province would derive from an industry of this kind I feel it my duty to give you (the Minister of Mines) my approval."

To the charge that present holders and operators will be adversely affected it is only necessary to direct attention to the fact that the authority asked for does not apply to iron ore locations already held until the Mineral or any other Act.

The object sought, briefly, is to prevent the further alienation of the iron ore resources to such an extent that their development is impeded. At present many such deposits are privately held and on none has much work been done. The only conclusion possible is that they were acquired, and are being held, for speculative purposes, a situation which, it must be clear, handicaps the efforts being made to interest capital in the development of an Iron and Steel Industry, an enterprise most important if British Columbia is to take the place her mineral riches warrant in the industrial world. An illustration in point is found on Texada Island where there are large iron ore deposits, of high grade, which have been out of the hands of the Crown for fifty years or more and on which there has been little expenditure in development.

While it is not intended to touch the unquestioned rights of these who have complied with all the laws heretofore, and have kept their properties in good standing, it is proposed that for a time such properties of this character, as may be deemed as of sufficient importance, shall be reserved by the Crown.

On the report of the discovery of iron ore, the resident engineer of the district in which such find has been made will be asked to inspect and report on the same. If it is considered on investigation that the ore is so situated, is in such quantity and of such quality as to warrant the belief that it might assist in the object in view, namely, the launching of an Iron and Steel Industry, the government power to apply the reserve probably would be exercised.

MANITOBA LETTER.

From Chas. A. Millican.
(Our Winnipeg Correspondent.)

Rice Lake District.

The Gold King Mines Ltd., with properties situated near the North East End of Hole River Lake in the Rice Lake District is the latest Company to place Development Shares on the market, offering 25,000 shares at 25c.

The prospectus and advertising matter are very conservatively worded; keeping clear of rash and extravagant statements.

On the Gold Pan Extension the Manager is rushing to completion the camp buildings and installation of Machinery. It is expected that mining operations will begin by 1st April and sinking carried on from the present 50 feet shaft down to the 300 feet level before much drifting is undertaken.

Mr. G. H. Porter, Managing Director of the Commonwealth Mine left on the 20th with supplies and a small crew of men to erect camp buildings preparatory to starting mining operations.

Major Pelletier has returned from the Gabrielle Mines, having completed the erection of new Camp building and putting the old buildings into serviceable condition for present use.

This Company will not instal any heavy machinery this season. It is the intention to do considerable stripping together with some sinking on present shafts. A large block of this Company's Treasury Stock has been purchased by an English Syndicate.

It is not expected that any work will be carried on at the Brooklyn Mine during the summer season.

On the 22nd inst., one of the Winnipeg evening papers made the announcement of a strike of $200,000 ore at the Gold Pan Mine, which caused considerable excitement in the City.

Later news relates the finding of a small pocket in the 200 ft. drift 83 ft. south of the shaft, but in extent it was exceedingly small, and the value not anything like as high as reported. A single shot blew out all there was of high grade ore. Work on the drift is still proceeding.

Golden Vein Mnie.

The shaft on this property is now down 30 feet. Cross samples taken every five feet run as high as $34.00 per ton, with a general average assay value of close on $9.00. A sample was taken from the bottom of the shaft shows an assay of $62.50 per ton. The vein is 15 feet wide at the bottom of the shaft and values appear to increase with depth.

Work on the Marigold Claim is being pushed. The shaft is now down 25 feet. The vein has widened to 5½ feet, and is carrying visible Gold.

WANTED.

Experienced man or Company, to install and operate concentrating plant on high grade chrome iron property. Over 1000 tons of ore mined, averaging better than 38 p. c. chromic oxide ready for concentrating. We have market for concentrated ore, and will allow substantial interest in prosposition to party installing and operating concentrating plant. Address: c/o Canadian Mining Journal, 528 Winch Bldg., Vancouver, Canada.

CHANGES IN THE CANADIAN MINING INSTITUTE

To the Editor "Canadian Mining Journal."

The plea of Mr. E. P. Mathewson in his address at the annual dinner of the Canadian Mining Institute for the adoption of the modern methods of business in the affairs of the Institute is warmly supported by many members. That there are obligations to the proposed plan, while not to be overlooked, should not be allowed to prevent a big step forward being taken now.

The purpose of the Canadian Mining Institute, according to its charter, is to encourage the development of the mineral resources of Canada. Its membership is predominantly made up of men of the engineering professions; but it includes many interested in other phases of mining. At times there as appeared a desire to degenerate to the status of a technical society; but the purpose of the Institute's existence has continued always to be the furthering of the mining and allied industries. The presentation and discussion of technical papers has always been a prominent feature of the meetings of the Institute; but never allowed to become the only feature. In this the Canadian Mining Institute has been a step in advance of the sister organization in the United States. It is interesting to note that the American Institute has recently made changes in its constitution which make it more nearly liike the Canadian organization.

The Canadian Mining Institute occupies the position of representative of the Canadian Mining Industry.

It seems to me that Mr. Mathewson and his supporters are on firm ground when they urge that steps be taken to insure that Institute should capably fill the position which it occupies. There is room for discussion however, as to whether the increased activity proposed should be made dependent on the securing of the financial support of the larger operating companies. The large companies have big interests to protect and it is quite proper and very necessary that they should unite to protect themselves. It is a proper function of the Canadian Mining Institute to support the big companies in many of their claims, for in the main the interests of the operating companies and of the whole industry are the same.

There can be little doubt that if the mine owners would give the affairs of the Canadian Mining Institute the attention that they give their own affairs they could soon make the voice of the Institute heard more insistently in places where it is highly desirable that it should be heard. With a business organization on modern lines the Institute would take on a new lease of life and become of vastly more importance to the industry and more fully function as the representative of the industry. There will nevertheless be members who will not look kindly on any proposal which will tend to make something of the nature of a mine owners' association out of the Canadian Mining Institute.

In recognizing the Institute's business office staff so as to make possible greater activity in matters that affect the industry, it may be found possible to get the desired results without seriously changing the present nature of the Institute. My own inclination would be to adopt Mr. Mathewson's plan and insure greater activity on the part of the Institute even if there is danger that the objections to the scheme may prove well founded. Possibly means can be found to avoid the danger without greatly altering the main feature of the plan, which is essentially to place the Institute in a position where it can be of greater service to the industry.

Toronto, 19th March, 1920 R. E. Hore.

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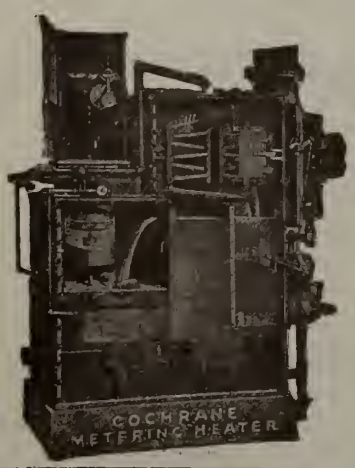

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EDITORIAL

Mining Investments in the Middle West

In the editorial pages of this Journal in recent issues there has been under discussion the very pertinent question of the relationship of investors to operating mining companies and to the owners of prospects. We had intended to discuss some phases of this subject at the recent annual meeting of the Institute. It is an unfortunate fact that financial and business men in Manitoba and Saskatchewan look askance at investments in mining fields. In many cases, indeed, when investments are made, secrecy is enjoined in order that the standing of our financial men be not impaired by the knowledge of the fact that they are interested in mining ventures. This is a situation so serious that we cannot avoid facing it and discussing the methods that may be adopted to change the present state of affairs.

In Manitoba, and probably in Saskatchewan, the mining industry in the precious metals will only be placed on a secure footing as far as the confidence of mining men is concerned, when a real industry is established. The fact that the Flin Flon property is now being operated and the probability that a deal will be made which will ensure an industry of large proportions, is of paramount importance. The gold industry, necessarily of a speculative nature, will secure confidence in financial circles when it is seen that a real industry has been established in mining through the copper properties. For that reason the future of the Flin Flon property has been the crux of the situation in connection with the recognition of mining among the industries of the Middle West.

It has been felt by mining men that irresponsible publicity in connection with gold prospects, more particularly in relation to advertising matter, has done a great deal to undermine the confidence of the men whose confidence it is important to secure. Advertisements of gold prospects appearing in the daily press are ostensibly written, as a rule, not for business men or for mining corporations, but for the small investor. The point of view is a mistaken one, and, like a boomerang, recoils on the districts connected therewith. It will be gradually conceded that legislative restrictions will not finally cure this situation; such restrictions, however, may do much to check mistatements and keep the situation under control. Certain enactments which have been passed by the Manitoba Legislature during the recent session provide that prospectuses be filed with the Public Utility Commissioner, whose duty it is to administer the Sale of Shares Act, and that such prospectuses give full details with reference to properties and the methods of organization of the companies applying for permission to sell stock. It is also provided that all advertising matter conform to the facts set forth in the prospectus. It is not to be expected that such provisions will inaugurate a new era; they indicate, however, the temper of the representatives of the people in this regard and such indication may mean much for the future.

There is a duty, however, which the mining men of Canada, more particularly through the Institute which represents them, should perform in order to assist the Middle West at the present time. Local branches may do much to assist the mining industry. The Institute as a whole, however, can do much more. There is no doubt that the western meeting was fruitful of good results, particularly in British Columbia. The suggestion should be carried out that the next western meeting should hold at least one session in the City of Winnipeg in order that the prominent mining men of Canada may discuss with the business men of Winnipeg the whole mining situation, more particularly in its western aspects and thereby establish confidence in the circles where confidence will mean much in an industry which, while it will not vie with agriculture, will yet be of great importance to the provinces of the Middle West.—R.C.W.

IS THE INSTITUTE READY TO ASSUME ANOTHER RESPONSIBILITY?

That the mine operators will find, in the services which the Secretary can render the industry, adequate compensation for the financial assistance which it is proposed to ask of them in putting the Institute on a better business basis may be assumed. At present the Institute is recognized by the Government as an organization that contributes to the welfare of the country and the Government helps to defray the Institute's expenses. The government grant, like the government officials on the Council, is recognized as a source of weakness when deputations from the Institute wait on governments. The Institute will be stronger if it can carry on without the assistance of a government grant. It is proposed that the operating companies should properly be requested to make this

possible by subscribing in proportion to their investment in the industry towards the cost of the Institute's work. It is proposed further to ask for subscriptions to pay for increased work by Institute officers.

There can be little doubt that the willingness of past governments to give financial support to the Institute resulted not from the organization's work on behalf of established industries, but from its useful work in connection with the establishment of new industries. The Institute has, owing to the early stage of development of our country, given much attention to development of mineral areas and has been a big factor in supplying useful information about mineral deposits and methods of mining and treating ores. If this part of the Institute's work is to continue and expand, there must be recognition of the fact that government officials and others not in responsible charge of mining operations have been the chief contributors. Men who represent money are asked to take the responsibility of putting the Institute on a better business basis. They should accept with this responsibility the duty of seeing to it that the educational part of the Institute's work is not allowed to sink too far into the background. There are many members of the Institute who have contributed something more valuable than money to the industry. Their contributions become more valuable when discussed by experienced operators; but care should be taken to insure that the contributions continue and that the demand for better business methods does not result in too little appreciation of the necessity of the encouraging of the pioneers and of the help given pioneers in the industry by men who do not represent money invested in the industry.—R.E.H.

MINING COMPANIES SEARCHING FOR PROPERTIES.

During the past few years several of the mining companies operating in Ontario have given much attention to the search for new properties. Some of the operators of silver mines at Cobalt have been particularly active. Company scouts have visited and examined hundreds of prospects, not only in Ontario, but also in far distant mineral districts. Some of the companies have undertaken exploratory work on many properties. Occasionally a company has committed itself to a large expenditure on property held with the option to purchase. In a few instances terms and results of exploration have proven satisfactory and the mining company has become the owner and operator of a new property. In other cases a controlling interest has been purchased and the responsibility of operation taken on. Up to date there are not many mines in Ontario that have been developed by companies in this way; but it is reasonable to expect that the existing organizations will be taken fuller advantage of in the future and that our mining companies will give more and more attention to the search for new properties that can be made productive.

An obvious advantage in favor of the mining company in this search is its staff of experienced men and its facilities for making assays and tests and for obtaining necessary men and supplies to carry on development work. An obvious disadvantage is the variation in opinons among shareholders when expenditures on a very speculative enterprise are to be undertaken. The original shareholders whose success came from a highly speculative enterprise may themselves be satisfied to hold what they have instead of venturing again. If they are willing, they have then to consider the many newer shareholders who did not invest when there was danger of failure and who may not be willing to venture now. If the shareholders are willing to speculate on development of new properties, they can well do so through their company's officers and staff, for they will thus have the benefit of a strong organization. The risk to be run, however, despite the best of guidance, is in most cases such that directors hesitate to act for their companies as they would for themselves, and mining companies are not making the progress in new development that some might expect.—R. E. H.

BRITISH COLUMBIA AND THE GEOLOGICAL SURVEY.

In this issue is published the text of a speech made by the Minister of Mines of British Columbia with reference to the resignations of members of the Geological Survey. The "Journal" welcomes Mr. Sloan's whole hearted and convincing endorsement of a point of view that has been urged with perhaps tiresome iteration in these columns. In setting forth his point of view Mr. Sloan has written a history of the Geological Survey of Canada that eloquently sets forth the proud and worthy traditions of what we venture to name the "Look Out" of Canada, which we believe our readers will find not only interesting, but inspiring. Mr. Sloan goes very far when he says that the Geological Survey "is the one branch of the Dominion Civil Service that has any direct bearing on our future". Yet, when that statement is pondered over, little exception can be taken to its accuracy. If other executive officers of provincial mine departments were as clear and as outspoken on the importance of the Geological Survey and its unimpaired maintenance there would be some chance of dissipating the ambiguity that characterises official attitude towards the Survey.

The Possibilities of the Oil Resources of Canada

By D. B. DOWLING*

The mobility of the liquid fuel introduces into the question of a survey of oil resources many problems quite foreign to the study of the coal measures. Certain formations indicate the probable presence of either of these resources, and generally the formations carrying oil precede in time of formation those carrying coal. The influence of earth movements and the introduction of compressive strains generally harden and consolidate the coal, but have the effect on the semi-fluid matter of increasing its fluidity and so hastening its segregation into pools, or even of facilitating the long period through which they have since been the porous beds to natural outlets. The survey of these resources must, in addition to the superficial mapping of the areas, also include studies of the physical condition of the beds presumed to be oil-bearing. As already suggested excessive fracturing and disturbance indicate a possible waste, whereas gently flexed beds may provide many structures favorable for the retention and collection of the oil.

The study of our probable fields must consequently include the outlining of the deposits, in which the oil has been found in other parts of the continent, a careful study of the general structure with the view of eventually eliminating those portions from which the reserves may be deemed to have been drained, and selecting for prospecting of those parts which give some promise of success. The term prospecting is not applied here in the same sense in which it is used when referring to the search for other minerals, but generally involves the actual drilliing of wells to test the measures, which should be undertaken only after the preliminary examination outlined above.

The granites of the Canadian shield represent parts of the older continent; upon this rests the stratified beds, in which are entombed the remains of the passing life of the earth. Much of this represents the life in the sea, and the great mass consists of the simplest forms. These appear to furnish the material which is altered to oil, while the plant life in the marshes and lagoons and near the shores appears to have been preserved as coal. Large areas of these rocks have been stripped from the granite base, leaving bare the "Canadian shield," which must be excluded from our possible oil fields, and other areas are broken, folded and faulted, so that careful examination will eliminate parts where it would be useless to bore. In these areas it may prove, however, that the faulting has exposed to ready mining shales that have absorbed or have retained the oils or materials that can be distilled into oils.

The Oil Formations

In the United States, oil is found in formations of Palaeozoic, Mesozoic, and Tertiary ages. In the Palaeozoic, oil formations are found beneath the Coal Measures in rocks whose ages range as far back as the Cambro-Silurian. The greater accumulations appear to be in the porous beds of the Devonian. In the Mesozoic formations, porous beds of the upper Cretaceous are productive in Wyoming. Similar strata have been prospected in the Canadian fields, but with little success. Oil has been found in Canada in the Lower Cretaceous, the horizon being approximately between the coal bearing Kootenay, and the western representative of the Dakota rocks. The Tertiary formations of the Pacific coast that represent marine deposits have proven rich in oil in the Californian fields. Very small patches of rocks of this age are found along the the Canadian coast, but these so far have not proven commercially valuable.

Palaeozoic Formations

As these formations were deposited about the old continental nucleus, during the period of its greatest depression, they now form, or underlie, a large part of the present surface. They have, however, in large areas been stripped from the old continent during the long period through which they have since been subject to erosion. In the subsequent changes of elevation , the differential movements are impressed on the beds in the form of undulations thereby facilitating the collecting of any contained oil in pools, but where the stresses were very great the deformation reached the proportions of destruction.

Of the original measures surrounding and partially covering the ancient continent, not only has a large part been removed by denudation, but great zones are fractured, folded and crushed. From these zones much of the broken material has been removed. Blocks that have been elevated have become drained of any possible oil, and the folded and crushed areas in consequence rendered of very slight value as oil fields. Where, however, the oil has not migrated to the coarse porous beds or sands, but is retained in the shales, the fracturing may be an aid to their exploration.

The fracture zones of the continent are for the Palaeozoic sediments the limiting boundaries of the oil fields, although within these zones small areas may be found with indications of oil.

The Fracture Zones

Two main lines of intensive crushing and deformation are indicated. The greatest follows the line of the Cordilleras through the length of the two American Continents. In Canada this belt line of weakness or deformation, which affected the Palaeozoic sediments, is a broad one, and is represented by the Eastern Belt of the Canadian Cordilleras. In this, the zone in which accumulation of oil might have been looked for, is entirely destroyed, and the blocks that are elevated and exposed in the eastern edges of the Rocky Mountains appear to be already drained.

Near the Atlantic coast, lines of elevation and fracture show the effect of great lateral pressure exerted at various times. The lines of weakness are not continuous nor essentially parallel, so that the band of deformation contains within it areas not badly crushed, and in some of these small showings of oil have been found. The disturbed measures show large quantities of oil shales, and the potential value of the Maritime Provinces for the production of oil would seem to lie in these shales.

Fracture zones are found in the northern or Arctic regions. These represent what appears to be normal

*Composite abstract of papers read before the Royal Canadian Institute, March 28, 1920, and before the Annual Meeting of the Canadian Mining Institute, Toronto, March 8-10, 1920.

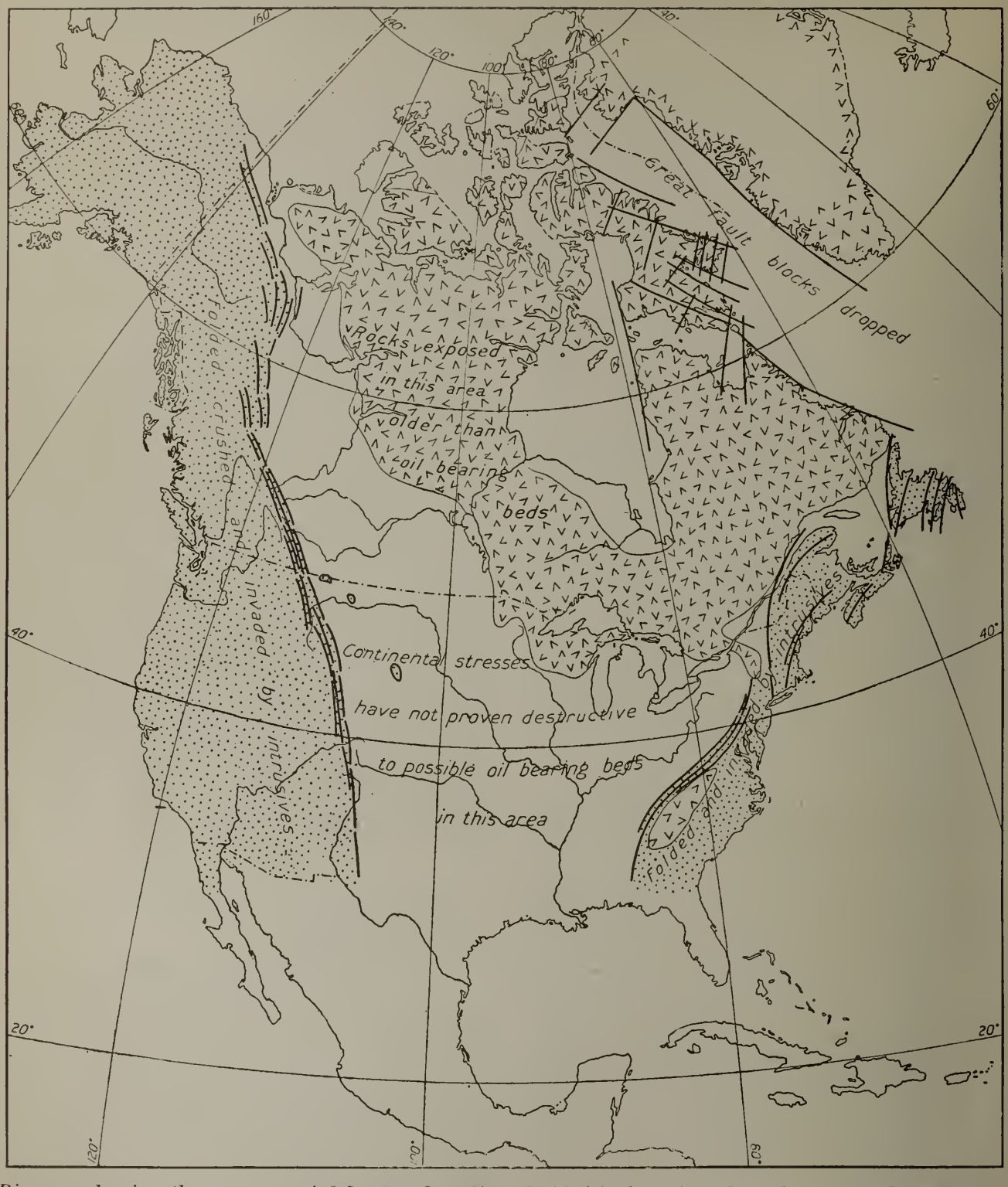

Diagram showing the area occupied by the Canadian shield (Archaean) and to the west and southwest, the disturbed and broken sedimentaries.

faulting and have made their impress on the topography mainly by the subsidence of great blocks as in Baffins Bay and Davis Straits.

Denuded Areas

A large portion of Canada forms what is referred to as the Canadian shield. This is an area largely denuded of any covering of Palaeozoic beds that may have been deposited on the pre-palaeozoic continent. It now forms an undulating or mammillated surface of crystalline or highly metamorphosed rocks.

Possible Oil Producing Areas.. Eastern Maritime Fields

Between the fracture zones of the Atlantic border there are a few areas which suffered but moderate deformation. The largest is in New Brunswick and a slight production of oil has been obtained. In the eastern part of Quebec in the Gaspè peninsula the presence of oil seeps has induced the spending of large amounts in prospecting. The attempt has not been successful in a commercial sense, owing no doubt, to

The Ontario Oil Fields.

the small area of the fault blocks. In Nova Scotia but one oil seep has been reported. In these areas the hope for oil production seems to lie in discoveries of oil shales rich enough for probable distillation. Promising fields of oil shales have been found in Nova Scotia and New Brunswick.

St Lawrence Fields

West of the broken area referred to above a narrow basin is found embayed in the St. Lawrence valley between the Archean area and the northward continuation of the Appalachian Mountains of the United States. In this basin sediments of the lower oil formations are found, but as the area was isolated probably as early as Carboniferous time through a period of elevation, and is of comparatively small size large accumulations of oil are not expected in it.

Ontario Fields

The basin lying to the west of the St. Lawrence basin extends westward to the Rocky Mountains and the sediments have suffered only slight warpings so that the accumulation of oil formed very large pools. This basin has been for a very long time the great oil field of the United States. In Canada the outer rim of this basin is found in Ontario where a steady production has been maintained for a long period. This has steadily declined, and many of the pools have been nearly drained. The demand for oil has revived the interest in further exploration. New pools have been located, and deeper drilling or drilling to lower horizons indicates that possible pools exist in these horizons.

Western Basin

The older deposits of the central part of the basin probably present the same succession of beds as in the southern and eastern fields but the deposits of the eastern and northeastern margin show for this central part of the continent a geological history very different from that of the areas more nearly connected with the outer seas. This has no doubt had an influence in the non-retention of oil in the beds of the outer margin of the basin. Bore holes in Manitoba and on Athabaska and Peace rivers in this outer margin give negative results in the search for oil. There is evidence in the absence of early Palaeozoic sediments and the absence also along the northeastern outcrop of Middle Devonian formations that the sea margin of this long period was a fluctuating one and that possibly the interval from Devonian to post-Carboniferous time saw a steady withdrawal of the sea or a slow elevation of the land.

During this long lapse of time it is quite possible that large areas suffered denudation, as the mantle did not consist of massive beds and would be easily fractured by differential elevation.

The retaining of fluid hydrocarbon in the elevated and probably thinner parts would therefore be extremely problematical. The central part of this continent was then depressed beneath the muddy Cretaceous sea and possibly the cover of shale then deposited on the remaining Palaeozoic beds has helped to retain in them some of the original oil. The general rise of the continent in Tertiary times brought the edge of the basin —the part now exposed—far above sea level and it would be natural to suppose that the drainage of the oil since that time would tend toward the basin.

In the Manitoba portion, where the Devonian section contains beds that are elsewhere oil-bearing, it should be noted that these beds are there about 800 feet above sea level. Their westward continuation at Moosejaw would be at least 1000 feet below sea level so that, provided the wastage before Cretaceous times did not exhaust the beds, the cover of Cretaceous shales and the limestones of the upper Devonian might retain the oil drained westward. In the absence of folding in the structure the oil might be found on this slope as low as the line of water saturation which is not known for this basin, but we might assume it to be as low as sea level.

The prospecting of this horizon would mean drilling through the Cretaceous shales and would be confined to a strip of country not more than about sixty miles in width measured from the edge of the Cretaceous escapment.

Along the northern border the problem is somewhat different in that it is not known with any degree of accuracy to where the supposed oil bearing beds which are exposed in Manitoba extend. The outcrops of the Palaeozoic at the contact with the Archean show overlapping of the beds, that is, at different points Devonian, Silurian and Ordovician sediments respectively are found in contact with the pre-Cambrian. Fluctuations of the margin are also shown in the individual beds of the formations; for instance, the Middle Devonian is absent in the exposures on Peace River below the cascades, and under the Upper Devonian is resting on the gypsum beds of the Silurian.

To the southwest the section is probably complete, and the location of the oil bearing Middle Devonian beneath the cover of shales and Upper Devonian limestones is the first problem to be solved, since on its position depends largely the occurrence of oil in the Devonian. Where it can be found near the margin and at a convenient elevation, there would be some hope of a future production from this horizon.

As it is not certain that the oil beds are present at any point in the northern area and drillings in the Peace and Athabasca valleys are in the nature of explorations; but withotu such adventure little will be learned.

The northward continuation of this interior basin follows the western edge of the Canadian shield. In Dakota and eastern Montana and northward through the prairie provinces of Canada it assumes a definite basin form, in which is found above the Palaeozoic oil beds, those Cretaceous deposits which provide both coal and oil for the western states and very abundant coal reserves for Canada. Owing to the great depression in the central part of the continent to which the Palaeozoic beds conform the areas available for oil prospecting consist mainly of parts of a somewhat narrow rim along the eastern side of the basin that is in a way limited to the part which projects above sea level.

This assumption of a boundary to the productive area is a tentative one based on the fact that farther into the basin the depth of Cretaceous sediments to be pierced become so great that drilling operations become very expensive and very difficult.

The re-appearance of the Palaeozoic rocks to the west of the basin is generally in the form of fault blocks overthrust on the newer sediments, and the actual western rim is deeply buried. There may be places where these rocks could be reached outside of the fractured zone of the mountains, but a great thickness of Carboniferous and early Mesozoic deposits here overlie the Devonian, and experience in the American field points to the greater value of the Cretaceous beds which overlie them, as oil containers. Beside the surrounding rim it may be of interest to note that although there are little evidences of abrupt changes of slope or of structures favourable to the occurrence of probable oil reservoirs, one terrace or broad anticline can be traced on the eastern slope of the basin from the northern point southeasterly about parallel to the mountains. It is probably more sharply defined in the measures near the surface than in these beds, and is discussed as effecting the Mesozoic deposits. It is joined at almost right angles by an uprise, which extends northeasterly from the Bow Island anticline, which rises to the south to join the Sweetgrass arch. a structure running into Canada from the uplifted and intruded area of northern central Montana..

This ridge structure which crosses the basin may be too deeply buried for present prospecting, but its presence will be of interest should the Palaeozoic rocks of this basin prove at any place to have oil pools.

Northern Basins.

No exact dividing line is drawn between the western basin and those basins to the north. The synclin- of the Western basin flattens to the north and the amount of depression in the front of the mountains lessens. A large area is underlain by Devonian beds that exhibit a very slight degree of folding. This area extends from the Rocky Mountains eastward to the granite areas of the Canadian shield. The relief is generally low and includes the Mackenzie valley. The disturbance which is marked by the upthrust of the Rocky Mountains extended into the area but with lessening force. A major fold or break crosses the

valley from south to north, dividing it into two distinct basins differing in structure. The area east of this fold and extending to Great Slave lake and Great Bear lake is a plain bounded on the south by the edge of the plateau built up of Cretaceous sediments, on the west by the Nahanni mountains and on the northeast by the mamillated surface of the Archaean rocks. The outcrop of the Middle Devonian sediments on Slave lake shows several oil springs. The rocks dip slightly to the southwest and seem to offer a large field for prospecting.

To the west of the dividing fold, noted above as the Nahanni Mountains, and along the lower part of the Mackenzie valley the sediments show a series of strong folds and oil seeps are quite common. In both these fields there seem to be great masses of oil saturated shales and porous dolomites from which oil is expected to be obtained by drilling. Should the drilling of the favourable structures not prove the presence of a fluid oil in commercial quantities, the reserve of oil in the shales should in itself be of great importance.

Arctic Islands.

The northward continuation of the strata exposed in the Mackenzie Valley is exhibited on several of the outer islands of the group. The structure of the islands exhibits very little of the compressive strains of the continent. Normal faulting is probably indicated as being the basis of the geographic features. The blocks which form the islands show the beds dipping at slight angles to the northwest and north. In rocks of Carboniferous age shales or cannel coals which appear to have a value as oil shales has been found on Melville island. The measures in which these occur are thought to thin out toward the east, as on Elsmere island they appear to be wanting. The rocks there exposed are mapped as Triassic overlying Devonian.

James Bay Basin.

An area of Devonian rocks to the south of the bay forms a small prospective area in which oil or oil shales may be discovered.

The Oil Possibilities of Western Canada.

The wonderful increase in the various uses to which the products of petroleum have been applied within the last few years, has called for an intensive search for new fields that is world-wide in its extent.

Canada has not hitherto been considered a particularly promising field but the large production that has been realized from the Cretaceous deposits of the western American plains, has stimulated prospecting in the northward continuation of these beds and also in the underlying Palaeozoic deposits which are found in the Dominion of Canada.

The structure of the oil-bearing area which lies in front of the mountains of Wyoming and Colorado has no exact counterpart in Canada inasmuch as the flexures in the beds are there largely due to uplift as well as to the effects of tangential pressure, while to the north the deformation is largely due to tangential stresses. There is thus a more complicated structure in the American fields than in Canada and to this is probably due a greater alternation of the petroleum-forming substances and probably a greater migration through the measures to retaining beds. It is noted also that horizons found to be oil-bearing in Wyoming have in Canada yielded but slight indications of oil. In the lower horizons we have evidence of the presence of a heavy oil at several places, but as the records are not numerous a general statement is all that can be offered.

A study of the structure to which is added the few drilling records has however been compiled in the following observations.

Oil-saturated sands have been found at the following localities:—

(1) At the southern edge of the Province of Alberta near the Sweetgrass hills—vaseline-like saturated sands.

(2) On Milk river in the Beaver well, a small flow of oil in artesian water.

(3) In Etzikon coulee at the United Company's well sands saturated with heavy oil.

(4) Gas wells Nos. 2 and 4 at Viking, a small showing of oil in gas sands.

(5) Oil shales at bottom of Morinville well.

(6) The MacMurray sands exposed on the Athabaska river, called generally the "Tar sands"

(7) At Peace river, thick oil in sands bored through between 900 and 1100 feet below surface.

These occurrences all appear to be in sands of approximately the same age and may be considered as indicating a rather extensive sheet impregnated by a heavy oil—in many places too thick for commercial extraction except where they occur at the outcrop. The areas in which commercial exploitation might be suggested are those which surround the deep basin of the Alberta syncline and include the outer foothills which are on the western edge;the upraise at the south in the Bow Island anticline and the north-eastern margin of the basin as far south as the depression leading to the eastern basin which centres about Estevan. In this eastern part it is not known that the oil horizon of Alberta is present.

The occurrences in the foothills do not seem to prove the continuance of the oil deposits, in their crude state, as far as the mountains. The oil that is there found in association with wet gas has the appearance of having been condensed by some natural distillation process, that is, it is not crude oil. Its transformation might be hypothetically assumed to be due to the great pressure and moderate temperature to which the heavy oil of the sheet just mentioned would be subject especially in the part deeply depressed in the Alberta Syncline. Its volatile constituents of the oil would follow the short limb of the syncline up toward zones of lower pressures and temperatures where they would be condensed. The condensed portions reaching the overturned edge would there be trapped as appears to be the case in the Turner valley anticline, and the gas would have vapours of the lighter oils still in it.

Renewed interest is being taken in the structure features of the outer foothills as being the edge of the Alberta syncline. Where this edge is marked by anticlines not too deeply buried, prospect drillings are to be prosecuted by the larger interests, in the hope of striking either light oil or finding gasoline vapour in the natural gas.

The production of the foothill areas last year was about 13000 barrels of light Kerosene oil containing probably 60 per cent of gasoline. Small stills are installed at three of the wells and the oil broken up for domestic use. At the Calgary Petroleum Products Cos. wells, absorbtion plants are installed and from the natural gas it is expected that up to 30 barrels per day of light gasoline will be obtained.

In connection with the foothill area an area forming

part of the mountains near Waterton lake merits consideration. Here the rocks are very much older than any known oil bearing rocks but in their bedding planes have distinct evidences of oil. As the oil does not seem to be indigenous to the rocks, it has been assumed that it comes from the Cretaceous beds that have been over-ridden in the overthrust of this mountain mass over the plains. It has been assumed that the plane of the thrust fault is at a low angle and that the shortening of the crust reached large proportions so that an extensive area may be underlain by rocks from which the oil might be derived. This assumption which has elements of probability might predicate an overlap between twenty and thirty miles in width, but in the mountains to the north of this no single thrust reaches this proportion, so that it seems necessary to modify the original theory.

The presence of the oils in rocks far above heights to which it could be borne by general water saturation and its light specific gravity suggests that the transference was gaseous probably along with vapour distilled from carbonaceous material in the overridden Cretaceous. The overlying beds are not badly folded and form a rather large covering mass that would retard the escape of the vapours.

The form of the cover is a synclinal trough, the lowest point being near the watershed which is here only a few miles from the eastern edge of the mountains. The trough is edged by anticlines and near these oil seeps are found both east and west of the summit. If the ascending vapours penetrated the base of the syncline where there would probably be open fractures and followed the beds in both directions it might be expected that the lighter oils would be found at a greater distance from the centre of the syncline than the heavier oils as they would have a greater penetration and longer life in the gaseous form. The facts seem to accord with this hypothesis as the seeps at the west about eleven miles from the centre of the syncline, yield oil of very light gravity (40°-42° Baume') while those to the east four miles from the same point yield oil much heavier (30° Baume'.)

The distillation process that might be presumed to have been active at one time, seem to have declined at the present time as there is little evidence of the escape of gas or of gas pressure in the wells now bored. These wells appear to be merely draining the beds above their level and if this is true it follows that prospecting may have to proceed on the assumption that the saturation is not being supplemented by present emanations of moment, that is oil derived from the draining of the beds by gravity from each side of the anticline should be the object of drillings.

The supposition outlined above of a gaseous origin for the oil introduces another interesting possibility namely that the sand beds of the Blairmore formation, which no doubt underlie the Cretaceous of the plain in front, may have also acted as passage beds and that some of the oil may have been transferred through them to retaining structures under the plains in the folds which parallel the outer edge of the overthrust mountains.

On the plains most of the prospecting has of late years been centred in the Peace river valley, where several wells averaging eleven hundred feet in depth pass through sands inpregnated with heavy oil. The flow is necessarily slow and although the presence of oil seems to be proven, no production has been attempted possibly on account of the trouble with water which can generally be attributed to insufficient or defective casing, and to lack of restraint on the part of the operators in drilling through the oil sand into the water bearing bed which lies below it.

The direction of the extension of the oil horizon depends on the attitude of the beds and as there are few exposures of the outcropping rocks and few bore holes by which to trace it, the general features only can be indicated. The gas fields at Viking and the Peace River oil fields are situated on a structural terrace which consists of a flattened strip on the eastern slope of the Alberta syncline. The flatening may in places even reverse the dip and form low anticlines. The western edge of the terrace is marked by an abrupt change of dip and at the point where this line swings to the southwest from near the border of Saskatchewan, surface crumpling is quite evident. The position of the oil-sands in this part of the terrace is here probably lower than desirable, but the flattened area or structural terrace widens considerably and there is always the possibility of local flexures and rolls in the bed providing local catchment areas for oil and gas. With this possibility in view a bore is being put down near Czar, Alta, on Ribstone creek. Boring near Lesser Slave Lake is being undertaken with the hope of extending the Peace River field. The information at present available is not sufficient to determine the exact direction of this extension; its position can be determined only by future boring toward the south east.

The belief that is so general among the drillers, that the really profitable oil horizon is in the limestone of the Devonian which lies beneath the oil impregnated sands of the lower Cretaceous has led indirectly to the spoiling of several possible productive wells in the Peace River field, as with the object of reaching the limestones, borings have been continued below the heavy oil of the Cretaceous into the water-bearing beds which overlie the Devonian limestone.

Tertiary Formations.

During the later history of the continent and after much of the deformation and erosion of the older oil formations, beds of Tertiary age were deposited along the western edge of the continent. Those found in the interior are generally of continental origin and what carbonaceous material they contain appears to have been altered to coal or in places to a very heavy asphalt. The more fluid hydrocarbons are at present supposed to be associated with the beds formed near sea level including those of the west coast and possibly some of the Tertiary of the extreme north on the Arctic islands.

On the Coast the rocks of the valley and coast of California have been found to contain very large stores of oil. Small exposures along the coast northward and in the depression occupied in part by the Straits of Georgia have been partially examined, so far with little success. In the delta of the Fraser river boring is now proceeding, but the deposits are very thick and the sandy nature of the measures suggest that the oil may be widely dispersed rather than gathered into pools.

The Part Played by the Canadian Geological Survey in the Development of British Columbia

Speech by Hon. WILLIAM SLOAN, Minister of Mines, British Columbia.

I desire to bring to your attention the serious state of affairs which threaten to have a most unfortunate effect on the development of the mineral resources of this Province. I refer to the recent resignations of a large proportion of the staff of the Geological survey of Canada, by reason of which, British Columbia is immediately deprived of the services of four geologists who worked here last summer, and will probably later lose others now available.

Everyone in this province knows more or less in a general way, of the work of the Geological Survey, but not many outside the mining fraternity, among whom I class that indispensable pioneer, the prospector, realize the great value of this institution to Canada.

It is my intention to set before you certain facts in connection with the survey with special reference to its work in this province, so that we all may realize the imminence of the danger to development of the natural resourses of British Columbia and to suggest means by which it can be averted.

The Fathers of the Survey

The Geological Survey of Canada is largely the outcome of the personal enthusiasm of William Logan, with whom became associated Dr. T. Sterry Hunt, men whose names are yet honored among scientists the world over for the work they did.

I do not know in just what year Sir William Logan's first work was done, but it was prior to 1843, for by that time the Geological Survey was in existence, and the first "Report of Progress" was for the year 1843, although not published until 1845. Naturally at that time, the first work of the "Survey" was in the "Upper and Lower Canada" of those days and in the Maritime Provinces.

Later came in the service, Sir William Dawson, who subsequently became principal of McGill University, and who was to be followed in later years in the Survey by his equally illustrious son, Dr. George M. Dawson, whose name is one to conjure with all over Canada, particularly in British Columbia.

The geologists and mining engineers of later days following in his footsteps, marvel at the accuracy and scope of his explorations, and geological chartings.

The first office of the Geological Survey was in Montreal and was later moved to Ottawa. The first Director of the Survey was Sir William Logan, who was succeeded by Dr. A. R. C. Selwyn, Dr. George M. Dawson, Dr. A. Bell, Dr. A. P. Low, Dr. R. W. Brock, and others, down to the present day Director and Deputy Minister, R. C. McConnell, now in his 42nd year of service in the survey.

Volume 1 of the Survey Report was for the years 1870 and 1871, practically the date of entry of B.C. into the Confederation of Canada.

With the opening of the West came the need of surveys, of exploration of its resources of all kinds, and the Survey stepped into the breach, and how well it did the work is a matter of history.

Maintainence of Geological Survey a Condition of British Columbia's Adherence to Confederation.

So well and favorable was its work and the need of such work appreciated, even in the then far-off B.C. at the time of Confederation, that we find in the Terms of Union of B. C. with the Dominion of Canada in 1870, in Section 5 subsection H. a separate and distinct proviso that the Dominion Government shall maintain and continue a geological survey in B. C., a proviso, I believe, inserted and insisted upon by the Hon. J. S. Helmcken, one of the few still with us of those farsighted pioneers who shaped our history and so well laid our national foundations. Possibly its acceptance was one of the things which reconciled him to the entry of this Province into the Confederation. So B.C. has a unique claim to the survey. We adopted it as one of the conditions of entry into the Dominion.

Of the early explorations of the Survey's staff, particularly to the West of the Rocky Mountains, the work of Richardson on the Coal Fields of Vancouver Island, etc., these are familiar to all of us interested in mining.

Then came Dawson and his work along the surveys of the C.P.R.'s various routes and his exploration into and through the Yukon, the latter taking place in the year 1887. I well recall the Fall of '96, when camped at the mouth of the "Throan Duik," which usage soon converted into "Klondyke," that the question came up of naming what it was known, in view of the importance of the discoveries, would become a busy centre. The name of Dawson was finally adopted and met with general satisfaction, it being considered an honor properly due the distinguished Canadian who years before had made tracks in a trackless land. Dr. Dawson's survey of Queen Charlotte Islands, his map of which, made from a sailing schooner, still practically constitutes the official chart of its eastern shore, and his trip up the Stikine with McConnell as assistant, the latter continuing down the Dease and Liard rivers. wintering at Fort Providence on the Mackenzie River, are other achievements with which his name always will be associated.

The Geological Survey has been the "Lookout" of Canada

Tyrell, of the Survey, told us of the Barren lands of the far northern interior, a district which possesses much mineral wealth. Low, afterwards director of the Survey, spent two years continuously in the Hudson's Bay, gathering data of all sorts and now Hudson's Bay promises to be the outlet for the grain of the great Northwest, Malloch died while wintering among Arctic ice. Drysdale was drowned, fording the Kootenay river. Capt. Leroy was killed in action in France.

These are the stories of patriotism, service and adventure that should stir our young Canadians to prepare themselves by intensive scientific study to be fitted to carry on; to bring a lasting name to themselves and permanent benefit to their Country.

They were willing to abandon the dream of future wealth, ever present with youth, for science, with very small monetary reward for many years. Must they

see their hopes of advancement to a higher rank barred by the stone wall of an unappreciative or indifferent country?

Perhaps the most striking result of the early work of the Geological Survey was the elucidation of the complex structure and relations of the great Pre-Cambrian formation in the vicinity of the Great Lakes. This was done by Sir William Logan, that great pioneer of Canadian geology, and his able assistants, working under handicaps of transportation, difficulty of obtaining supplies, etc., that the present day workers can scarcely realize. The great "Pre-Cambrian Shield" of Canada, contains the largest single area of rocks of that era exposed in the world, and besides being of unexceptional scientific interest these rocks contain numberous extremely rich mineral deposits. The names "Cobalt," "Porcupine," "Sudbury" and the iron and copper ores of the Lake Superior district are sufficient to remind one of the economic importance of this region. In that country, then a wilderness, Logan and his assistants, little dreaming of the vast wealth later to be discovered, carried on their labors. Their classification of the Pro-Cambrian formation stood in its entirety until recent years, and even yet forms the basis of Pre-Cambrian geology in America. Their work was done largely from the point of view of the pure scientist animated by no love of gain, and it has proved of inestimable value in the study of the highly mineralized areas which since have been discovered.

Logan, and later Sir William Dawson, were the first to study carefully the magnificent section of Carboniferous rocks exposed at the head of the Boy of Fundy, in Nova Scotia. Their detailed sections stand unrivalled to the present day, and are a lasting moment to the painstaking efforts of those early investigators. Their work in Nova Scotia was carried on by Hugh Fletcher and our present knowledge of the geology of that Province is largely due to the efforts of that extraordinary field worker whose name is a household word in that Province. With men like those to father the Survey and establish its custom, a pace has been set and tradition grown up that are not excelled by any other Governmental Geological Survey.

Work Done in British Columbia.

One of the most important piceses of geological field work ever done in America and certainly the largest single investigation undertaken in recent years was done in B. C. in connection with the re-survey of the International Boundary on the 49th parallel. This was done between the years 1901 and 1905 by Dr. R. A. Daly, a Canadian, now head of the Department of Geology at Harvard University. His report embraces several large volumes and an unequalled series of maps, illustrating the geology of a belt of country for 5 miles north of the boundary and stretching from Sumas Mountain on the Pacific to the frowning rampart of the Rocky Mountains overlooking the great plains in Alberta. Dr. Daly's work has thus given us a complete geological section across British Columbia, and it forms the basis for surveys and investigations carried on by later workers in the important mineral bearing districts in the southern part of the Province. The facts elicited during this intensive study of the Canadian Cordillera have contributed largely to the advancement of geologic science, and in Dr. Daly's hands have tended to solve problems of world interests.

Mr. Camsell, now the senior member of the staff working in this Province, has obtained valuable results at Hedley in his study of the Nickel Plate Mine, and later by his important discovery of the increased possibilities for prospectors in the Coast range, particularly along the line of the P.C.E. He is now in charge of the Vancouver office of the Geological Survey, an institution which is greatly appreciated by the mining fraternity of this Province.

An account, however brief, of the work of the survey in B. C. would be incomplete without reference to the topographic and geologic maps of the southern portion of Vancouver Island. These maps are masterpieces of accuracy and detail, and were intended as a standard type for Canada. An expert topographical engineer, R. H. Chapman, was obtained from the United States Geological Survey to superintend the mapping of these sheets and carried on his work from 1909 to 1913. The geological mapping was done by Dr. C. H. Clapp, now at the School of Mines, Butte, Montana.

In particular, the Geological Survey of Canada has developed and perfected the photographic method of surveying, and this research of great practical value was carried on in this Province.

Mention must also be made of the work of Dr. Schofield in the East Kootenay and other parts of the Province; of Dr. Allan in the Ice River district, and of Malloch in the Groundhog coal fields.

Work Done in Recent Years in B. C.

Having considered briefly some of the more important studies carried on by the Survey in the past in B. C. it is of interest to examine in more detail the work done in recent years from other points of view.

The following tabular statement compiled from the summary reports of the Geological Survey for the years specified, is very significant.

Field Parties.

Years	Geological
1908	8
1909	13
1910	12
1911	12
1913	14
1914	3
1915	9
1916	1
1917	3
1918	7
1919	8
1920	Possibly 3

And here let me say a word in connection with the efforts of the late Hon. Wm. Templeman, during the period he held at Ottawa the portfolios of Inland Revenue and Mines, on behalf of British Columbia's claim to the attention of the Geological Survey Branch. The table strikingly shows the results of his intercession in the interests of the Province. There were more parties in the field here during this period of office, 1909-10-11 than there have been in the last eight years.

The foregoing table shows the number of field parties the Survey maintained in B. C. for the years specified. It will be noted that in 1916 the effect of the war was most apparent. This year, owing to the resignations from the staff, it is possible that no more than 3 parties will be in the field, and perhaps not even that number.

In view of the almost certain large increase in prospecting, developing and general activity in the mining affairs, this condition is nothing short of deplorable.

Since 1914 the Geological Survey has lost a number of its most able field workers in B. C. by death. Besides, others have left for various reasons. Dr. C. H. Clapp, whose work on Vancouver Island has provided us with the key to the geology of the Coast District, is now at the School of Mines, Butte Montana; Dr. John Allan, of Ice River fame is head of the Department of Geology at the University of Alberta; Dr. A. M. Bateman is professor of economic geology, Yale University; and Dr. J. D. Mackenzie, who worked in the Queen Charlotte Islands and in the Telkwa District is still suffering from the effects of wounds received in France.

A review of the present situation shows, in brief, that out of 21 men fit for field work on the Geological Survey, eight have already resigned and more are likely to follow, leaving possibly only eight men available to carry on the Geological work of the Survey next summer, throughout the Dominion. This is less than the average number of geological parties in B. C. alone for the four years preceeding 1916. In addition to the loss of these trained experts the men who are immediately available to replace them are going as well; opportunities in commercial work are so much more advantageous than any offered by the Governmental service. This lays the Survey open to the danger of being recruited by insufficiently trained men; and in the calling of a geological expert,insufficient experience and lack of careful training is an insuperable bar to success. Even provided the Dominion Government offers sufficient inducement to students now in College to train for the survey work, they will not be ready to take up the duties of such men as Mackay, Wright, and others who are leaving, for ten years at least. It will take this time to gain the experience and knowledge necessary to make his opinion as valuable as that of the men who have just gone.

The present high standard of scientific attainment and the personal integrity of the survey men has long been recognized by all interested in mining in this country. The "Man from the Geological Survey" has always been welcome in mining districts, and the prospector has invariably welcomed him as an expert adviser. Survey men can obtain information and facilities for work from owners and operators that otherwise would not be available.

If the Survey slackens its efforts or if poorly trained men carry on its prestige will invariably suffer, the high tradition will be lost, and the whole country will lose accordingly. I wish now to bring to your attention how the losses will immediately affect this province.

On this point it is well to remember that British Columbia is somewhat differently placed to most of the other provinces of Canada because of the immensity of her undeveloped mineral resources, the wide expanses of unknown country geologically speaking and the fact that under the terms of the Confederation the Dominion Government undertakes to have carried out a geological survey of the Province.

The name "Cariboo" is one to conjure with B.C., and in fact the rush to the Cariboo placers in the 50's gave the first considerable impetus to the settlement of this Province. The gold in the present day channels was soon largely taken out but if the ancient buried channels can be discovered, the possibilities are unlimited, as witness the richness of the Tedtiary river beds of California and Victoria, Australia. Recently the Geological Survey has had Dr. B. R. Mackay working on this problem, Dr. Mackay possesses unique qualifications for the admittedly difficult problem of tracing out the old river beds, as he had special training in physiography and long experience as well, To this energetic, keen and highly trained scientist, his country offered the salary of $2,580 per year, with an annual increase of $180. He has resigned leaving his work incomplete and is now receiving $5,000 a year and all expenses.

The Portland Canal District is one that has produced very lately some of the richest ore mines in this Province, and is a new field where the services of a trained geologist would be particularly valuable. Dr. J. J. O'Neil who worked in that area last summer, and who like Mackay received $2,580, has resigned also, leaving his work incomplete to accept a salary of $5,000 a year and all expenses. Other instances are those of L. Reinecke, who spent last year on geological work in the Princeton and Pacific Great Eastern Districts and J. Stewart who worked for years in the Peace River District of B. C. Mr. Reinecke was receiving $2,580 and Mr. Stewart $1,900 per annum. Both have left the service and are now receiving $5,000 a year and expenses.

The many promising prospects and mines of Vancouver Island and the Southern Coast Districts are well known and their future development would be greatly facilitated by a comprehensive study of their peculiarities. Dr. V. Dolmage, who possesses special qualifications, is now engaged in this work at a salary of $2,100 a year and no doubt unless his position is materially bettered, he too will be lost to B. C.

Few, if any, of the Geological Surveys in the world, demand such a high standard of educational preparation as does our Canadian Survey for entrance into the geologists' ranks, and few have the scope for the field work to turn out such good men.

That this is appreciated abroad, if not in some portions of our homeland, is evidenced by the fact that Pearsons of London, who have need for geologists in all parts of the world, sent their chief geologist to Canada to corral as many of our Geological Survey as possible. We know they took six in one day at Ottawa, chiefly British Columbia of Western men and we know that they sent to Vancouver to try and get further recruits from the B. C. branch, but without success, so far, perhaps owing to the disinclination of the individuals to leave the Province.

Are we to see these men obliged, for financial reasons to leave us?

Present Value of the Geological Survey of Canada to British Columbia.

The present value of the survey to this Province

As to the present value of the survey to this Province. I will briefly list some of the less obvious, but none the less valuable, general benefits to be derived by B. C. from having the services of an active corps of geologists at the disposal of the mineral industry of the Province.

(a) It secures the services of the most highly trained scientists to work on local problems.

(b) These unbiased investigators can approach their problem in an entirely impartial manner.

(c) The staff are trained and expected to solve the larger geologic problems for which no individual mining Company can afford to maintain experts.

(d) These men are associated at Ottawa with others who work all over Canada and who are thoroughly conversant with the latest geological information. Thus, by criticism and suggestion, B. C. problems receive the benefit of this world-wide experience.

(e) The results of the work of the surveys are free to all, to the prospector as well as the mine manager or capitalist. Verbal information is given to any owner or investor at once. Written information in advance of Reports can be obtained at short notice on application at Ottawa.

(f) Geological maps form an accurate and reliable guide to prospecting. They act positively in directing the attention to most promising districts and in scarcely less valuable negative manner by outlining areas likely to be barren.

(g) The present day problem of mining are often largely geoglogical in their nature. Such questions as haulage, transportation, ventiliation, etc., can be easily solved by modern methods and there are plenty of engineers competent to do this.

It is not possible to get back the men who are gone for some years at least, if at all, but the 5 or 6 members of the staff who are now unsettled, can be retained, and students can be encouraged to train for the vitally important work of the Geological Survey as a career, if the situation is met promptly.

The cause of the dissatisfaction which has led to the wholesale resignations is not so much the scale of the salaries set out by the classification of the Civil Service, although this is by no means liberal, as it is due to the grading by the Civil Service Commission.

British Columbia is essentially a mining country. Our future is dependent upon that industry.

Proportionately as compared with other Provinces, we are more vitally interested in it than in any other part of Canada. If we do not have the mines, the rest is of no avail. We have vast areas totally unexplored, and vast areas merely run over, but sufficiently known to indicate wonderful mineral possibilities, and we need the geological survey. It is the one branch of the Dominion Civil Service that has any direct bearing on our future.

The Survey Crippled at the Threshhold of its Work.

And what do we find? The survey crippled, its usefulness threatened with paralysis for the next eight or ten years just at the critical period of our development, when reconstruction after the war is so essential.

It is now nearly fifty years since we entered Confederation, and, as I have stated one of the stipulations we made, and one of the undertakings given by the Dominion, was that a Geological Survey of the Province would be completed. This, as I have stated, was one of the terms of union. If the work is carried on no faster than it has been, it will be centuries before it is finished. I am speaking now from no close computation, but am sure that an estimate is well within the mark. And I am of the opinion that those who were assenting parties to the Terms of Union, in so far as this Province at least is concerned, never contemplated that this survey would extend into the period indicated. Let it not be supposed that I am unappreciative of what has been done That, however, is not the point. Again let me say that British Columbia is differently situated as compared with her sister Provinces at this time, when reconstruction is beginning, when the mining industry is commencing to take the important place in our industrial life which the extent and richness of our mineral resources warrant, and when bright and a prosperous future, provided mining men are given proper help and encouragement, is assured—I say that it is particularly unfortunate that, at this moment, the efficiency of the Geological Survey, in so far as B. C. is concerned, should be so seriously crippled.

In conclusion I have endeavored to present this matter fairly and without criticism and I trust that the House will unanimously support the resolution which I am about to move. This endorsation is sought in the hope and expectation that the Ottawa authorities will give immediate consideration to substantial financial increases to members of the Geological Survey and also that they may more fully grasp the importance of this scientific work and take such steps as are necessary to assure a more generous compliance with the Terms of Union in this respect than up to the present has been the experience of British Columbia.

BOOK REVIEW.

LOR, PROSPECTION, GISEMENT, EXTRACTION, by Georges P. Proust. Gauthier-Villars & Cie., Paris. 1920. Oct. Paper Backs, 320 pages. 10 francs.

This volume, in French text, is a comprehensive account of the occurrence of gold and its extraction in all parts of the world. It deals with the geology and chemistry of gold ores, prospecting for gold, the mining and recovery of the metal by concentration and cyanidation, and extraction costs. A rather unusual chapter is one of advice on outfit and clothing for colonial prospecting, which includes information on the raising and preparation of edible vegetables. A lexicon of minerals and their characteristics is appended. The work forms one of a series of science and industrial primers.

MINERALOGY, by F. H. Hatch, Fifth Edition Revised, with 124 illustrations, 7 ins. by 5 ins. Boards, 258 pages with index and tables. Six shillings net. Sir Isaac Pitman and Sons, London.

This work by Dr. Hatch, past-President of the Institution of Mining and Metallurgy, and well-known as an authority on petrology and the geology of ores, was first issued in 1892, and has been reprinted three times, without revision. The present edition is rewritten and enlarged, but Dr. Hatch in the preface states he has been careful to retain the essential features of its original arrangement. New features in the edition are tables of specific gravity and the refractive indices of the more important minerals, which will be found useful for those engaged in mineral separation and microscopic work. In the reference to iron ores there is, probably through inadvertence, no mention of the hematite deposits of Wabana, Newfoundland, nor to any of the Canadian occurrences, except as these may be included in the references to the Lake Superior District.

Northern Ontario Letter

The Silver Mines.

The upward turn in quotations for silver has been signalled by the resumption of bullion shipments, from the producing mines of Cobalt. During the period when a slight decline in quotations occurred, practically no bullion was shipped, the operators believing the recession to be only temporary. In this they appear to have reckoned accurately.

Reports that a shipment of $250,000 in bullion had been made from London to New York, and that the consignment was a part of a fairly extensive amount soon to be shipped from Germany via London served to influence the market more or less adversely. The influence caused was not so much due to the amount of silver involved, but was chiefly on account of its possible significance. It now develops that no adverse influence has resulted, and the quotations have accordingly strengthened considerably. Also, the former belief that a new upward movement is pending is taking renewed form among the silver producers.

An announcement of interest to Northern Ontario is that this district will be visited in September by a company of approximately six hundred journalists from the British Isles. It is stated that this will comprise perhaps the most distinguished group of journalists that ever paid a visit to the Dominion. The party will arrive in Cochrane at an early hour on September 6th, being accommodated in two trains of about ten coaches each. They will visit the Porcupine gold district in the morning and will arrive in Cobalt late in the afternoon of the same day, and will leave Cobalt for North Bay in the late evening.

Favorable developments on the University property of the La Rose Consolidated offers fair prospects of making it possible to maintain the record established by that company during the past calendar year. It is evident, of course that the University may not offer equal chance of large ore bodies as does the Violet property of the La Rose Company, but the amount of territory as yet undeveloped presents very important possibilities. The encouragement already met is considerable, and the company has commenced to ship medium grade ore, estimated to contain approximately fifteen ounces to the ton. Under present conditions, costs of operation are expected to continue to average about the same as last year, at which time it cost $1.05 to produce each ounce of silver. Even at this, with silver quoted at between $1.25 and $1.30 an ounce the margin of net profit is fairly substantial.

Reports of a possible margin of the Kerr Lake, Crown Reserve and Dominion Reduction companies have not been officially confirmed. If such a deal is really under consideration, knowledge of it appears to be confined to the head offices of the companies mentioned.

Considerable doubt exists as to whether or not the Adanac will be included in a merger with the Victory Silver Mines. At the time of writing the odds are decidedly in favor of the Victory interests accepting an offer of financial assistance made by Buffalo men whereby funds would be provided for the commencement of operations this spring on the Victory property. That there is little or no hope of the present interests in the Adanac attempting any further work on the Adanac property is indicated in the fact that the property is being dismantled, a part of the equipment, including the hoist, having been sold to the Oxford-Cobalt Company.

Underground work at the Cross Lake property has been suspended owing to the shaft having been flooded through the water in Cross Lake having risen several feet the outlet having become partially blocked by sand tailing from one of the custom concentrators.

The Tretheway Company, now confining its efforts to the operation of the Castle property in the Gowganda district, has met with the difficulty of an early breaking up of the road from Elk Lake to Gowganda. Whether or not this will delay the shipment of the carload of ore which the company has been assembling for shipment, has not been announced.

On the strength of a peculiar instrument operated by Andrew Cullen of Haileybury, with which Mr. Cullen claims to be able to discover mineral deposits, Mr. R. I. Henderson, of Toronto, has taken a working option on a group of claims located in the Gowganda district. The ultimate purchase price is said to be $300,000. It is proposed to carry on sinking operations just as soon as possible. Mining men are entirely skeptical of the claim made for the instrument, and the general impression appears to be that it is but another delusion of the class of old-time divining rod. The Cullen instrument is claimed by its owners to be constructed and operated on the principal that two things of a like nature attract each other and that by use of a small particle of silver he can discover the presence of silver, by the use of a little gold he can discover gold deposits, and by the use of coal-oil he can discover oil wells, etc. The instrument, however, does not appear to be taken seriously in the North.

At the 180-ft. level of the Triangle property in the township of Auld in the Elk Lake Mining Division a shoot of ore has been encountered. The vein is stated to be from one to two inches in width and contains several thousand ounces of silver to the ton. The wall rock also carries considerable leaf -silver for several inches back from the vein. The force of men is being enlarged from 18 as at present to about 25.

On the strength of a reported silver find in the township of Pense about twenty-five miles North from New Liskeard, about 85 mining claims have been staked and recorded by Toronto men. While nothing of a definite nature can be learned regarding the reported find, it is known that the rock formation is favorable, being made up of conglomerate as well as diabase. The stakings have occurred in the central and northern part of the township, as well as a few claims being staked in the central and southern part of the adjoining township of Mulligan.

Rumors have been current during the past week or so that the Canadian National Railways might consider a scheme to tap the West Shining Tree and the Gowganda mineral areas, by extending a branch from the Canadian Northern to Gowganda, by way of West Shiningtree. The report is totally unofficial and is therefore received with all due reserve.

The Gold Mines.

The fairly general discussion of the tariff question by the political contestants in the Temiskaming by-election set for April 7th, has caused more than ordinary attention to be directed toward this phase of the economic situation as effecting this country. For this reason, an editorial appearing in March 5th issue

of the Canadian Mining Journal has been widely read in the mining districts. Here, while opinions are varied and numerous, the contention is heard that gold being the standard of value, the gold mines would stand to benefit greatly by a reduced tariff. It is pointed out that free trade would all but shatter Canada economically, that buying in the United States would increase and would cause a further violent decline in the value of the Canadian dollar, whereas the gold produced by the gold mines on the strength of cheapened Canadian money would command full value in the United States and thus operate to the benefit of the gold mines.

As to the attitude of not a few gold mine operators, it is interesting to learn that there is a strong desire to avoid too much meddling with the tariff. Free trade, it is believed, would greatly benefit the gold producing companies, but, in doing so, would all but destroy Canada industrially and economically. That the gold mines could offer a stronger argument in favor of free trade than that presented by the farmers seems to be quite evident. The one difference is that the mining interests are apparently willing to not sacrifice Canada's financial status by bringing about free trade that would operate to the profit of but a few favorably placed industries.

At the Hollinger Consolidated an average of about 2,200 tons of ore daily continues to be treated, and from the record set during the first quarter of the current year, it appears reasonable to believe that operations for 1920 will compare favorably with that of the preceding year.

With wages having been increased in the Porcupine district to a point where they about equal that being paid in the silver camps, there is no longer much competition for labor, the supply having a tendency to become more evenly distributed over the entire field. While there is still a shortage in the Porcupine district, the situation has not grown any worse while it has shown moderate improvement. With winter having about drawn to a close, with the consequent curtailment of lumbering operations, it is believed that a large number of workmen from the lumber camps will now find their way to the mines. Accordingly, during the next month or so there is fair promise of working forces increasing materially.

The McIntyre-Porcupine continues its high rate of output, and with the ending of the company's fiscal year on June 30th next, the record shown will exceed by a large margin that of the previous banner year. Heavy production and continued favorable developments at depth tend to strengthen the outlook for the McIntyre. The mine has a full supply of workmen.

It is reported that work will be carried out this year on the Gold Reef property, and that a shaft will be put down to the 300-ft. level for the purpose of exploring for the downward continuation of the narrow, but rich vein which was worked near surface.

After more or less prolonged negotiations, the Porcupine Crown and the Thompson-Krist properties will be merged. The directors of both companies have agreed upon the basis of the merger, and the scheme now awaits ratification at a special meeting of the shareholders. It is proposed to incorporate a new company with a capitalization of $3,000,000, made up of 3,000,000 shares of the par value of $1 each. Of this, 2,000,000 shares will go to the Porcupine Crown and 1,000,000 to the Thompson-Krist. The Porcupine Crown Company will remain in existence and will retain control. It also withholds its cash from the merger. The Porcupine Crown will be represented by six and the Thompson-Krist by three directors. The announcement has been received with fairly general favorable comment, as in offers to the Porcupine Crown an opportunity to perhaps develop new ore bodies on the large acreage of the Thompson-Krist, while to the latter it offres the advantage of being taken into a thoroughly going concern, fully equipped with a modern mining and milling plant.

In the Kirkland Lake district, the arrival of spring has been marked by a further increase in activity among the owners of property in the development stage. It is evident that many new mining operations will be carried on this year.

During the month of February, according to an official statement just issued, the Lake Shore Mine produced $40,126.43. The tonnage treated amounted to a little under fifty tons daily or a total of 1,435 tons, while the average recovery from each ton treated amounted to $27.96. This is the highest grade so far treated by the Lake Shore.

Work at the 200-ft. level of the Kirkland-Combined property has met with a fair amount of encouragement and the work is being continued aggressively.

At the Ontario-Kirkland, preliminary plans in connection with the matter of providing a mill have been up for consideration for some time, and an official statement is expected as to the probable date on which the work of erecting a mill will commence.

The Peerless Gold Mines, at Boston Creek, of which Shirley Ogilvie of Montreal is president, is making good headway in the development of its Mondeau property. The shaft has reached a depth of 250 feet, where a station is being out preparatory of commencing lateral operations. Once drifting is well under way at this point, it is proposed to continue the shaft to a depth of about 400 feet. The vein on which the shaft at the present depth of 250 feet.

The Miller Independence is proceeding with crosscutting operations at the 500-ft. level. Delays have occurred in connection with turning on electricity, but the difficulties have now been overcome, and within a few days power will be switched on and will thus make it possible to speed up operations.

A small mining plant has been shipped to the Kennedy-Boston property where it will be installed for the purpose of continuing the shaft from its present depth of 100 feet to the 150-ft. level where it is planned to carry on drifting operations.

Announcements that the Ontario Government is favorably disposed to continue the Temiskaming and Northern Ontario Railway from Cochrane to James Bay have been made. The date of commencement, however, is very vague, so much so that many things may in the meantime happen to alter the Government's opinion. For instance, it is stated that while in sympathy with the projected line, it would be unreasonable to proceed with the plan until such time as economic conditions become reasonably adjusted. This latter plan is believed in the North to be the proper course. However, it offers an opportunity for politicians to express "Costless" sympathies.

The Northern Manitoba Field

By R. C. WALLACE, Commissioner of Northern Manitoba.

At the date of writing, more than a month before breakup, prospects look very bright for the summer and for the future in the territory north of The Pas. The fact that the Flin Flon property has been optioned to very responsible copper mining interests has meant that the eyes of the mining world on this contient are being turned to this territory. Mr. Hammell, who has negotiated the twelve months option under which $200,000 will be spent on the property is in the district, as also Mr. Koerner who will direct operations for the Thompson interests. The contract has been taken by the Longyear Exploration Company and Mr. Eubanks, with forty miners, has already gone through to Flin Flon. It is understood that Mr. Stovel, who is well known to Ontario mining men, is in general charge for the Longyear Company and that he will himself visit the district at breakup. The plant belonging to the Mandy Mining Company has been bought by the optionees and it is understood that the Prince Albert Mining Co's plant at Beaver Lake is also being taken over. The intention is to sink two shafts on the ore body to the 400 ft. level, to drift at that level the whole length of the property and to crosscut to both walls at short intervals. There is a good set of buildings on the property which will be sufficient for the preliminary development work, and all the heavier machinery and supplies will be taken in over the ice before the break-up.

Arrangements are also being made that the Provincial Government put into shape for summer transportation the seventeen-mile wagon road between Sturgeon Landing and Lake Athapapuskow. This will enable summer transportation to be carried through almost entirely by water with the exception of this stretch of wagon road. With those who know the property well and who understand what the development work now to be carried on means, there is confidence felt that the option will later mean a sale of the property, and that the initiation of a copper smelting industry there and the building of the railway to the property which will necessarily follow, will establish a solid mining industry of large proportions in Northern Manitoba. On this will also be built a gold mining industry at Beaver Lake, Copper Lake and Herb Lake; the former area lying on the western end of the belt in Saskatchewan. Whether another Flin Flon will yet be discovered in this area is on knees of the gods, but even the most conservative would admit that the chances of the discovery of other copper properties of value in this territory, which has only been imperfectly prospected, are very good. Even at present a custom smelter erected at the Flin Flon would result in the development of some properties on which it is possible to concentrate the copper ore and ship the concentrates to the smelter.

There will be solid development work on the gold properties throughout the belt during the coming summer. In the Beaver Lake area in Saskatchewan, Ontario mining interests have secured a sampling option on the Graham property. The Wolverine properties in the same area are included in the Flin Flon deal and will doubtless be operated either for a flux or independently. It is also known that the Ontario interests have an option on a sulphide body at Ross Lake, one of the numerous sulphide bodies of large dimensions which are to be found throughout the belt. On Gordon's big dyke at Copper Lake, diamond drilling operations are now in progress, the contract having been obtained by Smith and Travers. It is understood that fifty thousand dollars will be spent on this property. In the Herb Lake district it is a matter of gratification that sufficient money has been obtained through Winnipeg financial men to recommence operations immediately on the Rex Mine, the successful development of which is now confidently expected by all who know the property well. Work will also be recommenced immediately on the Northern Manitoba property, on which very rich ore was obtained to the 100-ft. level to which the property has already been developed. Preparations are also being made for the operation of the Bingo property which shows very high surface values. On the Apex group at the north end of the Lake, which represents a large body of mixed quartz and granite, mineralized to widths in places of sixty feet with arsenopyrite and with good surface values in gold; it is expected that work will be begun in the Spring and that development will be carried out immediately by diamond drilling to ascertain the value of the ore body as a whole. Some four car-loads of canoes have already been sold at The Pas and the indications from enquiries made from many quarters on the continent are that a large number of mining men and prospectors and many mining companies will be actively interested in this district during the coming summer.

The Associated Engineers at Crosby, Minnesota, represented by Messrs Pearl and Knickerbocker, have made arrangements to instal an assay office at The Pas and to place in charge a qualified assayer of some seven years' experience. This office will be of great assistance to prospectors and mining companies, owing to the fact that considerable time will be saved in getting returns for material taken in from the field.

THE BELCHER ISLANDS IRON DEPOSITS.

Popular interest in the Belcher Islands has been aroused by rumors that an attempt would be made to take examining engineers to the property this winter by airplane. It is quite unlikely that the hazardous journey will be made, but it is understood that it was seriously contemplated by certain engineers. There is good reason to believe that the deposits will be examined this year as soon as weather permits transportation by water.

Excellent iron ore has been brought to Toronto from the Belcher Island by the discoverers and by engineers who visited the property for the owners. Evidence is accumulating that large bodies of good ore have been found. It is not at all unlikely that an iron mining industry will be founded on these discoveries. It is possible also that waterpowers on the adjoining mainland will be utilized to smelt electrically the iron ore from the islands. The present difficulty of access has made naturally for delays in recognition of the mineral possibilities of Hudson Bay. It seems likely now that this year will see a long step forward on what has been a very slow journey.

NOVA SCOTIA NOTES.

The Dominion Coal Company's Glace Bay collieries in March showed an encouraging increase in output.

The production for the first quarter of the year compares with 1919 as follows:

	1920	1919
January	275,129	276,036
February	248,338	262,876
March	292,668	273,051
	816,135	811,963

It therefore approaches 1918 figures by approximately five thousand tons. April is a short month, containing several holidays, but it should be possible to exceed the production of 1919, which was only 258,196 tons, unless drift-ice interferes with the shipping.

The suggestion has been made in the Nova Scotian newspapers that the Dominion Coal Company will not, during the coming Summer, make any determined attempt to send coal to the Montreal market, but will content itself with supplying the local demand, and selling cargo and bunker coal, for which of course there would be a brisk demand during the coming season. While it is probable that local demand will absorb so large a portion of the coal production as to leave for export a much smaller quantity than was the case before the war, it will be a surprising reversal of the policy of the Dominion Coal Company, if no decided attempt is made to regain the Montreal market, where, as recently pointed out in these columns, a potential market of at least three million tons per year exists for Nova Scotia coal.

The improvement which had commenced in the European coal situation, and which led to hopes that industry there was resuming its interrupted progress, has been nullified by the events in the coal district of the Ruhr, Germany, the result of which will be quite far-reaching. Britain and the United States will be called upon to make good the deficiency of coal in France, Italy, Holland and Denmark, and along the whole course of the Rhine which will arise from the troubles in the Ruhr District. A continuance of European demand for coal from North America may therefore be expected, from which Nova Scotia will benefit, but it is not to be expected that the Nova Scotia operators will lose sight of the necessity to regain their own proper and ancient market, which extends, or should extend, just so far as ocean-going vessels can navigate the St. Lawrence channel.

There is ground for much cynical comment in the announced intention of the United Mine Workers in Nova Scotia to base a new demand for increased wages on the increase recently granted to the bituminous miners in the United States. Two years ago the coal operators of Nova Scotia and the United Mine Workers executed an agreement, the crux of which was that miners' wages in the States were not to be used as a basis for adjustment of miners' wages in Nova Scotia. The spokesmen for the United Mine Workers at the conference in Montreal where this arrangement was formulated and signed by the parties thereto made much capital out of the solicitude of that organization for the sacredness of contracts, and urged recognition and acceptance of the control of the mine workers by the United Mine Workers because this union always kept its agreements, a fact that would ensure satisfactory and permanently harmonious relations in the future. The truth of this statement now awaits confirmation.

MANITOBA LETTER.

By CHAS. E. MILLICAN, Winnipeg.

2,200 lbs. of ore has been shipped to Ottawa from the "Wolf" property, east of Little Rice Lake for the purpose of having a comprehensive test made. A local assay of this shipment gives $86.00 per ton.

The Ripstein Syndicate, a close Corporation holding several claims in the Rice and Long Lake Areas, have a party of men doing a considerable amount of stripping.

The Northern Copper and Nickel Mining Co. near Ingolf, east of Winnipeg, have men on the ground proceeding with stripping. This Company has ordered a diamond drill and as soon as it is on the claim boring will be started. It is the intention of this Company to operate three drills this season.

On the Pan Extension all machinery has now been installed and sinking operations begun.

A very comprehensive map has been compiled by the Overseas Development Corpn. Ltd. of Winnipeg showing the respective prospected mineral areas in South Eastern Manitoba to date. This map has been compiled from various authentic surveys and a great deal of additional information has been embodied, such as the existing winter routes, proposed summer road to Rice Lake. The map proper is on a scale of 3 miles to the inch and shows the relative positions of all these mineral areas to Winnipeg and to the different water and rail routes as well as the different power sites. It is understood that copyrights will be allowed for this map.

It is expected that, with the opening of the water routes, a considerable amount of exploration work will be undertaken this summer in those parts of the Rice Lake Area which have not yet been thoroughly prospected. It is also probable that more attention will be paid to the copper discoveries in the vicinity of Lac du Bonnet and the country north of the Winnipeg River.

It is proposed to induce parties of students of the University of Manitoba to engage in prospecting trips during the summer vacation, and in some cases we believe that several of the students interested in geology will be taken on the different mining gangs where exploration and development work will actively be carried out this summer, especially in the Rice Lake country. In all probability some of the work being undertaken on the Gabrielle camp this summer will be done by students under the direction of an experienced foreman.

The Public Works Dept. of the Provincial Government has issued the necessary authority for the construction of a Summer Road into the Rice Lake District via the Hole River and Hole River Lake water route to the lower Bellevue Mine Landing, thence in a South Easterly direction to Caribou Lake.

A Portage Road about two miles long on the South side of the River from the head of Lake Navigation to the upper side of the rapids is to be put into good shape.

The Dominion Government is to be asked to repair the rock dam located just above these rapids, which was damaged by ice some years ago. The result of

this work will be to raise the water in the river and lake to a sufficient height to afford draft for boats and barges drawing four or five feet right up to the Bellevue Landing—a distance of about 20 miles inland. Under present conditions a boat drawing 3 feet can make this point.

From this Landing the new road—about 15 miles long—will be constructed to Caribou Lake, following ridges where possible, and will serve a number of Mines in this District, which will be reached by short lateral roads, and will prove of great assistance in getting summer supplies.

From the Caribou Lake end of the road a good canoe route can be followed to Long Lake, with only three short portages to negotiate.

On the Bingo Mine a camp is being constructed, having a present capacity for a crew of 12 to 15 men. The buildings are of log construction—the timber being in close proximity to the Camp site.

The Company are installing a gasoline engine of sufficient power to carry sinking operations to the 500' level. A hoist is also being installed. A contract has been let for sinking to the 100 ft. depth.

C. H. Miles, M.E., exploring engineer, Fort Frances, Ont., is in Winnipeg en route to the Copper Lake district, northern Manitoba, where he and his associates have secured a large number of mineral claims. They will carry on development operations this summer. There are six experienced miners and prospectors in the party.

THE LOW-GRADE ORES OF ONTARIO.

Successful Beneficiation of Masabi Range Ores of Similar Character, Suggests Similar Possibilities in Ontario.

By J. J. O'CONNOR, Port Arthur, Ont.

The successful development on a commercial scale, of Canada's enormous reserves of low grade iron ore, situated mainly in Northern and North Western Ontario, would do more to place this country on a sound, independent economic basis, that any project looking to production, that could be undertaken.

Few Canadians realize the enormous wealth in iron ore lying dormant and undeveloped within our borders. Most of them believe that we are without sources of supply, of this most necessary basic metal. They are not blameable for this opinion, so generally held, but feel that they are justified in holding it, in face of the fact that we now import 96 per cent of the iron ore used in Canadian blast furnaces, and in addition, import upwards of 100,000 tons of pig iron, and about $175,000,000 worth of iron and steel products annually.

During the past five years railway maintenance has been at the lowest ebb, railway construction practically nil, and all other forms of constructive development, almost at a standstill. We now find ourselves in the midst of a period of readjustment, and reconstruction, when these arrears of construction work must be caught up. With an immense mileage of railway improvements to make, and railway extensions to be constructed. Steel ships to be built as a necessary complement to our government owned railways, in pursuance of the adopted policy of a government owned merchant marine, for the expansion of Canada's foreign trade. With all other industrial lines to be developed and expanded, to enable Canada to pay its enormous war debt. There has never been a time in the history of this country, when the maximum of possibilities were as great as they are today, never has been a time when we are so much in need of our latent mineral wealth, as we are at present.

With 14,000 miles of railway on our hands, and more to follow, with traffic to find for this enormous mileage, for its maintenance and necessary extensions, together with other industrial needs, it would seem to be a fitting time for the government to come to the aid of the iron ore industry, in a practical way, and make Canada independent, instead of practically dependent, on foreign ores, as she is today.

At this time, when the Canadian dollar has lost a considerable portion of its face value, through over purchasing abroad, the logical course is to turn to our own resources, and make of them, assets in fact. No natural wealth can be considered an asset until it is developed.

Instead of importing over two million tons of iron ore annually, develop our own ore, help stabilize exchange, and bring the Canadian dollar back where it should be.

One of the greatest factors in retarding the development of Canadian ores, is the easy accessibility of United States, Lake Superior ores. Furnace men are able to import these high grade ores free of duty, at low freight rates, and consequently have paid no attention to our own ores.

Canadian blast furnaces have been subsidized to the extent of $17,000,000, they have been placed on a sound basis at the expense of the neglect of our own ores. It is not reasonable to expect them to turn to the use of ores that must be beneficiated in some form, while other ores are so freely open to them.

That we have immense deposits of low grade beneficiable ores, has been amply proven. Particulars of the location, quality, extent, and amount of development that has been done on them, has already appeared in these columns.

The twenty-eighth annual report of the Ontario Bureau of Mines, 1919, just issued, says, on pages 31-32, "The fact that most of the iron ore mined in Ontario requires beneficiation before smelting has undoubtedly retarded the development of iron mining in the Province. There are very large reserves of ore in the northern and northwestern regions, but so far as the character of the deposits has been revealed, they are in the main low in metallic contents, and in some cases carry an objectionable proportion of sulphur." "Many of these deposits are contained in ranges of banded ore, composed principally of magnetite, but frequently carrying hematite as well. In these layers iron ore alternates with layers of silica or jasper, such layers varying in thickness from that of leaves in a book, to a foot or several feet. The intermixture of iron and silica being intimate, fine grinding is necessary before any method of magnetic concentration can be employed, and complete separation between the particles of ore and those of silica is difficult."

Much time, and a very large expenditure of money has been made on the Masabi range in Minnesota, in perfecting processes for the beneficiating of ores similar to our own. These processes have been brought to such a state of perfection, in their experimental plant in Duluth, by the Masabi Iron Company, that they are amply satisfied that they now have commercial success within their grasp.

Their plans are all complete, the money has been paid in, and construction is about to begin on their

new plant at Argo, Minn. The original unit will entail an expenditure of $3,000,000. The new plant is to be constructed of steel concrete and wood. The first unit will have a capacity of treating 3,000 to 4,000 tons per day. Other units will be added as circumstances dictate.

The equipment will consist of crushers, ball mills, magnetic separators, sintering plant, etc.

Their product will be in the nature of a clinker, which is produced after the separation of the ore from the rock, by the sintering process. They are now experimenting with peat to be used in sintering. The product may be described as a clinker of high grade ore, free from moisture and all deleterious elements, very porous. The desirability of the product has been established by the preliminary tests, following the operation of the experimental plant in Duluth. They put three-quarters of a million dollars into the experimental stage of their enterprise, standing to lose it all, or make good.

If shrewd iron operators, on the richest iron range under development, in the world today, can make such huge expenditures for the beneficiating of low grade ores, it means that they have sufficient vision to prepare for a future that is certain to come, when high grade ores will be diminishing. They cannot last for ever at the present rate of fifty or sixty million tons per year.

Between 10 per cent and 15 per cent of the iron ore used in the United States today, is beneficiated. All of the New York and Pennsylvania ores undergo some treatment before smelting.

The enterprise and foresight shown by operators on the Masabi range in improving the grade of their ores, is increasing yearly, every season shows an increase in tonnage of beneficiated ores, over the preceeding one.

With this example before Canada, why should not something be done along the same lines for the development of our own iron?

Our ores in the main, lend themselves to beneficiation and much more readily than the ores to be treated by the plant mentioned above.

The Bureau of Mines report above referred to, says "Undoubtedly the iron ore deposits of Ontario will be called upon, and it may be at no distant date." With this authoritative statement, some measures of aid should be undertaken by the Government of the Province, aided by the Federal authorities to bring about the early exploitation of this natural resource.

The Province should undertake the diamond drilling of the various ranges, to be recouped for its expenditure, where merchantable, or beneficiable ores are located, contingent on expending the money so repaid, in further drilling on another range, and so on, until the whole of the ranges were gone over. If they would undertake to do this an experimental plant would be erected in this district, that would demonstrate the feasibility of creating, not only an iron ore industry, but a steel plant, rail mill, by-product plant, and all the subsidiaries that go with an iron and steel enterprise.

The railway mileage to be maintained, and the mileage to be built in the future, will be greater west of the Great Lakes, than in the east. This means at least $1.50 per ton on steel rails, in favour of this point, as against any point east of here.

This form of government aid should not occasion fear on the part of the public that that any one man, group of men, or any one community would be the sole beneficiaries of the aid given, its benefits would be felt from coast to coast, no one section of the people would be so directly benefitted as the agriculturists. It implies the continuous flow of freight traffic. Prosperous communities would be built up, enlarging and bettering the farmer's market. More, and cheaper agricultural implements would be manufactured in Canada, leading to a solution of the tariff problems of the present.

The Federal government could give substantial aid to a beneficiating plant, without the expenditure of one dollar by admitting the heavy and expensive machinery necessary in such a plant, free of duty.

This is a concrete and feasible proposition, easy of accomplishments, that would demonstrate Canada's ability to stand on its own feet, in the matter of iron ore requirements.

SKINNER'S MINING MANUAL AND MINING YEAR .BOOK

We have received a copy of the 1920 edition of this standard work of reference on mines and mine incorporations which has now reached the 34th year of publication. The price is 20s net, or 21s 6d post free out of Great Britain. The volume contains one thousand pages, and can be obtained from Walter R. Skinner, 11, Clements Lane, London, E.C.

The information given is unusually complete, and and of a nature that will make it useful to consulting engineers and all persons interested in mining investments.

METAL QUOTATIONS.

Fair prices for Ingot Metals at Montreal, 6th April, 1920.

	Cents per lb.
Copper, Electro	24½
Copper, Castings	24
Tin	71
Lead	11
Zinc	11½
Aluminum	45

MINING SOCIETY OF NOVA SCOTIA.

Proposal to Change Name of Society and Date of Annual Meeting.

At the Annual Meeting of the Mining Society of Nova Scotia, which will be held in Glace Bay, Cape Breton, on the 4th and 5th of May, a motion will be made to change the name of the Society to "The Nova Scotia Mining and Metallurgical Society." A further motion will be made to allow the Annual Meeting to be held between January 1st and July 1st in each year, instead of between January 1st and April 1st, as prescribed in the by-laws.

POSSIBILITY OF OIL OCCURRENCES IN SPITZBERGEN.

The Northern Exploration Company, of London, in a letter to the shareholders states that following the observance of the gas flows in Spitzbergen by the Company's geologist, arrangements have been made for exploration of the neighbourhood for oil. The "Financier and Bullionist" refers to liquid oil springs and specimens of bitumen, noticed in Spitzbergen in 1905 by the Rev. E. T. Gardner.

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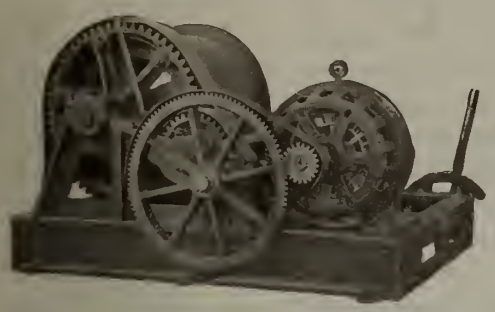

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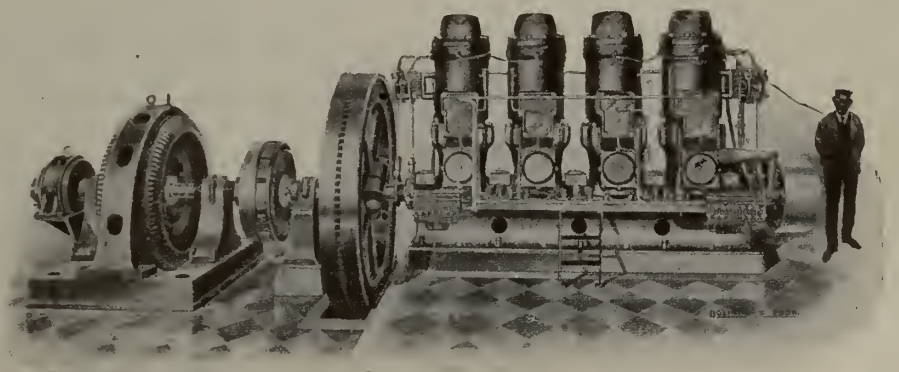

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A SIGNIFICANT STORY

The story of the discovery and early development of the Mandy ore deposits, as recounted by Mr. J. E. Spurr in the March 13 number of the "Engineering and Mining Journal," give some indication of the opportunities that Northern Canada presents to those who would develop mineral deposits. Mr. Spurr and his party were making a visit to the Flin Flon discovery when observations were made that soon led to the discovery of the Mandy deposit, which has now yielded several thousand tons of rich copper ore and which may yield a larger tonnage of lower grade copper-zinc ore in the near future. Manitoba's first copper producing mine became a producer very soon after its discovery. Mr. Spurr says of the events leading to staking of the claims:

"From Athapapuskow we travelled along the narrow Schist Lake; here we noted that the iron-stained rock gave the first suggestion of mineralization; and, indeed, we knew that we were not far from the Flin Flon discovery. We kept on the west shore, but got little protection from the wind sweeping straight down the lake. Arriving at what seemed to be a small island (where now is the Mandy mine), we kept inside the island for better protection against the choppy waves It turned out to be a peninsula, and we returned with speed and disgust, for we had counted on making the long swamp portage between Schist and Flin Flon Lakes before dark, and it was getting late. Coming back along the shore we noted at one point very heavily iron-stained float at the edge of the woods. We stopped to land and investigate, but we were warned that if we took the time to do so our present day's schedule. and so our whole schedule, would be disarranged. It was agreed, however, that Jackson and Reynolds (two of the party), after visiting Flin Flon, should return by the way we had come and should investigate this locality carefully.'

After visiting the Flin Flon and returning to the Pas, Mr. Spurr's party waited there for Jackson and Reynolds. Jackson arrived the following day and reported that he had found sulphide ore—

"immediately under the moss at the spot we had noticed and discussed, had scraped off a space three or four feet wide and found no walls; and had located claims, those covering the ore in his own name and probable extensions in the name of friends He showed me the ore, clean bronze-like massive pyrite, concerning whose value he was in doubt; but I advised him judging from the peculiar yellow shade, it should contain between 20 and 30 per cent copper. He accordingly recorded the claims, and a written agreement was made transferring his locations to the Tonopah Mining Co., of Nevada, of which I was vice-president and engineer, leaving him an interest in the property as compensation.

"Immediately I sent for an engineer—McDaniel—to come from Colorado to the Pas, and arranged to have him return to the spot with dog teams as soon as the river froze hard, make camp and trace the discovery."

"MacDaniels' first cut across the outcrop of the Mandy mine, as Jackson had named it, showed about forty-feet of nearly solid sulphides, copper and zinc, averaging about 18 per cent copper and high in zinc. Subsequent cuts, however, proved that the first had been the widest and later trenching revealed the surface outcrop as lenticular and a little over 200 feet long. Diamond drills were sent in to determine the depth and revealed the lens pitching to narrow dimensions in about 200 feet.

"The high grade copper lay in masses and layers separate from the zinc ores and mixed ores, permitting separate mining and the then high price of copper determined the plan of mining and shipping this copper ore. Mining equipment was hauled in over the ice, and when installed the ore was systematically mined."

The story of the discovery and development of the Mandy mine is a very creditable one. It shows how one little patch of the Northern wilderness has been made productive, and should prove an incentive to other enterprising men who are willing to spend time and money in exploring new fields.—R. E. H.

U. S. SUPREME COURT DECISION ON THE STEEL CORPORATION.

In "Some Considerations on Monopolies" discussed in this column in our November issue, we suggested there was "no good reason for objecting to large consolidations of capital, as such." The Boston News Bureau recently summarised the main feature of the U. S. Supreme Court decision in the suit of the U. S. Government against the Steel Corporation by the phrase: "Size no Sin." The U. S. Steel Corporation was upheld as a lawful consolidation because its monopoly had not been used to menace the State, which should serve to strengthen the hands of those who hold that the more complete the control of any industry, and the nearer that control approaches monopoly, the more economical and efficient will be the operation of the industry, and that in this respect unified control of any industry is for its general good, so long as no attempt is made to subvert legislative processes. As a means of obtaining the unified control that is necessary to ensure the fullest measure of efficiency, it will be generally admitted, after the lessons of the war period, that private control includes less evils, and is not so objectionable from the point of view of the public weal, as government control under a system of popular representation based upon the ballot.

In regard to the extension of the Steel Corporation's activities into Canada, it is fair to assume that some hesitation may have been present in the minds of those who direct the Corporation's policies, so long as the legal status of the consolidation was questioned by the government of the United States, but this uncertainty having been removed, there would seem to be no further reason for hesitation, and, seeing that the conditions which favour the extension of United States business organizations into Canada were never so powerful as they are at this time, a logical result of the Supreme Court decision may be the hastening of construction work at Ojibway. In such event, the Canadian steel companies will have to compete with the efficient forces of a great consolidation, under unified control, a condition that will force Canadian steel interests to fall into line with the general tendency of the times towards self-protection by a combination of forces.—From Iron and Steel of Canada.

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:-: EDITORIAL :-:

The Mines Act 1907

We are publishing, for the information of our readers, and abstract of the Mines Act, 1907, under which the Department of Mines at Ottawa was established. Some information on the old classification and salary schedules is included; this information has all been gleaned from public documents which can be obtained from the King's Printer in Ottawa free of charge..

Members of the mining profession and others interested in mining matters in Canada appear to be lamentably ignorant of the Federal Department of Mines and the organization provided under the existing law. Our issue of February 25th last contained a resolution (on page 159) unanimously adopted at the last meeting of the Mining Society of Nova Scotia re Salaries of the Geological Survey. This resolution has been forwarded to the Government at Ottawa and, among other things, "Urges on the Minister of Mines the complete reorganization of the Department, including the uniting of the Geological and Mining Branches under one executive head."

Strange to relate these two Branches not only are perfectly logical divisions of the work of the Department but were definitely recommended to the Government by the Canadian Mining Institute in 1900, and this suggestion was adopted in the legislation introduced by the Hon. Clifford Sifton in 1907. The law has provided for a **single executive head** of the Department of Mines since its inception. The present executive head is Mr. Richard G. McConnell, B.A., who has been Deputy Minister of the Department of Mines since the first of December, 1914. A reference to the text of our article on the Mines Act will show that the Geological Survey is a very large organization with a wide field, which embraces nearly all branches of Natural Science. In addition to Geology many other branches of scientific investigation are covered by the staff and the importance and value of this other work must not be overlooked.

We make these comments because we think that it is advisable that critics of the Department of Mines and would-be advisors of the Government should first carefully inform themselves as to the facts before making representations at Ottawa.

The salary question, the unrest in the Government service, and the question of resignations of the scientific staffs in Ottawa, will be dealt with more fully in a subsequent article. We wish to point out that the Department of Mines is only one of several Departments employing a scientific staff and that resignations from absolutely essential technical services have been very frequent of late throughout the whole public service. In the Department of Mines, it might be noted in passing, there have been more resignations from the Mines Branch than from the Survey, although the latter has about twice the staff. The work of certain divisions has been greatly reduced, and in some cases it may cease altogether.

Little Discussion of Papers or Topics at the Annual Meeting of the Institute

As a social gathering, and as a source of papers for inclusion in the Transactions, the recent meeting of the Institute in Toronto was an unqualified success. The papers were of high merit, and in accord with the best traditions of the Institute. There also prevaded the meeting a sense of nearness to active business affairs, and a feeling that the Institute was a real force in the direction of policies that was unusually vivid. There was also an actual participation in the meeting by men of large affairs and responsibilities that was much appreciated, particularly those features of the meeting which were made possible by the courtesy of the International Nickel Company.

Nevertheless, the meeting would have been a greater success if more discussion had taken place on the papers read, and on the topics that were listed on the programme for discussion.

For example, the symposium of papers on fuel supply represented much preparatory work by the Secretary and Committee, and can be correctly described as covering most of the phases of our fuel supply, comprising as it did papers that dealt with lignites, briquetting, oil, bituminous coal, anthracite, and questions of economics and transportation affecting fuel supply. Mr. Stirling's paper bristled with points on which discussion is needed concerning a coal field of

vital value to Canada. It is, we believe, a matter for genuine regret that this exceptionally complete symposium of fuel papers did not, as far as the coal and lignite papers are concerned, elicit any discussion at all; and, in regard to oil, an inadequate and rather irrelevant discussion.

There is no question of more pressing urgency before Canadian mining men than that of fuel supply, for upon it all the mining activities of the country are dependent. It is to be hoped that the complete absence of discussion on this matter in Toronto does not indicate a disinclination on the part of the members of the Institute to examine the fuel problem, or to tackle a question that is not made of lesser importance by fear of its many difficult phases. The Canadian Mining Institute can hardly expect definite action from those who direct the policies of Canada, if its own attitude remains obscure.

Mr. Mc. Evoy's paper on the Status of the Engineer was designed to provoke discussion. The fact that a discussion was desired was noted on the Programme, but in spite of all this no one said a word. The President explained very clearly the attitude of the outgoing Council, and the quite definite action it had taken, but if the incoming Council was looking for an expression of opinion on the part of the members to guide them in the coming year, they did not receive it. It may be that the members of the Institute so unanimously approved the action of the Council that they considered discussion unnecessary, but, as no one said anything, such a conclusion cannot be more than a surmise.

We ventured some months ago to suggest in this column that the programmes of technical society meetings are too crowded, and that papers selected for reading at the larger gatherings should be reduced to a few previously published papers, selected for discussion because of their topical, provocative or unusually important character, rather than for initial presentation.* We were also sufficiently ingenious to ask for expressions of opinion on this suggestion, but failed in this endeavor to "start something", much as the papers read in Toronto failed to elicit comment. It would, of course, be temerarious to infer that the members of the Institute are inarticulate as a body, because there is both traditional and contemporary evidence to prove that as individuals they can on occasion become loquacious, if not actually vociferous.

We believe the lack of discussion at Toronto was occasioned by the fullness of the programme, and the desire of those present to give an opportunity to every person who had prepared a paper to deliver it.

A full programme is a desirable thing, but adequate discussion is not less desirable. Is it not possible to compass both?

*Issue November 26, 1919, page 879.

IN MEMORY OF CAPT. O. E. LeROY.

The "Journal" is in receipt of a communication from the University of British Columbia, published in this issue, which announces the successful commencement of the raising of a fund of ten thousand dollars for the endowment of a memorial scholarship at this University.

Simultaneously, we learn that the LeRoy Memorial Fellowship in Geology at McGill University is being founded, and that a sum of ten thousand dollars is being sought, from the proceeds of which a student will be able annually to take a post-graduate course in geology.

The "Journal" believes that those of its readers who knew the late Captain LeRoy will echo the comment of one of the McGill men who is trying—and with gratifying success—to forward the Montreal project, who, upon first learning of the Vancouver project, remarked, "Two memorials are none too many for O. E. LeRoy." The Canadian mining community is large enough and wealthy enough to justify the hopes of those who are seeking subscriptions both in the East and in the West.

J. Austen Bancroft, of the Department of Geology, McGill University, Montreal, is receiving subscriptions for the McGill Fellowship; and R. W. Brock, Dean of the University of British Columbia, Vancouver, for the Scholarship.

No memorial is so lasting, and so much in accord with our national traditions, as an educational endowment of future generations in memory of a scholar-soldier who died in battle. We recommend both these memorials to the generosity of the mining profession in Canada.

RESULTS OF THE INDUSTRIAL CONFERENCE.

It is announced that a conference with the Government is to take place at Ottawa between representatives of employers of labour, workmen, and provincial governments, with a view to unifying the existing provincial and federal laws that have to do with industrial occupations. This conference, although the fact is not announced in the newspapers, is presumably a result of the Industrial Conference held at the instance of the Minister of Labour in Ottawa last September, and is being convened by the Department of Labour. As the attention of the Federal Government is to be directed to the existing provincial statutes affecting minimum wages, mothers' pensions, workmen's compensation, factories acts, labour bureaus, hours of labour, child labour, and all legislation connected with arbitration and conciliation in labour disputes, it will be advisable for employers to keep in close touch with this very important matter.

One of the recommendations to be made that is likely to receive consideration by the Federal Government, is that urging uniform codification of workmen's compensation laws. In some of the pro

vinces, workmen's compensation laws of much merit and fairness are being well administered, while in other provinces compensation laws exist that in one instance cause unnecessary and costly litigation and are very unsatisfactory from the workmen's point of view; and in another instance penalise the employer to an inordinate extent. It is very advisable that large employer should carefully watch the development of unification of compensation laws—which, in one form or another is a foregone conclusion—lest unfair provisions should be given wider application.

GOLD PRODUCTION IN NOVA SCOTIA.

The gold mining industry in Nova Scotia has had a hard task to exist for many years past, and production has declined year by year, but it will be readily understood that under the present conditions of labour and costs of wages and materials, the Nova Scotia industry has suffered more than that of any other part of Canada. The Mines Report states: "The "continued demand for labour in other industries, "together with higher rates, with no decrease in the "cost of material, has had the effect of still further "decreasing the output of gold in the Province." A special report on the gold mining industry has been prepared by Mr. G. F. Murphy of the Halifax Technical College, and is elsewhere published in this issue. It will be noticed that some relief from high fuel costs is hoped for from water-power electricity. Time was when Nova Scotia produced most of the gold mined in Canada, and it is to be hoped that some means will be found to prevent the entire cessation of gold mining in the Province, which appears to be not an unlikely contingency.

By the courtesy of the Editor of "Coal Age,,' who attended the Toronto Meeting of the Canadian Mining Institute, we reproduce in this issue a cartoon from "Coal Age" which is an example of the telling manner in which a clever cartoonist can sum up in one drawing the gist of many reams of writing. One thing we believe our readers will appreciate and admire in this cartoon is its good-natured limning, for while Miss Canada is shown wielding the hammer in business-like fashion, she is represented as a comely and youthful damsel, as we all believe her to be; and the correctness of Uncle Sam's attitude is just what one would expect from a well-bred old gentleman towards the young lady next door. Mr. Dawson Hall and the cartoonist are happy in their collaboration.

Many a fellow's prospects are bright only by contrast with his own dullness.

CAPTAIN LeROY MEMORIAL.

University of British Columbia.

In 1915 C. E. LeRoy, late of the Geological Survey, enlisted in the 72nd Seaforth Highlanders of Canada. After training with them in Vancouver, he was transferred, to help recruit and to command the company that the University of British Columbia, in its first session, was contributing to the 196th Western Universities Battalion.

While leading his company at Passchendaele in the autumn of 1917 he fell mortally wounded.

The returned boys whom he recruited, trained and led, have resolved that the memory of his life of service, his sterling qualities, his lovable nature, his generous disposition, his thoughtfulness for others, his devotion to duty, and his supreme sacrifice, shall be perpetuated as a priceless tradition to inspire present and future students of the University he so honored by his service.

It has always been a favorite, if secret, practice of Capt. LeRoy to assist needy students to attend college Had he returned, he would now be helping some of his boys to fit themselves for leadership in civil life. The boys decided that such assistance shall continue to be forthcoming in his name. At a dinner on February 25th, the Universities Service Club undertook to raise at least $10,000 to found the Captain LeRoy Memorial Scholarship to assist necessitous students, preference to be given first to returned soldiers and then to dependents of enlisted men. Over $1,000 was immediately subscribed, in addition to $250 cash paid in to permit announcing the Scholarship immediately for next session.

As the members are almost exclusively returned men who have their own financial difficulties in completing their college courses, they cannot attain this objective without outside help, but they realize that Capt. LeRoy's many friends (and all who knew him were his friends) will welcome this opportunity to assist in commemorating his memory in so appropriate a manner.

A new university stands in particular need of such scholarships; it stands in particular need of tradition to inspire its students with ideals of perfect citizenship. Returned soldiers now need such scholarships and many soldiers' orphans will need them if they are to receive the education their fathers would have provided for them. There will always be good students who can never receive a university training except by this means.

There is every incentive to make this memorial a worthy one. Anyone who wishes to be associated with this undertaking may communicate with R. W. Brock, University of British Columbia, Vancouver.

OBITUARY.

Elias Rogers.

With the death of Elias Rogers there passes a pioneer of the coal trade in North America. Mr. Rogers purchased the first coal mines opened in Jefferson County, Pennsylvania, and in 1876 came to Toronto and established with his brother Samuel the coal business which later became the Elias Rogers' coal Company. In 1909, Mr. Rogers became President of the Crow's Nest Pass Coal Company. He died at the age of 70 years. Mr. Rogers was born at Whitchurch, York Co., Ont., and was a prominent member of the Society of Friends.

Correspondence

PETROLEUM HYSTERIA OF E. & M. JOURNAL.

To the Editor of the
"Canadian Mining Journal."

Sir:

German propaganda and Sinn Feiners machinations are being carried on more actively than ever in the Great Republic to the south of us. Judging from the editorial in the "Engineering and Mining Journal," March 27th, pp. 733-4, even the Editor of your contemporary has been infected with the virus. In his hysterical "The Menace of Britain's Petroleum Policy" and the "Higher Patriotism" he says in part: "In the conduct of which campaign she (Britain) has discriminated against American commercial competitive progress, by laws, regulations, and decisions barring aliens from fields under her control." This statement is remarkable, or shall we say, amusing, when we consider what has long been the law of the United States regarding the staking of mineral deposits. No alien can get title to a mineral deposit in that country, as the following quotation from the American Mining Code shows: "All valuable mineral deposits in lands belonging to the United States, both surveyed and unsurveyed, are hereby declared to be free and open to exploration and purchase, by *citizens of the United States and those who have declared their intention to become such* . . ." but by no other persons.

Moreover an alien cannot even own a house in his own name in many, if not in all, the States.

Contrast these conditions as regards the treatment of aliens with those that prevail within the British Empire! But probably we have been too lénient and good natured in the past and it is well that we should now take a leaf out of Uncle Sam's book and prevent aliens from getting title to our natural resources, especially those like petroleum that are of both great military and industrial importance. Our friends in the Great Republic need not fear that we have ulterior motives if we are seeking to control the petroleum resources of the Empire. As it was in the last war, so it will be in the future, our Navy will stand for the protection especially of all the English-speaking peoples.

Has old Standard Oil come to life again after its almost complete dismemberment by the United States Government a few years ago? And are some of its hired men joining in the howl with Germans and Sinn Feiners against perfidious Albion?

At the beginning of the Great War one of the most important petroleum companies, although nominally under neutral control, was really enemy controlled and made conditions awkward for the allies. Why should the British Empire in the future not follow the United States example and not permit aliens of whatever nationality to get control of her natural resources?

From the following extract from a recent Press despatch it is evident that more control of the industry by government would do no harm in Britain, and elsewhere—"The present retail price of 3s 8½d a gallon of gasoline—about 90 cents if exchange were at par—compared with the wholesale price of 1s 6.4d f.o.b. at New York, reveals a good deal of profiteering in distribution. . . The world supply of motor spirit . . . is virtually controlled by the Standard Oil Company and the Royal Dutch Shell Company. . . . There is some hope for British consumers in the fact that the Government controls the Anglo-Persian Company, and it is urged that the products be sold at a reasonable figure within the Empire. A recent British government report suggests that the whole question of the production and price of motor spirit should engage the attention of the League of Nations." But, according to the Editor of the "Engineering and Mining Journal," Britain is committing a crime in attempting to control profiteers! He would let the Standard, the Shell, and other concerns run the industry to suit themselves. He would even blacklist American oil geologists who enter the employ of the British! But after all is said we should make allowance for the E. and M. Editor's hysteria. The long drawn out discussion on the Peace treaty at Washington must tend to get on a fellow's nerves. We should remember that our friends are technically still at war. PHILAMERICA.

April 6th, 1920.

CANADA'S ALLEGED AUTONOMY.

To the Editor of the
"Engineering and Mining Journal,"
New York.

Sir:

The Canadian Mining Journal, in its issue of Jan. 16 commenting upon an editorial which recently appeared in the "Engineering and Mining Journal" on the League of Nations, objecting to the plural vote for the British Empire, remarks that the article "betrays a curious inability to understand the status of Canada." Referring to British colonies for which votes are claimed, our contemporary goes on to say that "each of the peoples so named constitutes a self-supporting, autonomous, sovereign nation, and if this fact is not understood throughout the world, it is only possible to express surprise." The "Canadian Mining Journal" betrays a curious inability to understand the English language when it describes Canada as as an autonomous,sovereign nation. Canada went to war automatically as soon as England desired hostilities. Her government pledged aid to the Allies, and preparations for an expedition were under way on an extensive scale long before the assent of the Canadian Parliament was asked as a mere matter of form. During the controversy which ensued the principle that "when Britain is at war Canada is at war" was accepted by all parties with the exception of the Quebec Nationalists. How can a country claim sovereignty and nationhood when it is bound to render military aid to a suzerain power whenever the latter demands it?

Lord Robert Cecil, a prominent advocate of the League of Nations, in a recent speech, displays the same "curious inability to understand the status of Canada" at which the "Canadian Mining Journal" can only express surprise. He is reported as saying that "We could not continue indefinitely the system by which the direction of our foreign policy was exclusively in the hands of the mother country, though any blunder in it might affect the prosperity and possibly the national existence of all parts of the em-

pire." In the face of such an admission the claim that Canada and the other Dominions are entitled to representation in the League as autonomous and sovereign states is preposterous.

PHILLIPS THOMPSON.

Oakville, Ont., Feb. 16, 1920.

Note.—The preceding letter to the editor of the "Engineering & Mining Journal" had been overlooked, but it requires a reply. While we entirely disagree with Mr. Thompson's statement that Canada has in recent years considered herself "bound to render aid to a suzerain power," it should be pointed out that our remarks in the 16th January issue had reference entirely to Canada's new status as a signatory to the Peace Treaty, in which is incorporated the provision for the League of Nations. If there existed any dubiety in 1914 as to Canada's status as "a self-supporting, autonomous, sovereign nation" none exists today, and it was this fact we desired to emphasise. We also understand Lord Robert Cecil's statement to be confirmation of our point of view, namely, that the exclusive direction of foreign policy in the Mother Country has passed away. This is not an "admission." It is weighty enunciation of a new condition. As to the assent of the Canadian Parliament being asked to a declaration of hostilities in 1914, we have yet to learn that the consent of the British House of Parliament was asked. The British Cabinet acted, and so did the Canadian Cabinet. If the Cabinet had not acted "automatically," or, (as is presumably meant) quickly, the Canadian people would speedily have empowered a new Cabinet. If ever there was a spontaneous expression of the popular will it was seen in the manner in which Canada went to war in 1914—Editor.

BOOK REVIEW.

"FURTHER INCIDENTS IN THE LIFE OF A MINING ENGINEER." By E. T. McCarthy.

Mr. McCarthy, the author of this book, is one of the most highly respected and best beloved of that now small number of English mining engineers who studied under Professors Huxley and Tyndall, and who form a genial coterie into which it is a particular pleasure for the engineer, visiting London, to be admitted.

His books, of which this is the second, give an account of his life in most of the mining districts of the world, including Canada, the United States, Mexico, Uruguay, South Africa, Australia, New Zealand, China, Manchuria, Siberia, the Malay States, Siam, Borneo and Japan.

He begins his stories, for the book is a series of more or less disconnected stories, with a trip to Chiapas in southern Mexico and his life for three years as the manager of an isolated copper mine. His staff was small and his men were mostly renegades and murderers who had fled from the more settled parts of Mexico and the Southern United States.

Later he describes another trip to a gold and silver mine in the States of Chihuahua where he stayed for a few weeks as examining engineer.

In 1897 he took charge of Pigg's Peak Mine in Swaziland where he remained with his wife and young son till 1899, when in spite of contrary instructions from his directors in England, and of objections and discouragement on every side, he closed the mine and fled with the men, women and children who would go with him, to Lorenzo Marques on Delagoa Bay, whence he took ship to England. Three days after he left the mine, the Boers in South Africa opened active hostilities against the British, took possession of this property and took away the few men, who had insisted on remaining at it, and forced them to march hundreds of miles across country to Pretoria.

Most of the rest of the book is taken up with the author's life in the far east, including China, Japan, Malay States, Siam, Perak, Borneo and Korea. Afterwards he made several visits to the Spassky and Atbascar Copper Mines, as well as to many other places in Siberia, while the final short chapter is devoted to brief notices of two visits to Porcupine in Northern Ontario, one after the great fire in 1911 and the other in 1914, just on the outbreak of the War. On the latter occasion he was accompanied by Mr. Edward Hooper, and shared the hospitality of our fellow Canadian Dr. J. Mackintosh Bell.

The book is dedicated to the memory of his wife, whom he found very ill when he returned from Canada and who shortly afterwards died. His tribute to the memory of his wife, who was his heroic companion throughout his travels, is very touching and pathetic, She had helped him to make a home wherever he went, both for his own family, and for the mine staff working under him.

The book is not only the account of the life of a mining engineer, it is the story of the doings of a forceful Englishman who has roamed over the world, and has helped to develop its resources, partly for his own benefit, but mostly for the benefit of humanity at large, for whoever induces the earth to increase its yield, whether of grain for food, or of metal for implements, etc., is advancing the cause of civilization and progress. He pushed civilization a little further forward by his ability and capacity for work and by his willingness to undergo hardship and privation for the sake of successful accomplishment. As long as the British race is dominated by the spirit that prevades this book, no matter how gloomy the immediate outlook, there need be no fear of its ultimate success.

The book should be read by all mining engineers and should be used as a text book in the mining courses of schools and colleges, for it indicates to all who contemplate entering the profession the trouble, labour, vicissitudes and pleasures that pave the way to a successful career.

As in the case of the former volume any profits that may be derived from the sale of the book have been generously devoted by the author to St. Dunstan's Hostel for the Blind.

Toronto, April 7th, 1920. —J.B.T.

NEW MINING COMPANIES.

Recent mining company incorporations announced in the Ontario Gazette are: King Kirkland Gold Mines, Limited, with a capital stock of $2,500,000; the Gowganda Engineering and Construction Company Limited, head office Toronto, authorized capital $40,000. Silbar Cobalt Mines, Limited, head office Toronto, authorized capital $1,500,000. Federal Feldspar, Limited, chief place of business, Ottawa, capital stock, $40,000. Kitchener Kirkland Mines, Limited, head office, Kitchener, Ont., authorized capital $3,000,000, provisional directors, H. O. Feick, C. A. Imerson, R. O. Kleinschimidt, C. W. Feick and G. E. Chapman.

The Department of Mines of Canada, its Organization and its Work.

The Department of Mines of Canada, as at present constituted was created by an Act of the Parliament of Canada assented to on the twenty-seventh of April, 1907. Although the Department has been in existence over twelve years, the plan of organization and the functions of the two branches and other subdivisions are matters not clearly understood, even by many in Canada who are closely associated with the mining industries and with the work of the departmental staff. The present article is intended to place before the readers of this journal a concise and accurate statement of the present organization and functions of the department as defined by the statute under which it was created. A brief historical sketch of the more important events which led to the organization of the department is included.

The Geological Survey of Canada, the forerunner of the present Department of Mines, first constituted in 1842, was organized only after some ten years' active propaganda on the part of interested persons. During its early years, the work of the survey was confined largely to general scientific geologic work, much of which had, however, an economic bearing. The investigations embraced only parts of the provinces of Ontario and Quebec, which then constituted Upper and Lower Canada. After confederation (1867) its work was extended to include the Maritime Provinces and, later, the whole of western Canada, and this with only a very slight increase of staff at that time.

During the next interval of a little more than two decades, general areal explorations were carried on in various parts of Canada; a few men inadequately equipped were required to explore the vast domain of half the continent.

In the early eighties of the last century, persons who were immediately concerned in the development of the mineral resources of Canada began to importune the government of the day to give more attention than had been given in the past to the collection of statistical and other information relating to these resources and to the mining industries of the country. The matter also seems to have been a subject of discussion among the interested members of the British Association for the Advancement of Science, which met in Montreal in 1884, for we find that members of this association, at this time, strongly urged that prompt steps be taken to supply this want. Two years later, in 1886, a strong and influential deputation of mining men and others interested in mining, representing all parts of Canada, waited on the Minister of the Interior, with a request that a "Bureau of Mining and Mineralogy" be established. Their memorial reads as follows:

Whereas, it is believed that the information and statistics regarding mining and mineral developments in Canada furnished by the Dominion Government are not in keeping with the desire of those interested in such developments, and are neither sufficient nor accessible enough to supply the public with full, authentic and prompt information on these subjects; we do, therefore, wish to respectfully bring to the attention of the government the following desires of a section of our community:

1. To have full and reliable information of the mining and mineral developments, and statistics connected therewith, for the whole Dominion, published each year, as soon after the end of the year as possible.

2. To have a medium through which information relating to our miners in all parts of Canada can be given to the public —such medium to be a monthly publication.

This would have a tendency to bring our mining industries constantly before the public and to educate them to take an interest in sound and legitimate mining enterprises, besides giving to the world at large constant information about mineral development in Canada compiled from records and reports of a mining bureau under government control which would be authentic and reliable.

This memorial contained five numbered suggestions, the first and most important of which reads as follows:

That a mining and mineralogical branch of the Geological Survey be established which will publish its reports separately and annually, such a branch to be presided over by an independent officer.

These recommendations seem to have been accepted and acted upon, for in the following year, 1887, was published a report entitled "Statistical Report on the Production, Value, Exports, and Imports of Minerals in Canada, during the year 1886 and previous years," the first report of its kind. Subsequently, a special Mines Section of the Geological Survey in charge of Mr. Elfric Dirent Ingall, who is still a member of the Geological Survey, was organized to collect and publish information of this character.

Statistics and the various methods of compilation seem always to be a bone of contention and Canadian mining statistics have been no exception. Again, the rapid expansion of the country create new demands. In a new country, such as Canada, with her vast extent of territory, largely unexplored, where new indurtries are constantly being organized to exploit her natural resources, the demands upon the government for information and assistance in the establishment of these industries are both insistent and persistent. There are many enterprises where technical knowledge and skill are required, more especially in the initial stages, and there are many occasions where a paternal government can, in various ways, assist its constituents with technical information. Even after the organization of the Mines Section of the Geological Survey, these matters of statistical information and of more direct aid to mining industries of the country became matters of frequent discussion among mining and others associated with the industry.

These discussions seem to have culminated in the passing of the following resolution at the Montreal meeting of the newly organized Canadian Mining Institute in 1900.

Resolved that the Canadian Mining Institute in annual session assembled desires to direct the attention of the federal government to the magnitude and importance of our mining industry which during recent years has developed so rapidly and respectfully urges an increase of government aid wherever possible and the establishment of a strong and practical Department of Mines or of a department which shall be devoted to the interests of the mining and metallurgical industries and which shall include the Geological Survey and all other necessary branches.

This resolution when presented to the government, was also accompanied by a statement and recommendations with reference to the establishment of the proposed Bureau or Department of Mines, as follows:

It requires an independent head, which, while responsible to a minister, should be practically free from political control, and administration entirely on a non-partisan basis.

Should be divided in three main divisions, viz.,
(1) A Geological Survey,
(2) A Mining and Technical Branch,
(3) A Statistical Branch.

1. The present survey to be reorganized and the different branches separated so as to avoid confusion; e. g., a Topographical branch, which would greatly expedite the work of another branch, viz., the Geological branch proper. There also should be divisions to include petrography, chemistry, palaeontology, etc.

2. The mining and technical branch should deal with inspections and reports concerning the economic possibilities of districts already discovered, and of regions yet to be explored. Monographs on various localities, industries, processes and methods should be issued frequently. This branch also should deal with questions of production, transportation and cost. If possible, the head of this division should be an experienced and practical (if not practising) mining engineer.

The difficulty of obtaining such a man leads to the suggestion that the head officer of this bureau should have a list of competent engineers who are authorities in the different fields or branches of the profession, who should be called upon, when required, to report upon special subjects or special operations, at the discretion of the head officer, or when demanded by the public interests.

3. Statistical work is rendered necessary by the different ways and units employed at present by the different provinces of the dominion, and by the fact that existing statistics from any department of the Government are not inclusive of all the information that is available on any one material or subject.

It happened that some years previously, as a result largely of informal discussions and interviews, this question of the establishment of a Department of Mines had already been favorably considered by a responsible minister of the Crown. We find that a few months after the resolution above quoted was presented to the cabinet an Order in Council was passed making a new appointment to the position of Superintendent of Mines, an office in the Department of the Interior which had been created nearly thirty years previously. The first duty assigned to this officer was the establishment of the Dominion Government Assay Office at Vancouver. In the following six years a number of technical reports on mining subjects were prepared and published under the direction of this officer. The most important work undertaken during this period was probably the investigation of the processes of Electric Smelting of Iron Ores in Europe, followed by the experimental work under government auspices in electric smelting of iron ores at Saulte Ste. Marie. Another important innovation was the introduction of the Swedish methods of magnetic surveying for exploring Canadian magnetite deposits, and the publication of a monograph on "Magnetometric Methods of Surveying."

During this period, we find an anomalous state of affairs in the organization of the governmental service for investigating mines and mining. The original Department of the Geological Survey, one branch of which was engaged in special investigation of mining matters, were presided over by the Minister of Interior. Under this same minister; in the Department of the Interior, was a Technical Branch, controlled by a Superintendent of Mines and a third branch called the Mines Branch,* also existed, in which was vested the control of mineral lands belonging to the Crown.

It was not until the end of the year 1906 that the government decided to further accede to the wishes of those interested in the mining industry, as made known to it both by the resolution of the Canadian Mining Institute, and independently, by individuals and corporations. On the twenty-seventh of April, 1907, the statute now in force, entitled "An Act to Create a Department of Mines" (6-7 Edward VII., Chap. 29), became law. In general principles this Act embodies all the recommendations contained in the resolution of the Canadian Mining Institute, presented to the government six years before.

The principal clauses of this statute are as follows, the numbers being those of the original Act:[1]

1-2. Include merely the short title of the Act and certain definititions.

3. Establishes "The Department of Mines under the control and management of a Minister of Mines."

4. "The department shall administer all laws enacted by the Parliament of Canada relating to mines and mining,[2] and shall also have the management and direction of all subjects assigned to it by the Governor in Council."

. . . . . .

5. "The department shall consist of two branches, one of which shall be called the Mines Branch, and the other of which shall be called the Geological Survey."

6. "The functions of the Mines Branch shall be: (a) to collect and publish full statistics of the mineral production and of the mining and metallurgical industries of Canada, and such data regarding the economic minerals of Canada as relate to the process and activities connected with their utilization, and to collect and to preserve all available records of mines and mining works in Canada; (b) to make detailed investigations mining camps and areas containing economic minerals or deposits of other economic substances, for the purpose of determining the mode of occurrence, and the extent and character of the orebodies and deposits of the economic minerals or other economic substances; (c) to prepare and publish such maps, plans, sections, diagrams, drawings and illustrations as are necessary to elucidate the reports issued by the Mines Branch; (d) to make such chemical, mechanical and metallurgical investigations as are found expedient to aid the mining and metallurgical industry of Canada; (e) to collect and prepare for exhibition in the Museum specimens of the different ores and associated rocks and minerals of Canada and such other materials as are necessary to afford an accurate exhibit of the mining and metallurgical resources and industries of Canada."

7. "The functions of the Geological Survey shall be: (a) to make full and scientific examination and survey of the geological structure and mineralogy of Canada; to collect, classify, and arrange for exhibition in the Victoria Memorial Museum such specimens as are necessary to afford a complete and exact knowledge of the geology, mineralogy, palaeontology, ethnology, and fauna and flora of Canada; and to make such chemical and other researches as will best

* At the present, the branch of the Department of the Interior is called "The Mining Lands and Yukon Branch," the chief administrating officer is Mr. H. H. Rowatt.

[1] It has not been thought necessary to publish the statute in detail; only those clauses which explicitly define the functions of the various branches of the service and the scope of their investigations are here reproduced.

[2] This clause has never been put into force.

tend to ensure the carrying into effect the objects and purposes of this act; (b) to study and report upon the facts relating to water supply for irrigation[1] and for domestic purposes, and to collect and preserve all available records of artesian and other wells; (c) to map the forest areas of Canada, and to make and report upon investigations useful to the preservation of the forest resources of Canada,[2] (d) to prepare and publish such maps, plans, sections, diagrams and drawings as are necessary to illustrate and elucidate the reports of surveys and investigations; (e) to carry on ethnological and palaeontological investigations."

8. "The department shall maintain a Museum of Geology and Natural History for the purpose of affording a complete and exact knowledge of the geology, mineralogy and mining resources of Canada."

9. "The Governor in Council may appoint a Deputy Minister, a Director of the Mines Branch, a Director of the Geological Survey, and such other officers and clerks as are required for the proper conduct of the business of the department, who shall be appointed and classified under schedule A of 'The Civil Service Act,' and in accordance with and under the terms of section 6 of the said Act."[3]

10-19. Deal with internal affairs of the department, appointments, restrictions, equipment, and annual summary reports.

20. "The minister may cause distribution to be made of duplicate specimens to scientific, literary and educational institutions in Canada and other countries, and also authorize the distribution or sale of the publications, maps, and other documents issued by the department."

21. "The minister may, for the purpose of obtaining a basis for the representation of the mineral, mining and forestry resources and of the geological features of any part of Canada, cause such measurements, observations, investigations and physiographic, exploratory, reconnaissance surveys to be made as are necessary for or in connection with the preparation of mining, geological and forestry maps, sketches, plans, sections or diagrams."

22. "Chapter 65 of the Revised Statutes, 1906, is repealed."

During previous years, several statutes and amendments thereto had been passed, establishing the Department of the Geological Survey and defining its functions. These various statutes were subsequently consolidated and revised, appearing as Chapter 65 of the Revised Statutes of Canada. Section 22 of The Geology and Mines Act, 1907, specially repeals the statutes, and section 5 constitutes the Geological Survey Branch of the Department of Mines. The purpose of this change appears to have been to avoid having two deputy ministers administering small departments whose work was closely related, and to avoid a continual overlapping of work, which would lead not only to confusion but to waste of time and effort and loss of efficiency.

A comparison of sections 6 and 7 of the act, quoted, will show that in general the Mines Branch of the Department of Mines is concerned with technical problems and with the detailed investigation of mining properties, while the more purely scientific and geologic investigations and the exploratory work are assigned to the Geological Survey Branch.

The department is administered by a deputy minister, acting under the Minister of Mines. Directly under the deputy is a staff of 17 which includes the editor's branch and the accountant's branch neither of which is constituted as a special branch of the Department of Mines by the statute. The technical work of the department is carried on, under the administrative head, by the two principle branches of the department, the Mines Branch and the Geological Survey Branch. The work of each of these branches is controlled by principal technical officers, who are termed respectively the Director of the Mines Branch, and the Director of the Geological Survey Branch.

MINES BRANCH

The Mines Branch, as at present constituted, is divided into the outside and the inside service, both services being administered by the Director of the Mines Branch. The Dominion Government Assay office at Vancouver is attached to the outside service of this Branch: the inside service, with headquarters at Ottawa, is organized for administrative purposes into the following divisions, each with a chief technical officer and such additional staff as has been provided:[1]

Administration and Library Staff.
Metal Mines Division.
Non Metal Mines Division
Fuel and Fuel-Testing Division.
Ore Dressing and Metallurgical Division.
Ceramic Division.
Roads Material Division.
Chemical Division.
Mineral Resources and Statistics Divison.

The civil estimates for the fiscal year 1919-20 provide for a staff of 63 exclusive of the Assay Office at Vancouver.

Outside Service. The Dominion Service Assay Office at Vancouver was established at that point to purchase and market gold from Yukon, British Columbia, and adjacent territories. The officials employed in this office number ten, in addition to the Director.

The various Testing laboratories at Ottawa require the services of a number of employees, which include technicians, skilled mechanics, and labor. These employees are also classed in the outside service. Their numbers vary from time to time. The Summary Report of the Mines Branch for the year 1916 gives 23 names on this staff.

Inside Service. The inside service of the Mines Branch has its headquarters in Ottawa and is compris-

[1] These duties are performed in part by the Dominion Water Power Branch Department of the Interior, of which Mr. J. B. Challies is the present Superintendant.

[2] These duties are not performed by the Geological Survey, but by the Forestry Branch Department of the Interior, of which branch Mr. R. H. Campbell is Director.

[3] The present Deputy Minister is R. G. McConnell, B. A. The present Director of Mines Branch is Dr. Eugene Haanel.

[1] Compare Summary Report of the Mines Branch, 1916, p.l.

ed of those employees who are on the permanent staff. The estimates for the last fiscal year, as already noted, provide for a staff of 63 persons. Field officers of the Mines Branch also very frequently engage additional temporary assistance, but no statement of the number of persons employed on this service from year to year has been published in the annual reports.

Geological Survey Branch

The Geological Survey Branch of the Department of Mines, as constituted in 1913, was organized as follows under the Director of the Branch.[1] No essential changes are noted in this organization in the Summary Reports of recent years.

Administrative Division.
Geological Division.
Topographical Division.
Biological Division.
Anthropological Division.
Draughting and Illustrating Division.
Photographic Division.
Library.

This branch also undertakes the work of collecting and caring for material for the Victoria Memorial Museum. The Civil Estimates for the last fiscal year, 1919-20, provide for a permanent staff of 141 persons. During the field season it is customary to engage the services of a number of independent scientists, usually members of the several University Staffs. The field parties of the Geological Survey are also provided with such labor as may be required. The number of persons employed in their several capacities on outside temporary service of this character varies from year to year. The annual summary reports do not contain any statement showing the size of the extra staff employed upon field service by the Branch.

Explosive Division

Provision was made in 1914, by Act of Parliament, for the regulation of the Manufacture, Testing, Storage, and Importation of Explosives. (Chapter 31, 4-5 George V). The Explosives Act was put into effect by proclamation on Mar. 1st, 1920 as provided in clause 27 of the Act. Originally it was planned to have this Act administered under an Explosives Division of the Mines Branch. This plan has not been carried out. An Explosives Division has been organized in association with the administrative staff of the office of the Deputy Minister. The staff of this Division, as at present constituted, comprises four technical officials and two clerks. It is stated, non-officially, that it is proposed to constitute this Division as a separate Branch of the Department of Mines, but no provision for the creation of such a branch appears in the Mines Act or in the Explosives Act.

General Considerations

The Civil Estimates for the last fiscal year (1919-1920) provide for a permanent staff of 222 persons in the Department of Mines at Ottawa exclusive of the newly organized Explosives Division. The total salary vote for this service was $422,747. This amount does not include the salaries of persons employed on temporary service or those in the so-called outside service. The remuneration for these services is provided in other votes.

[1] The Summary Report of the Geological Survey, 1913, p.l.

The average salary provided is at the rate of $1,904 per annum. The Mines Branch vote was $123,362, providing an average salary of $1,955 for the 63 Employees of that Branch. The Geological Survey vote was $265,722, providing an average salary of $1,884 for the 141 employees of this branch, the lower average being due to the larger proportion of clerical service provided.

The technical employees of this Department are grouped chiefly in the two upper divisions of the classification in effect at the time these estimates were provided. The Mines Branch estimates provide for 51 employees in the two upper divisions, with an average salary schedule of $2,158 and a total vote of $110,037. The Geological Survey vote provided for 109 employees in the two upper divisions, with an average salary schedule to be $2,156 and a total vote of $235,060. It is therefore to be inferred from these averages that the technical staffs in both branches of the service are paid on practically equivalent scales.

The maximum salary paid in the Department, exclusive of that paid the three chief administrative officers is $3,700. There are four officials in the Geological Survey on this rating. The maximum in the Mines Branch is $3,500. The salary of the Deputy Minister of the Department is $6,000 per annum and is not included in the above averages. The salary of the Directors of the two Branches (Mines $4,000, Geological Survey, $3,800) are included in the averages.

Finally it is to be noted that in the case of all appointments made since 1896, which includes nearly all the staff with the exception of a few of the higher paid officials in the Geological Survey, five percent of the nominal salaries as given here is not paid to the employees, this amount being retained for a fund not under the control or available to the employees, and known as the Retirement Fund. The actual salaries paid, and available to the employees to meet the costs of living are only 95 per cent of the amount given in the greater number of cases.

GEOLOGISTS LEAVE THE CIVIL SERVICE

Whitehall Petroleum Co. and Universities Take Three Men

Dr. E. L. Bruce, geologist in charge of work in northern Manitoba, has tendered his resignation to the director of the Geological Survey in order to take a position for the summer with Whitehall Petroleum Co., before accepting the professorship in mineralogy at Queen's University, Kingston. The tremendous development taking place in the recently discovered mineral district north of The Pas has been greatly assisted by Dr. Bruce's timely reports and maps.

Dr. F. J. Alcock, who for a number of years has likewise been working in northern Manitoba and Saskatchewan, is also considering an offer of employment with Whitehall Petroleum Co.

It is announced that Dr. S. J. Schofield, who has had 13 years experience in British Columbia, is leaving in the fall to accept a professorship in geology at the University of British Columbia.

Report on the Metalliferous Mines of Nova Scotia

(Prepared by G. F. Murphy, and abstracted from the Mines Report for 1919.)

Serious Condition of the Gold Mining Industry.

The tremendous rise in the cost-level of labour and materials in the last few years has effected the gold-mining industry by causing a rising in the cost of production which, due to our monetary system, can not be balanced by a proportionate rise in the price of the product.

In Nova Scotia, where gold mining has been struggling for a number of years, this added burden has made profitable mining almost impossible. There were only three companies that carried on any regular mining operations throughout the past year, and in the case of at least two of these, I have reasons to believe that operating expenses were at least five times the value of the gold recovered. Therefore, their hope lies in the value of the product being increased by some means at present not apparent, or something done to reduce the cost of production. This seems more apparent when we remember that practically all the larger undertakings in past years, when operating costs were only half what they are today, failed badly. Many of these undertakings were no doubt, mismanaged and exploited without any sincere effort to make the venture pay, but all mismanagement has been discontinued in recent years by the increase in the cost of operation.

I have examined a statement of expenses of one company operating last year. These figures show that it has cost them—$13.00 per ton for rock, broken or $207.00 per ton of ore milled—50 per cent. of total expenditure went in wages and 16 per cent. for fuel. The value of the ore was $40.00 per ton. These figures may not be altogether reliable as their tonnage is usually estimated, nor do I think this is a fair average of the cost of mining in Nova Scotia, but the figures can be used to compare with the cost of mining in Northern Ontario, where the total cost per ton of ore milled is as low as $5.00

The great increase in cost in Nova Scotia per ton milled over per ton of rock broken, as noted in the above figures, is due to our narrow veins. In the mine referred to above, it is estimated that it is necessary to break 16 tons of rock to secure one ton of ore. This ratio would be a fair average for the entire province and is a difficulty with our gold veins that is seldom realized.

The question that naturally arises is what can be done to revive this industry, once an important source of revenue to the province.

The diamond drill has been used to great advantage in the development of the gold mines of Northern Ontario and other mining camps, and might be used to stimulate mining operation in some of our gold mining districts. Our irregular ore bodies with their many rolls and enrichment zones, are not as well suited to drilling operations as the large, regular ore bodies of Ontario; but there are many cases where drilling could be used to advantage in proving the existence of veins, especially those where the value is known and the lead has been lost by faulting, or in districts like Killag, where prospecting, on account of the heavy drift, is very expensive and uncertain.

Many reasons have been given for the present condition of our gold mining industry and a consideration of them, no doubt, will help to guide future efforts, but I think that the important thing at present is to find a means of reviving the industry. I believe that we must realize that our gold mines must be worked on a small scale. That is, that only the enriched portions will pay to mine, more especially is this true with the increased cost of mining. It naturally follows therefore, that the building of elaborate plants must be discouraged, as our mines can not pay a large overhead-charge.

A difficulty at present is a scarcity of labour. Mines that are prepared to pay the prevailing wage cannot obtain miners, as only those remain in the districts who, due to family ties, could not move out. This, of course, will right itself eventually.

The fuel question is serious. Wood, the fuel that was chiefly used, has become very scarce in close proximity to the mines, and with the high cost of labour it is no longer a cheap fuel. The result is, not one of the mines operating at present is using it, but for the most part, have substituted oil engines. Coal, on account of transportation difficulties, is usually out of the question.

The only solution for this problem is to supply the mines with hydro-electric power. If, through the efforts of the Government, cheap power could be supplied, one of the chief difficulties in the way of successful gold mining would be removed.

I would therefore strongly recommend that the Government give the gold mining districts special consideration in their water-power project. Also give every aid to prospecting. Human nature will provide the incentive, and the search for gold will go on. Let the industry stand or fall on its own merits, its history in the past has been too tragic to be repeated.

The following is a list of the companies or individuals who have been mining during the last year:

Sherbrooke Mines & Power Co., Goldenville, Guysboro Co.
Montagu Goldfields, Ltd., Montagu, Halifax, Co.
H. F. Ross, Caribou, Halifax Co.
Caribou Gold Mining Co., Caribou, Halifax Co.
Alex. Greenough, Oldham, Halifax Co.
John Greenough, Oldham, Halifax Co.
Harry Ferguson, Oldham, Halifax Co.
John Hyland, Fairview, Halifax Co.
W. P. C. Inglis et al, Mt. Uniacke, Hants Co.
M. J. O'Brien, Renfrew, Hants Co.
Great Canadian Gold, Consolidated, Malega, Queens Co.
D. M. Thompson, Mill Village, Queens Co.
Scheelite Mines, Ltd., Scheelite, Halifax Co.
Malagash Co., Malagash, Cumberland Co.
Consolidated Manganese Co., New Ross, Queens Co.

The Malagash Salt Deposit, Nova Scotia.

The Anual Report of the Mines Department of Nova Scotia has the following reference to the Malagash salt deposit, to which previous references have been made in the "Journal".

As development proceeds in the Malagash salt deposit, more definite information is obtained. Last year's report mentioned that bore holes had tended to prove the existence of 600 square feet of salt-bearing

strata; at the close of 1919, drill holes had revealed the presence of brine underlying an area of about 5,000 square feet.

Messrs. Chambers and McKay continued the development during the whole of 1919, have sunk the shaft refered to in last year's report 33 feet farther or to a total depth of 118 feet, and had at close of year driven a tunnel north from the bottom of the shaft 20 feet into the salt strata. The salt extracted from the workings has been of a satisfactory character.

Evidence obtained from the bore holes and shaft, seem to indicate that the overlying 85 feet which is horizontally stratified, is made up of material derived from rock associated with salt that went into solution, and that below that plane the strata assumes the dip and strike found in the surrounding rocks that have been examined.

The structure of the main body of rock in the area is that of an overturned anticline, and the deposit lies in the northern limb with a south dip. Assuming that salt underlies wherever brine was encountered in the bore holes, there is space for a thickness of about 350 feet of salt strata with a dip of 35 degrees.

As the salt was doubtless formed in a basin-shaped body of water, it is reasonable to expect that a thickness of 350 feet must have had considerable lateral extent and that therefore, unless a great deal has been eroded, the salt must extend to considerable depth. The direction of the bedded strata is that of the belt of lower carboniferous rock that extends across the country from Malagash Point away towards Cumberland Basin. It is also reasonable to expect a continuation of the salt bearing strata in that direction. The surface features around the salt deposit are also suggestive of lowering, owing to underground material going into solution.

It seems, therefore, that the conclusion that there are millions of tons of salt present in the deposit, is quite a justifiable one. The presence of potash salts in the deposit is also a matter of great importance.

NOVA SCOTIA NOTES

Labor Matters at the Coal Mines

The Board of Conciliation which considered the wage questions at issue between the Nova Scotia Steel Company and its mine employees has recommended a higher scale of wages. In recommending the increase the Board explains that its suggestions of increase are not as large as it would have preferred to make them, but in view of the difficulties under which the Scotia mines are operated, in comparison with competing companies, the Board believes that the granting of rates as high as are paid in competing mines would necessitate the entire or partial closing down of the Sydney Mines collieries.

The Conciliation Board makes a suggestion of similar bearing to that made by the Fuel Controller in his final report, namely, that the Government Railway should contract to take a certain quantity of coal over a period of four or five years ahead. This has particular reference to the Jubilee mine, the coal from which is unsuited for some purposes, but has been largely used as locomotive steam coal on the Government Railway for some years past. If the company were able to count upon a definite outlet for Jubilee coal, the systematic arrangements for working the mine and assuring continuous employment could be made.

The Conciliation Board which sat at Inverness Colliery has also made its report, and recommends certain wage increases.

The United Mine Workers have been in convention at Truro, N.S., during the week beginning April 5th.

The Wage Committee recommends that a demand be made for a 27 per cent increase in wages to date from the first of May, 1920, which shall be cumulative upon and in addition to the general increase in wages granted at the first of the year. This increase was made the subject of a yearly agreement, which provided for revision at the end of each four months should the cost of living and other economic conditions have altered the relative status of wages and living costs.

The new increase is asked for as a result of the recent 27 per cent increase obtained by the United Mine Workers in the bituminous coalfields in the United States. As has been previously pointed out, it was agreed between the coal operators and the United Mine Workers at the beginning of 1918 that wage conditions in the United States should specifically not be taken as a basis of wage demands in Nova Scotia. In view of this agreement, and the general increase obtained January 1st, the recommendation of the Wage Committee that a further 27 per cent be asked was unexpected and will doubtless be vigorously combatted by the operators.

The Department of Labor announces that future Boards of Conciliation will be so arranged as to permit of simultaneous dealing with similar wage questions in one district. This is presumably to avoid such long-drawn out negotiations as have taken place in Nova Scotia since the first of the year, where it has not been possible to adjust the wage conditions in one district until another district had been dealt with.

The Convention was marked by reaction from the Winnipeg strike and the O. B. U. movement in the western collieries in District 18. While the Convention as a whole was distinctly opposed to the O. B. U. idea, there was evidently a minority in favor of it. Much discussion was caused by the reading of a confidential letter from the Minister of Labor pointing out the dangers and the unwisdom of the methods of the O. B. U. J. C. Watters said that to go over to the O. B. U. would bring chaos and disaster to Nova Scotia, and he advised adherence to the United Mine Workers, a sentiment that met with almost unanimous approval. The criticism of those who favored the O. B. U. side of the western controversy was directed against the limitation of individual action which had been enforced upon O. B. U. members by the "closed-shop" and "check-off" system compulsory in the mines of District 18.

The Late Edward Hall Carter.

The death took place in Toronto on April 18th at his residence in Toronto of Edward Hall Carter who for some years had been prominent in mining circles both in Ontario and British Columbia, where he was manager for several years of a gold mine in Yellowstone,, and afterwards Inspector of Mines for Ontario from 1900 to 1906. The late Mr .Carter was also one of the geological party which drew the dividing line running from Lake Superior to the Hudson Bay between the Provinces of Ontario and Quebec. He won the gold medal at Bishop Ridley College and graduated from the University of Toronto as a Bachelor of Applied Science. He was a member of the National and Royal Canadian Clubs, and is survived by his wife, and four sons.

Northern Ontario Letter

THE SILVER MINES

Emphasis is placed on the importance of local silver refineries by the absence during the last week of March of any ore shipments from Cobalt. It demonstrates in a conclusive way the fact that an increasing percentage of the product of the mines of Cobalt is being refined at home. The great volume of white metal now goes out in silver bars in express cars, rather than the old expensive method of shipping the ore in its crude state with its thousands of tons of accompanying rock.

Silver quotations appear to have again become quite steady at a point not far below a parity with gold at 16 to 1. At such a price the mines are pushing operations to the maximum of capacity, and in the case of the leading producers the treasuries are literally building up cash. The companies for the greater part welcome this opportunity to strengthen their treasures, in that some of the mines are growing old, and in order to perpetuate the prosperity accruing to the shareholders, new productive mines must be developed or purchased. To do this successfully, a substantial treasury is invariably necessary.

According to the belated annual statement of the Beaver Consolidated Gold Mines, the Company treated a total of 26,974 tons of ore during 1919 and recovered 301,781 fine ounces of silver. The total cost of mining, milling, administration, taxes, depreciation development, exploration and repairs amounted to only $7.41 for each ton of ore treated. Despite the loss of time caused by the 7-week labor strike, as well as the influenza epidemic, the net profit on the year's operations amounted to $158,215, as compared with $168,642 in the previous year. Broken ore reserves total 25,696 tons in which the silver content is estimated at ten ounces per ton. In addition to this is $73,892 in ore ready for shipment, plus a large tonnage of low grade material not included in the estimates. On the whole, the physical condition of the Beaver appears to have been strengthened during the year. As regards the financial statement, a surprise of $1,049,080 is shown. In a sense, however, this is yet largely on paper. For instance, $362,261 is shown as shares in the Kirkland Lake Gold Mines, while $404,726 appears in bills receivable, this being money advanced to develop the Kirkland Lake Mine. The latter property is referred to again in this summary under the "Gold Mines" heading.

The Kerr Lake Mines have issued an interim report which promises to meet with general satisfaction, not only for the reason that it shows candour to the shareholders, but has several favorable features, not the least of which is the fact that a majority interest has been acquired in a Utah silver mine, and also a gold dredging property in New Zealand. The official statement follows:—

"Recent important acquisitions have been made for your company, and in orded that you may be fully informed, the following interim statement is submitted covering the six month period ended February 29, 1919.

"As you have been previously advised, no definite life can be estimated for your property at Cobalt, and in view of this, it has been deemed advisable to prosecute a vigorous search for new mining ventures in which to employ the company's large cash resources.

"After due consideration and careful examination by competent mining engineers, a majority ownership has recently been acquired in a silver mine in Utah, and also in a gold dredging property in New Zealand. Further than this, your properties in Cobalt have been operated with little interruption and a satisfactory output has resulted therefrom.

"The Utah property referred to has recently been equipped and entered upon the productive stage in December, 1919 the mill having a capacity of 150 tons a day. The ore reserves of this mine stand at the present time at 87,000 tons, averaging 18 ounces of silver and 80 cents in gold. The productive limestone extends over a mile across the property, and approximately half this length on the surface shows an outcrop similar to that above the ore thus far developed. Only a small percentage of the total mineralized area has thus far been prospected, and the best geological opinion indicates the possibility that very many times the above tonnage will be developed.

"Taking silver at $1.10 per ounce, which is a price substantially lower than now ruling. it is estimated that a net profit of approximately $9.50 per ton will result from this ore. Thus the share of the Kerr Lake Mines in the annual earnings of the Utah property alone, after the repayment out of earnings of certain advances made on the purchase price of the property, is estimated at $265,000, equivalent to about 45c. a share on its issued capital. Very favorable reports were made by the engineers who investigated the New Zealand property. The ground has been exhaustively tested and it is estimated that the area thus far drilled will net a profit of $3,436,000 after deducting cost of property and equipment. It is estimated that the annual income accruing to Kerr Lake through the two-thirds interests in this property, will amount to tp-proximately $287,000 or approximately 50 cents a share. The equipment of this property with a dredge is now in process and should be completed by spring of next year."

In regard to the Kerr Lake Mine, itself, the report says:—

"The developed ore reserves as of August 31st, 1919, were reported at 500,000 ounces. Further underground work during the period produced additional ores with the result that the actual production for the six months ended February 29th, was 610,231 ounces. No accurate estimate of present reserves can be made, but it is expected that your Cobalt mine will continue to be productive for a considerable time. The production for the first two months of 1920 amounted to 213,234 ounces.

"Besides the money already invested in the new properties above referred to, your company had on hand as of February 29th, 1920, in cash and Government securities alone, $2,415,027, or slightly in excess of $4 per share on the outstanding capitalization."

During the month of February the Kerr Lake Mine produced between 99,00 and 100,000 ounces of silver valued at $135,000, made up of silver at $1.25 an ounce plus the premium on New York exchange.

During 1919 the Trethewey mine produced $169,-294, as compared with $254,038 in the previous year. The net for the period amounted to $31,814. In January, 1920, the company sold its Cobalt mine for $100,000, as reported at that time in the "Journal." The annual statement declares that the $100,000 thus received will finance the development of the company's recently purchased Castle property in Gowganda, if needed, but that at present the property has already been brought to almost a self-supporting basis. The report deals optimistically with the outlook at Gowganda.

The McKinley-Darragh financial statement for the first quarter of 1919 is very favorable, showing a total of $474,864.39, made up as follows:—

Cash in Bank	$203,594
Canadian Victory Loan Bonds	100,000
Ore in Transit and at Smelter	127,700
Ore at Mine Ready for Shipment	43,570
	$474,864

The McKinley plans to also start up its big oil flotation plant about May 1st.

An injunction has been issued restraining the La Rose from purchasing the minority interest of the University property. It holds good for three weeks.

It is reported that the Peterson Lake has made arrangements to have the Dominion Reduction Company treat its tailings pile, the arrangement having the appearance of being likely to result in a moderate profit to the Peterson Lake.

Water trouble caused at the Cross Lake property by rising water in Cross Lake are being overcome, and work will soon attain normal proportions.

At Gowganda, the Reeves-Dobie company is making arrangements to install additional grinding equipment in its mill, with which it is hoped to place the property on a profitable producing basis.

During the month of March, the Nipissing Mining Company produced $384,723, or an average of $12,410 every twenty-four hours. This compares with $329,401 in February and $423,139 in January. The output for the first quarter of 1920 amounted to a total of $1,137,263 and is at the rate of $4,549,052 a year, thus once more setting the highest record in the history of the Nipissing Mine, which company since 1904 has produced over fifty-seven million ounces of silver bullion valued at not far under forty million dollars.

In his regular monthly report to the President and directors, Hugh Park, manager, says:—

"During the month of March the Company mined ore of an estimated value of $384,723 and shipped bullion from Nipissing and customs ore of an estimated net value of 136,771.

"General underground development at all shafts cintinued to be favorable during the month Two small veins were found at the first level of 63 shaft. They are each one inch wide and contain good values. It is probable they are extensions or branches of the previously known veins. Development of these veins at the second level will be delayed until connection between 63 shaft an 96 tunnel has been completed, in about five weeks. This future devolopment will probably produce satisfactory results.

"The low grade mill treated 6,814 tons. The high grade plant treated 173 tons. The refinery shipped 106,624 fine ounces of bullion.

"Following is an estimate of production for the month of March:—

Low Grade Mill	213,789
Washing Plant	170,934
Total	$384,723

Silver Ore and Bullion Shipments

Ore shipments from Cobalt during the week ended April 9th totalled well over half a million pounds. Five companies contribute to the output, sending out a total of eight cars containing approximately 575,736 pounds.

Following is a summary:—

Shippers	Cars	Pds.
Temiskaming	2	156,663
Coniagas	2	148,000
Northern Customs	2	130,400
La Rose	1	65,673
Dominion Reduction	1	65,000
Totals	8	575,736

During the corresponding period, no bullion shipments were reported.

GOLD MINES

A slight, though gradual improvement in the economic conditions is steadily adding to the scope of mining operations in the gold-bearing districts of Northern Ontario. Questions pertaining to labor, that is to say: the temper of the workers and the question of wages, is one that may or may not enter into the calculations which are to correctly deal with this year's work. However, harmony is as much in evidence now as formerly, and the Porcupine district has not had a labor disturbance since 1912.

The Hollinger Consolidated continues to treat approximately 2,200 tons of ore daily, while the number of men engaged number 1,100. From this it will be noted that about two tons of ore is being treated for each man on the new pay-roll. This will compare with about 1½tons per man at one time during the war.

At the Porcupine Crown, the mill is operating at nearly full capacity and mill heads are reported to be running high, the average grade of the broken ore being around $11 to the ton.

The McIntyre-Porcupine has cut the downward continuation of its main, or No. 5 ore body, at a depth of approximately one quarter of a mile. The vein shows a width of about fourteen feet, and is comparatively high grade at the point where cut. This is confirmation of diamond-drill results formerly secured while drilling from the 1,000-ft. level. It is now proposed to carry out an aggressive development program at the present depth, as well as to direct attention toward still deeper workings.

Nothing of more than ordinary interest is reported this week on the Dome, with the exception that good progress is being made at the 1,100-ft. level in the work of exploring the Dome Extension property.

Reports that an exploration program has been outlined for the Gold Reef have served to attract interest toward that property. It is reported that a large block of stock has been underwritten at a price that promises to finance a fairly comprehensive scheme of exploration.

In the Kirkland Lake field, the report on the Kirkland Lake Gold Mines is one of the features of the week. The report shows that sufficient ore is blocked out between the 300-ft. level and the 700-ft. level to keep the mill operating at full capacity of 150 tons a day for more than two years. While the report thus refers to "ore," yet it is disappointing to note that no reference whatever is made as to either the grade of the ore tested during the past year, or to the gold content of that said to be blocked out.

Premature reports have been sent abroad that the Tough-Oakes Gold Mines had resumed early this month. The truth is that this is under consideration, and may possibly take place some time next month. Even such an early start has not been definitely decided upon.

On the Canadian-Kirkland it has been decided to discontinue the present plan of exploration underground, and, instead to carry on a diamond drilling campaign.

ADVISORY CONFERENCE COMMITTEE ON ENGINEERING LEGISLATION IN ONTARIO.

Views of all Engineers are sought.

In common with their fellows of other provinces, the engineers of Ontario are keenly interested in obtaining suitable legislation to establish their status and to regulate their practice. To accomplish any real results, it was realized that all branches of engineering should be consulted, and that all kinds of divergent opinions must be brought together on common ground.

The Advisory Conference Committee has been formed with this end in view. The Committee consists of two representatives of each of the following organizations:—

Canadian Mining Institute;

Engineering Institute of Canada—Ontario Division;

American Society of Mechanical Engineers—Ontario Section;

American Institute of Electrical Engineers—Toronto Section;

Canadian Institute of Chemistry;

Association of Ontario Land Surveyors.

Ontario Association of Architects.

The above organizations have been chosen as most representative of their respective branches of engineering in Ontario.

Two lengthy sessions have already been held, and much progress has been made towards the establishment of broad general principles upon which legislation should be based. Now that the work is well organized, it is the intention of the Committee to pursue the matter vigorously until a conclusion has been reached. The task is not an easy one, and if some considerable span of time should be found necessary to its fulfillment, it will be because the Committee wish to be thorough, and to bring in a report, which can be freely endorsed by both parties. The matter is being considered by the committee with a view to meeting the requirements of the different branches of the profession as well as eliminating grounds for objection on the part of any branch, while retaining one general organization of the whole profession. It is perhaps not going too far to say that the result of the conferences already give reason to expect a satisfactory conclusion.

The views of all engineers of Ontario are sought, and any of them may feel free to communicate with the Committee to this end. Mr. Clifford E. Smith is chairman; Mr. Willis Chipman, Vice-Chairman, and Mr. F. R. Ewart, Secretary. Communications may be addressed to the latter at 207 Excelsior Life Building, Toronto.

TORONTO NOTES.

(By Our Toronto Correspondent.)

A meeting of the shareholders of the University Mine was held in Toronto on April 5th, when it developed that legal proceedings on behalf of certain minority shareholders of the company had delayed the sale of the assets of the mine to the La Rose Mine. The officers are now faced with an interim injunction to restrain the sale and an adjournment for three weeks was taken.

The La Rose Mine already owns about 98 per cent of the stock of the University, but news of the proposed transfer brought the 2 per cent minority, or some of them, into action, with the result that an interim injunction was granted by Judge Wallace in Woodstock, Ont. It is understood that the minority shareholders of University Mines number about forty, and their share of the liability of $61,000 of University to La Rose, which it was proposed to wipe out in payment for the entire property, is about $1,200. The claim is made that to wipe out their rights, for this small debt, would be unfair and illegal, and that the proposed price is altogether inadequate.

It seems quite likely that extension of the T. & N. O. Railway from Cochrane to Moose Factory on James Bay will be proceeded with in the not far distant future. The Ontario Legislature has gone on record as favoring the extension of the line and Premier Drury has declared his entire approval of the project. The Premier said that the Government was placing $25,000 in the estimates for surveys and exploration of the route to the Bay. He depreciates, however, embarking on any large capital expenditure at the present time.

The attempt of J. A. Jacobs of Montreal to secure by agreement certain rights with regard to the external affairs of Black Lake Asbestos and Chrome Company, has received a set-back by the decision of Mr. Justice Kelly in Toronto, granting an injunction to McDougall and Cowans on behalf of themselves and their shareholders against the directors of Black Lake restraining them from carrying out an agreement made with Mr. Jacobs. The action arose out of an agreement whereby Mr. Jacobs was to be given certain rights with regard to the internal affairs of the company, including the right to choose his own board of directors. Conditional thereto he undertook to purchase a proportion of the company's stock. It is anticipated that the court decision will defeat Mr. Jacob's attempt to gain control of the company.

At a meeting of the shareholders of the Black Lake Asbestos & Chrome Company held in Toronto on Wednesday of this week the proposal to move the head office of the company to Montreal was dropped. A committee was appointed to represent the shareholders and bondholders and co-operate with the directors in connections with any future negotiations for possible sale of control of the company.

Hugh Sutherland, of the firm of F. C. Sutherland and Company, and party of English capitalists who recently spent a week in Porcupine, Kirkland Lake and Cobalt, returned to the city last week and expressed themselves as being impressed with the mineral possibilities of Northern Ontario.

They were particularly surprised by the magnitude of operations at Porcupine. The party included two well-known mining engineers. As a result of their visit it would not be surprising to learn of a considerable volume of new capital coming into the camp in the immediate future. The party, accompanied by Mr. Sutherland, is returning to London via C.P.R. liner S.S. Corsican, sailing from St. John, N.B. Mr. Sutherland expects to be in England about two months.

Mr. J. A. M. Alley, a director and secretary-treasurer of Wasapika Consolidated Mines Ltd., died in Toronto on April 2. Mr. Alley was 65 years of age and was born in Quebec.

He early became identified with the Traders Bank, of which he was Secretary when the amalgamation with the Royal Bank took place. He was then appointed Manager of the Toronto office of the Royal Bank, a position which he held until he retired from the bank's service.

NEED OF "SEASONAL" COAL RATES.

A word much used, and like other commonly employed terms sometimes abused, is the adjective "seasonal" as applied to industry. Occasionally there appears to be an undue and unreasoning subservience to the restrictive influences of the seasons.

The bans imposed by nature upon agriculture are the least escapable. Even some of these have been made more elastic by more scientific farming. It is in mining and manufacture that a good deal of needless and wasteful tyranny, consecrated by custom, persists. Some of these customs are almost as arbitrary as the fashions.

A notable instance is the marketing of coal. The individual, seeking a convenience and cheapness that are often illusory, helps impose a collective handicap of cost or danger, and helps disorganize the great industry of coal mining—with such incidental effects as complaints and strikes of the miners. The need is to encourage an ordering of coal pretty much the year round, instead of a convergence of demand on a small part of the year.

The remedial suggestion expressed recently in the Boston News Bureau by Vice-President Cousens of the Metropolitan Coal Co., in favor of "seasonal" rates on bituminous coal to encourage the movement at the proper time of year, meets with favorable consideration from railroad men and coal people in New England.

As a matter of fact it is understood that during federal operation a suggestion to this effect was made but for some reason without result. The subject, however, is one that is likely to receive increasing attention. It is not revolutionary and seems to be one means of relieving New England of the recurring winter periods of distress from acute coal shortage.

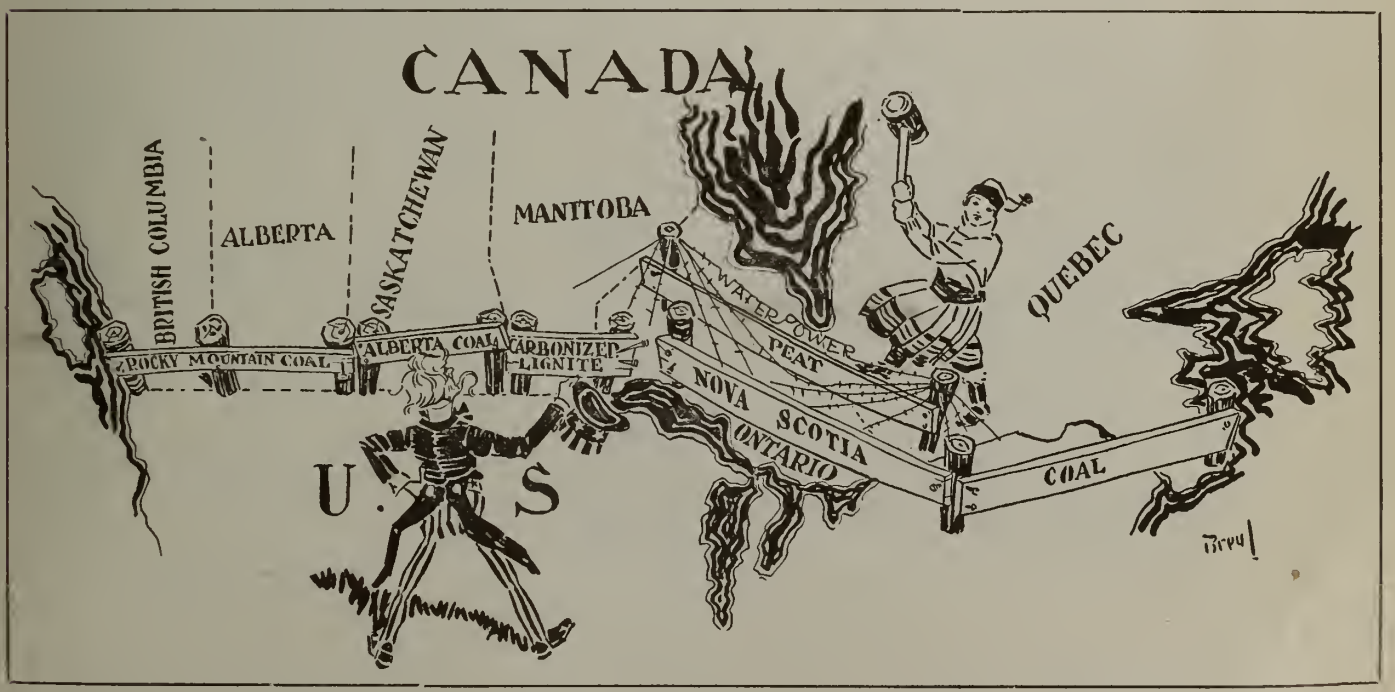
President E. J. Pearson, of the New Haven Railroad, says it is possible that the New England railroads may undertake to develop interest on the part of the consumers of coal in New England in the direction of laying in such quantities during the open season that along about the first of next December there will be an average of perhaps three months' supply at the various points of use or local distribution throughout New England.

Eugene McAuliffe, who has been largely indentified with the use and production of fuel, and who did much valuable work during federal operation in the direction of fuel economy, declares that the fundamental and crying need of the bituminous business in stabilization. "The production curve, work day curve and workers' wage curve, as well as the profit and loss curve, all show too many peaks and valleys."

The effect of the fluctuating load that is now being placed on the over-taxed transportation facilities of the country represents a great source of economic waste. For instance during summer months the railroads, which own 974,547 coal-carrying cars, are ordinarily taxed for storage room in which to place their idle cars. Certain roads whose freight traffic is 50 per cent or 60 per cent coal are compelled to send their cars elsewhere in order to find room for them.

To bring about equalization it will probably be necessary for all consumers, including railroads, industries and domestic dealers and distributors, to purchase during the months of March to August, inclusive, about 50,000,000 tons of bituminous coal that is now ordinarily purchased during the remaining six months of the year.

The publication of "seasonal" coal freight rates with a reduction from the established basis from March to August, inclusive, would, assist very materially in remedying conditions.—Boston News Bureau.



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—From "Coal Age" of March 25th, 1920.

MANITOBA LETTER.

By CHAS. A. MIILICAN, Winnipeg, Man.

V. H. Campbell, of the Public Works Department, Provincial Government has left for the Rice Lake District to complete the survey and carry on construction of the new Summer Road from Hole River to Caribou Lake. All the camp equipment, hay and oats for feed, road scrapers, explosives and drilling tools have been delivered on the ground at Gold Creek, some three miles along the new road location, which starts from the Lower Bellevue Landing on Hole River. This work will be pushed ahead as rapidly as possible, so that the road may be in commission by July or August.

It is authoritatively stated that prominent and substantial Americans, including well known Minnesota bankers have secured a group of claims on Hole River. This group consists of six claims directly east of the Gold King's holdings. The claims are the "Omi Fraction," "Knox," "Dunn," "Marconi," "Jack Pine Fraction," and "Wilson." This property has been only partially prosepcted, but is said to have some very attractive leads. A wide vein runs diagonally across one of the claims, and it is the intention of the new owners to put a diamond drill on this lead and prove it up.

The Pan Extension Gold Mines Co., Ltd., held its annual meeting April 5th.

The directors reported that the affairs of the company were in a very satisfactory condition, and that preparations had been made for systematic and energetic work on the property. To this end one of the most complete plants in the province has been installed, and a large supply of wood for fuel purposes brought to the mine, sufficient to secure the operations on the property through the entire season.

The financial statement was read and showed that the company had ample funds to prosecute the work on the property, and was in sound condition in every way.

The following directors were elected for the ensuing year: H. B. Montgomery, John Beckman, E. J. Harden, Wm. D. Shaw, all of Winnipeg, and William F. Yers of Minneapolis.

The managing director, Mr. Beckman, explained that it was the intention to sink the shaft to deeper levels and block out the ores so that the company would be in a position by the time that the next winter season arrived to instal a mill if conditions warranted.

The Gold King Mining Co. has sold the block of development stock which was placed on the market three weeks ago and is now in a position to carry out the work mapped out for this season. Work will commence as soon as navigation on the lakes will permit.

A charter has been secured by the Deep Rock Mining Co. This company has four claims east of Gold Lake.

PORT ARTHUR NOTES.

By J. J. O'CONNOR.

Messrs. Wilson Bradley, and R. C. Jamison, of the Silver Islet Syndicate, are in Port Arthur, engaged in assembling the necessary plant and machinery for the opening of Silver Islet Mine. Much of this has already arrived, part of the plant is being secured locally, and all will be in readiness to begin this important undertaking on the opening of navigation, in about ten days.

For the present, they purpose unwatering the mine, down to the 100 foot level, and will then have a look over the roof and workings, to that depth.

A large percentage of values taken out under former operations, were found in that zone.

Further plans will be determined on the results of this preliminary work.

The water will be blown out of the mine by an air lift, with a capacity of one thousand gallons per minute. No difficulty is anticipated in keeping the zone of operations free of water, and it is expected that the work will be carried out under the very best of mining conditions.

No plans for the mainland operations have been definitely decided upon, but are being given consideration.

The revival of this famous old silver mine, will be watched with interest, by the whole mining fraternity, and their best wishes go out to these enterprising men, in their spectacular undertaking.

Conditions today, are in striking contrast to those that obtained in 1869, when the first mining work was done on this little speck of bare rock, less than one hundred, by one hundred feet, in size, and but nine feet above the surface of Lake Superior. At that time the mainland was an unbroken wilderness, now it is the most popular summer resort on the north shore of Lake Superior, peopled in season, by many happy souls, housed in the most inviting cottages, with ample wharf, and landing accommodations. There is no finer bit of scenery on the north shore of Lake Superior, than in the vicinity of Silver Islet, it is rugged, picturesque, and beautiful in the extreme, and will go a long way to make the new mining operations an easy task, as compared with the old beginnings, when tomorrow might see the work of today wholly obliterated by the elements.

DESTRUCTION OF ROUMANIAN OIL WELLS.

The Roumanian Consolidated Oilfields Company brought suit against the British Government for damages sustained by the destruction of their oil-wells and equipment by Colonel Sir John Norton Griffiths, M.P., who was commissioned for this purpose just before the Germans occupied Roumania. Mr. Justice Darling gave judgment in favor of the company, finding that Colonel Griffiths, as the envoy of the British Government, had promised compensation, and that on this promise the company had consented to destruction of its property. Mr. Justice Darling, in his judgment, remarked that Colonel Griffiths had gone about like the great god Thor, with a hammer, knocking off any essential part of machinery, and throwing it down the wells. He thought that the Germans, had they obtained possession of the oilfields undamaged would have worked them to their own advantage, nor could he imagine that these "foresighted summoners of war and waste" would have gone away and left enemy property in any better position than they left the library at Louvain.

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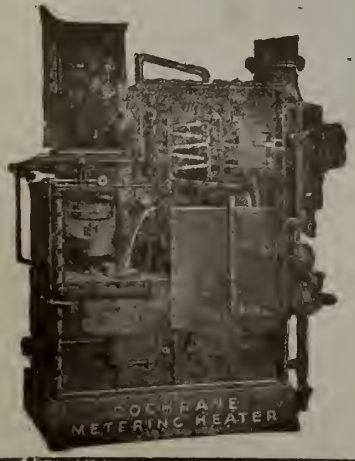

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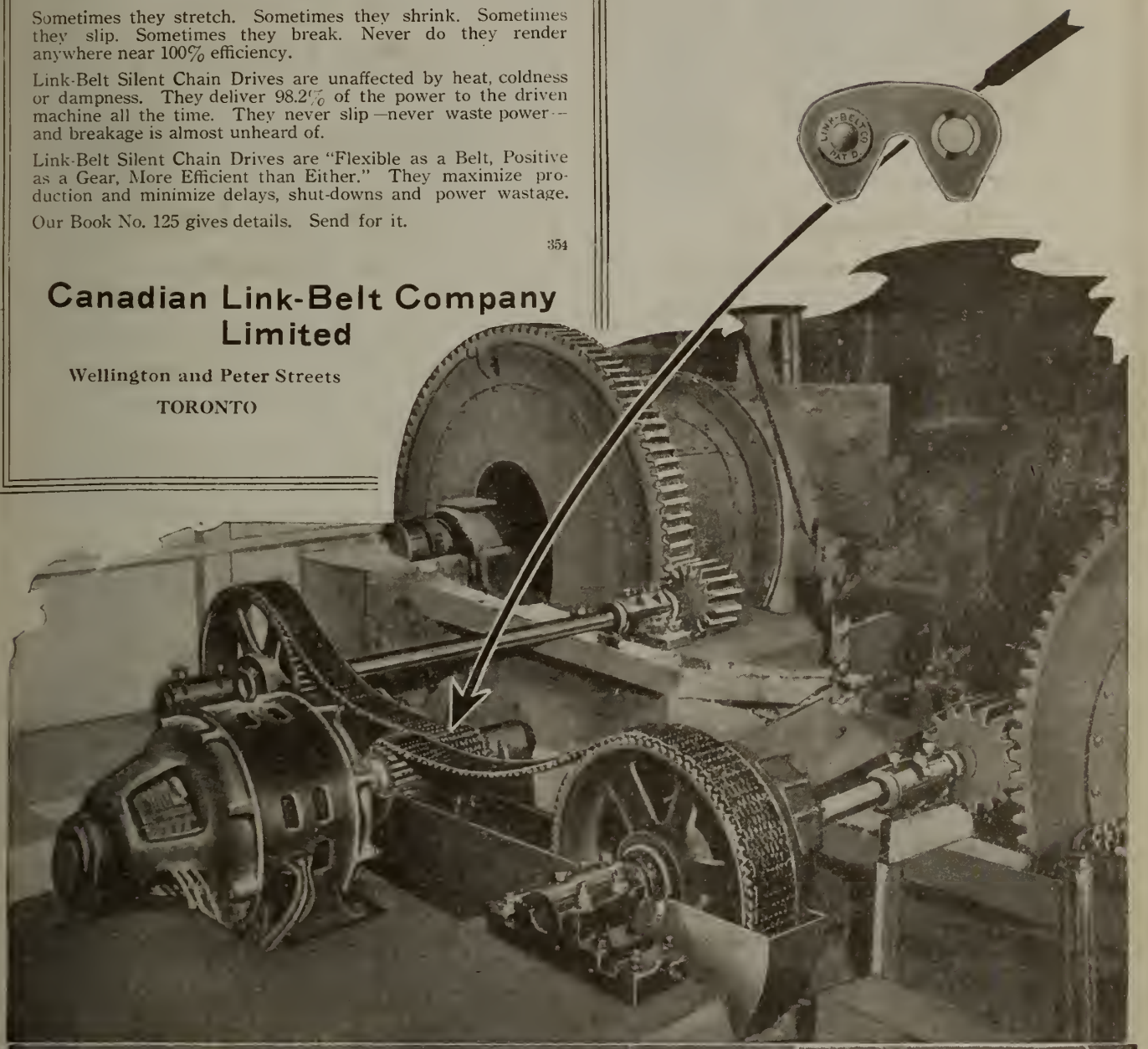

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:-: EDITORIAL :-:

The Glace Bay Meeting of the Mining Society of Nova Scotia

The Annual Meeting of the Mining Society of Nova Scotia promises to be unusually interesting this year. It is to held at Glace Bay, the local capital of a district that has been producing coal for a century and has seen the mining and shipping of more coal than any other producing point in Canada. Among other claims for distinction possessed by Glace Bay is that it was the site of the first wireless call across the Atlantic, it being from Glace Bay that Marconi first talked with Poldhu Station.

A later, and more notable honor that attaches to Glace Bay and its immediate environs, is the large voluntary enlistment that took place during the war. While comparisons of enlistments and causalties are open to misconstruction unless very carefully worded, we believe that Glace Bay's record in this regard is an exceptionally proud one, and its results in the reduction of coal production have been and will continue to be very far-reaching.

Glace Bay is a name that will in years to come be very prominent in the transactions of mining societies, as in its immediate vicinity the future will see the most important developments of undersea mining in the world, so far as present knowledge of undersea coal deposits indicates. The long-distance underground transmission of electric current, the conveyance of ventilating currents for distances and against resistances not now contemplated, the speeding up of the underground transportation of coal and materials; the carriage of workmen to and from the producing coal faces, and new problems in mine illumination and signalling, will all see great advances at Glace Bay. The distances from shore at which coal can be mined will, in the first instance be limited by economic factors, the chief of which will be the commercial value of coal. That this is a steadily rising value can be taken for granted. Nevertheless, it is probable that the cost of coal extraction from under the sea will set bounds to production before physical difficulties set the absolute limit. Sufficient is known today, however, to indicate that the old assumed limit of three miles from shore can be exceeded, and very possibly this limit can be doubled so far as physical considerations are concerned. . In this connection, much interest will attach to the paper which is to be read by Mr. Walter Herd, the Mining Engineer of the Dominion Coal Company, on the application of hydraulic stowing to undersea coal workings, with especial reference to the Sydney coalfield. Probably no development of mining practice of recent years has such a bearing on the possible extent of undersea coal-mining as the feasibility, or otherwise, of hydraulic stowing.

Resignations from the Mines Branch and Geological Survey

In this column last week, the frequency and number of recent resignations from the Mines Branch at Ottawa was commented upon, and it was mentioned that the work of certain divisions had been greatly reduced and in some cases may be expected to cease entirely because of the depletion of the staffs.

Mr. P. G. McConnell, the Deputy Minister, has recently stated before the Committee that is examining into expenditures on scientific work under government direction that in a few months half of the staff of the Mines Branch will have left that Department's service for private employment, because they feel "that "scientific men are placed at a disadvantage in the "government service, and are taking the only course "open, namely, getting out to private work."

Mr. McConnell's summing up of the situation is exact. The question that interests the public is whether Canada can afford to be deprived of the services of these trained scientists, who, in most instances, are leaving the service of the Government not because they are attracted by higher salaries, but because they cannot live, as professional men should live, on the salaries allotted to them.

A recent debate in the Senate on the scale of salaries that should be paid to scientific workers in government service was illuminating, inasmuch as it disclosed on the part of men who should know better, fundamental misconceptions on several matters that have from time to time been emphasized in this "Journal," namely, the importance of the work carried on by the technical departments of the Civil Service, the scale of remuneration that trained scientists are entitled to, and the possibility of filling the vacant places ceused by resignations. The average salary paid to

servants of the Mines Branch and the Geological Survey is respectively $1,904 and $1,884 per annum. In the upper divisions of the two branches, which includes the technical employees, the annual salary averages in the case of the Mines Branch $2,158, and in the case of the Geological Survey, $2,156. The maximum salary in the Geological Survey is $3,700, and in the Mines Branch, $3,500.

When it is possible for men who have achieved sufficient distinction in public life to be made senators to maintain that such salaries as these are adequate, that the country cannot afford to pay more, and that the places of men who refuse to give their services any longer for such indecently inadequate payment can without difficulty be filled, it must seem that further resignations cannot be avoided. It also follows that if the country places such a low estimate on the work of the technical department of the Civil Service it will reap correspondingly poor results. Parsimony at the source of national wealth and progress is wrongly applied. The encouragement of mediocrity, timidity, lack of faith in one's country, ingratitude and miserliness proceeding from ignorance, have not hitherto been characteristics of the Canadian people. We believe they are alien to the Canadian spirit, and constitute the negation of progress. In the public interest, Mr. McConnell's frank statement is to be welcomed. If the Canadian public understood how vitally the future of the country was imperilled by the justifiable dissatisfaction of technical civil servants at this time there would be a speedy readjustment of official attitude at Ottawa.

The Public's Duty Towards Coal Producers

"Coal Age" of New York, in a recent issue, summarises the majority report of the Commission that has recently considered the problem of coal production, distribution and sales in the United States, and points out some conclusions of this Commission which parallel strikingly the reasons given by the Editor of the "Journal" for the comparative failure of the coal trade in Canada, in a paper recently read at the Canadian Mining Institute meeting in Toronto.

Our contemporary writes: "The consumer of coal is told bluntly that most of his coal troubles are his own fault, springing from the fact that he has been heedless of his duty to the men who dig and ship his coal." The Commission points out the evils of high demand in Winter and no demand in the Summer, and says unhesitatingly "that the railroads, the iron and steel producers, the public utilities and other big consumers of coal must shoulder the responsibility for these conditions. It condemns frankly "the traditional coal purchasing methods of the railroads," and "Coal Age" remarks that "this way of telling the public of its own shortcomings and advising it to remedy its own faults instead of choosing fantastic theories of economic betterment seems strangely new and refreshing."

The high prices of coal today is a consequence, in large part, of the hostile attitude of the people and large purchasing interests towards coal operators in the past. The United States Commission finds that all the bituminous coal producers in the United States in 1918 made only 9.72 per cent on their investment, while "the companies reporting very high rates of return upon investment are all small concerns with investments of only a few thousand dollars, whose net income represents to a large extent the earnings of the owners for their own labour and management." The same might be said of Canadian coal producers, except that it would be difficult to find in Canada, even in 1918, a coal company that made ten per cent on its investment.

For example, the price of coal to the consumer in the Sydney, Nova Scotia, district is today seven dollars per ton. During at least fifteen years, from 1900 to 1915, the price of coal in this locality remained stationary at three dollars per ton. At that figure the operators did not realize a return on their investment which would permit of the accumulation of proper financial reserves, nor is it probable that in this fifteen year period the business of mining coal in Nova Scotia yielded an average of five per cent to the operator. The attitude of the public was so hostile, and that of the railways so short-sighted, that the operators did not dare to face the full truth of their own cost-sheets, and they for years sold coal at a price which recouped them for the immediate expenditure of wages and purchases of material, but did not include the provisions for amortization, depreciation, depletion of areas and rising costs of production that were just as properly a part of the costs of mining coal as were labour and material charges. Today, the consumer must pay for undercharges of the past, and he must also, unless worse things are to follow, pay a proper actuarial proportion of the costs of the future. It is all very well to load posterity with debt, but the public today happens to be the posterity of an indifferent, non-understanding and hostile past.

To those who have had the direction of coal mining operations know what labour and thought are needed to take a half-cent per ton off the producing cost. They have had the pleasure of learning in recent years, through the investigations of fuel administrations, that the profit of the coal producer is as nothing compared with the "spread" of the coal merchant and the distributing agencies. They have seen the local coal-

hauler add more to his charges in a day than the coal operator added in years, and the conviction is spreading among coal operators, that, as was pointed out in the "Journal" some years ago, the coal operator must, in self-defence and for the protection of the public, himself control the sale and distribution of coal from the pit-mouth until it is landed in the cellar of the ultimate consumer. As an example of waste of effort and generally misdirected energy, take the case of most Canadian towns, where coal is hauled in half-ton carts to consumers' cellars through snow and mud, when, if ordinary common-sense were applied to the question, it could be transported at a moiety of the cost, in large motor-truck consignments, under Summer conditions. Ten cents a ton off the cost of production would send a mine manager crazy with joy, but a good many times ten cents is thrown away by antiquated methods of delivery little in advance of the bullock cart. Why should all the efforts of the mining engineer, mine accountants, machinery experts, and the provision of devices for utilising refuse coal and saving all the possible by-products of the industry be nullified as soon as the colliery confines are passed by a system of coal distribution whose chief characteristics are waste, duplication of effort, misdirected energy and general confusion, interspersed by excellent opportunities for discerning persons to make a few dollars in the confusion.

Increased Wages to Mine Workers Cause Double Increase to the Ultimate Consumer

One of the least understandable contentions put before the public in connection with the selling price of coal is that it is possible for substantial wage increases to be given to the mineworkers without necessitating any increase in the price to the consumer. It has been suggested that an increase in wages at the source of coal supply can be minimised by larger production and economics until a vanishing point is reached with the arrival of the coal in the bins or cellar of the ultimate consumer. Nothing could be more misleading. The effect of a wage increase upon the selling price of coal must always be "crescendo" and never "diminuendo." One of the most unjust statements we have recently seen is a warning put out by a government official in the United States against profiteering in coal which intimates that the increased cost of coal to the consumer will be limited to the increased amount of wages given to the mine workers.

The mine-workers in the United States have been given an increase of 27 per cent in wages. To illustrate how this will work out, take as a concrete example a colliery raising 2,000 tons of coal per day, with a labour cost before the increase of one dollar per ton.

2,000 tons at one dollar	$2,000
Increase in wages of 27 per cent	540

As a result of the increased wages paid to the mineworkers there will be an immediate rise in the cost of materials secured locally, such as horse-feed, pit-timber, and in all incidental costs of hauling, machine-shop work. This increase can be conservatively placed at five cents a ton. There will be a much greater ultimate increase, as eventually all the increased cost of wages will come back upon the purchase price of metal supplies, wire ropes, mine cars, oils, etc., but this rise will be gradual, and cannot be figured accurately as to immediate effect.

Added to the previously mentioned costs, we now obtain	$2,640.00
Divided by 2,000 tons, or, per ton	1.32

A colliery of this size will use for its own consumption, at boilers, for heating and yard transportation, say 200 tons daily. The extra cost of coal to fires will be therefore $64.00, being 2,000 tons at 32c per ton.

The price of coal to employees will remain constant, so that the increased cost must be recouped from an addition to the cost of production. Assuming the number of householders to be 125, which would be about right for a colliery of this extent, and consumption of coal at two tons monthly per household, there will be about ten tons daily, or say three dollars to be added to mine cost. The sum of these additions is $2,707.00, equal to a cost per ton of $1.35.

It is assumed that the production under increased wages will remain unimpaired, but it is well known that contract workers usually have before them a certain daily earning, which consciously, or unconsciously, they do not exceed. The history of wage increases has been that a decrease in the output of the contract worker follows. Should this be the case, the cost per ton will be increased by much more than the amount instanced.

The coal operators must charge the railways more for coal under these circumstances, which we will estimate will increase the cost of coal transportation to market by five cents per ton. As the wholesaler does business on a percentage basis, his spread on the handling of coal to the retailer will be necessarily increased by at least two cents per ton. The retailer, who must take a larger percentage, will probably have to add another five cents, and the teamster who deposits the coal in the cellar will be moderate if he does not add more than three cents per ton. Addition of these cumulative increases, all small, but we believe all unavoidable, will bring the original 27 cents per

ton up to 50 cents, without any additional revenue to the coal operator.

Nothing is said of the case of the railways, who will shortly after the increase to the miners becomes effective, have to face a demand for increased wages from the railway employees, on the plea of dearer coal, and will also, as mentioned, have to pay more for locomotive coal.

The foregoing considerations have been confined to labour costs, but there are many other costs on the colliery sheet which will be affected by the wage increase, such as rates and taxes, insurance costs, compensation costs, and other fixed charges, and eventually every item of material, everything that depends on freight rates, administrative and executive charges, will be increased, too probably accompanied by a decreased production.

The foregoing is not intended as an example of the vicious circle, about which we have heard ad nauseum, but as concrete example of how a 27 per cent increase to the miner will, before it reaches the consumer, become a 50 per cent increase, despite all the pious hopes of the profiteer hunters, without benefiting anyone permanently, the miner himself not excluded.

There is no help for this condition of affairs apparently, but the officials of the United States Government should not add insult to injury by suggesting through the press that it is possible for coal operators to absorb the cost of wage increases out of their profits, or to confine the increase to the consumer to the actual amount of increase obtained by the miner. It cannot be done.—From "Iron and Steel of Canada".

"CLOSED SHOP" BY GOVERNMENT EDICT.

The "Edmonton Bulletin" has the following:—

"Our so-called Minister of Labor has started to enforce his edict that no one may work in a mine in Alberta unless he belongs to the United Mine Workers. The first fruit of his enterprise in that direction is that four mining camps in the province are shut down, with more results of the same kind likely to follow the further extension of his mischievous interference. Autocratic measures can be carried a good way in Canada. But when it is attempted to compel men to join a labor union the point is reached where such measures ought to fail, and are likely to fail. Any man who can dig coal, and who is willing to do so, and to behave himself, ought to be allowed to work in a mine—so far as the law is concerned—without asking the consent of the United Mine Workers and Senator Robertson. And the people of Alberta are entitled to have coal to burn whether or not the men who dig it have the approval of this alien labor organization and the irresponsible head of the labor department. If the Minister of Labor cannot do anything to get men to labor he at least might stop preventing men from laboring at a time when increased production is so desperately needed."

In our January issue we expressed the belief that the enforcement of the "closed shop" by Government edict was new, and also very dangerous, because based on a fundamentally erroneous principle. The problem of the O.B.U. in the West was, and is, no doubt a very anxious one, but not even the most pressing problems can condone expediency, nor can it ever come about that the violation of a first principle of citizenship can ever bring in its train anything but harmful results. The Minister of Labour, or any other person in office, has no right to enforce membership in an organization upon any man. He might just as properly dictate the cut of his clothes.—From "Iron and Steel of Canada".

AIRPLANES FOR PROSPECTING.

In a recent number of the "Engineering and Mining Journal" attention is called to the great undeveloped northern areas of Canada which may reasonably be expected to prove productive of minerals, and it is suggested that airplanes might be advantageously used in exploration. Many who have slowly traversed the northern wilderness have longed for the power to fly like the birds, and the great impetus given by the war to aviation has made it seem likely that the explorer's dream may soon come true. We are particularly favored in Northern Canada owing to the presence of numberless small quiet lakes that would make splendid stopping places for airplanes of the "boat" type.

Those who have made enquiries concerning the cost of operating airplanes, are not inclined to believe that there will be much flying over our northern woods for some years yet. There are, however, special occasions when the advantages gained might compensate for the cost and we may expect to hear soon of exploring parties starting off in the early Summer by airplane for districts that are otherwise very difficult of access. It is to be expected, however, that the spirit of adventure and the pleasure of exploring new fields will for some time be more effective in luring the aviators than will comparisons of transportation costs and the saving of time on the journey.—R.EH.

Mr. Balmer Neilly, Secretary of the Ontario Mining Associations, has left Cobalt, where he has been a resident for many years, for Toronto, and he will immediately open the permanent office of the newly formed Association.

Mr. Neilly was manager of the Penn-Canadian Mines and is a past-President of the Timiskaming Mine Managers' Association. He is also a vice-President of the Canadian Mining Institute.

Mr. J. B. Tyrrell, of Toronto, Canada, has been engaged by the National Mining Corporation of London, England, as one of its Consulting Engineers.

Correspondence

THE GOVERNMENT OF CANADA

The Editor of the
"Engineering and Mining Journal"
New York.

In the March 6 issue of Engineering and Mining Journal, page 595, under the title "Canada's Alleged Autonomy," I note with interest the statements made regarding Canada's status as a nation, and as many of the statements are incorrect, I take the liberty of writing you on the subject.

There is still considerable misconception in republican countries on the Canadian system of government, and, among uninformed sections of the people, a fairly general opinion still exists that the Dominion, forming part of the British Empire, with a monarch at its head, is necssarily subject to autocratic rule, or at least, very much at the dictates of the Colonial Office in London, Nothing is farther from the truth, as residents of the Dominion who have come from all quarters of the globe could testify, and though maintaining her place as an integral part of the Empire, Canada is absolutely self-governing, and its government second to none in its democratic traits. Canada is a nation, and her status, as such, was plainly asserted and recognized at the Peace Conference, and she is accorded a voice among the nations of the earth. Though spontaneously her loyalty to the Empire took her into the war immediately upon England's declaration, she entered as an independent nation, and was under no compulsion to enlist her forces or resources.

Canada is a self-governing British Dominion, with a responsible government, which means that the will of the people is absolute in the matters of government, and that the Governor General, the King's representative in the country, must form his executive council or cabinet from the members of Parliament who can command the support of the majority of members of the House of Commons, the house, which in practice, has sole control of the powers of taxation and appropriation. It means that the political executive of the day resigns its executive functions whenever it ceases to possess the confidence of the people.

The Dominion of Canada is under responsible government in the fullest meaning of the term, and in the internal affairs of the country there can be no uninvited interference by Great Britain, whether by Parliament at Westminster, the Colonial Office, or the Governor General. Recognition of this fact is the fundamental principles of the relations between Great Britain and the overseas Dominions. The Imperial Parliament has far less to do with the internal affairs of Canada than, for instance, Congress has to do with the internal concerns of the several states of the Union. Relations between Great Britain and Canada are not those of domination on the one hand, of subserviency on the other, but as between nations equally free to do as they will.

Before the confederation of the Dominion in 1867, there was a Governor-General, established at the capital of the United Provinces, and a Governor in each of the then other provinces of British Columbia, Nova Scotia, and Prince Edward Island. They were all appointed by the crown at the recommendation of the Colonial Office. By the British North America Act, however, though the office of Governor-General was continued, governors of the separate provinces ceased to exist, and for them were substituted lieutenant governors— invariably Canadians—appointed by the Governor-General in council.

The Governor-General and the lieutenant-Governors of the provinces are the sole representatives of the King in Canada, and the appointment of the former, which is always done with the approval of the Dominion Government, is the only civil designation made by the crown. These men have absolutely no influence on the Government and its policies, and, directly or indirectly, do not affect the every-day life of the Do-Dominionminion, its policies, standard, or ideals, as much as, for instance, any Canadian newspaper editor. The Governor-General is the material link with the Imperial Government, and is only interested in the smooth and continuous running of the Government. The only voice of the country is that of public opinion as expressed at the polls at the periodical elections.

The people of Canada elect their own governments, make their own laws, and control all their own polical affairs. All matters of taxation are entirely in their own hands, and Great Britain has no more control over them in this regard than it has in the imposition of a tax on the people in the United States. Canada, though a loyal dominion of the British Empire, as the recent war most clearly evidenced, maintains her place among the nations as responsible and self-governing; and pursues the way of democracy untrammelled by autocratic bonds or extraneous hindrances to her people government.

In this question it is interesting to read the Prince of Wales' remarks at a recent banquet tendered him in Ottawa. Speaking on his relations to Canada, he says: "Canada, like the other British dominions, played such a big part in the war that she has in consequence entered the partnership of nations and has affixed her signature to the peace treaties. This means that the old idea of an empire, consisting of a mother country, surrounded by daughter states, is entirely obsolete and has long been left behind by the British Empire. Our empire has now taken a new and far grander form It is now a single state, composed of sister nations of different origins and different languages. The British nation is the largest of these nations, but the younger nations have grown up to its equals, and Great Britain, like the dominions, is only one part of the whole.

In view of the facts, as set out in the foregoing, I trust, in fairness to this country, you will be disposed to publish this letter, as you have published statements of Mr. Thompson, in the article referred to.

NORMAN S. RANKIN,

Montreal, Canada, March 27, 1920.

The "Journal" welcomes Mr. Rankin's satisfying reply to Mr. Phillip Thompson's letter in the "Engineering and Mining Journal" of New York, which found fault with our statement that Canada was a self-supporting, sovereign, autonomous nation. If there are persons who doubt that this is Canada's status, it is, as previously remarked, only possible to express surprise. An established fact does not permit of argument.—Ed.

The Importance of Cool Dry Compressed Air in Mining

A Discussion of Some of the Troubles Caused by Moisture in Compressed Air and how They may be Overcome.

By F. A. McLEAN.

The Evils of "Wet" Air.

Moisture in compressed air should always be avoided, especially where it is to be used to operate reciprocating or rotating mechanisms, on which it has a pernicious effect when carried into the working parts, tending to wash away the lubricant; thereby increasing the wear and shortening the life of the moving parts through leaving highly finished and closely fitted surfaces bare, and in sliding or rolling contact with each other. While this is true of practically all air compressed machines, it is particularly so in the case of those operating at high speeds, such as hammer drills, pneumatic tools, motor-driven air-hoists, sand rammers and the like, in which the surfaces exposed to wear are of necessity limited in size as well as machined to very close limits, and wear is particularly objectionable on the ground of lowered economy through increased air consumption and loss of power.

While moisture in wet air is bad enough in interior piping, its effects are likely to be far worse out of doors in open-cut mining, quarrying, contracting, switch and signal work, etc., where it is likely to collect at low points in the system, causing water hammer, with consequent racking effect on the joints, and loss of power through reduction of the air passages, as well as increasing the danger of freezing and bursting of the pipes during cold weather. The low temperature caused by the rapid expansion of the air from the exhaust of rock drills, pneumatic hammers and other air-operated devices will often freeze the moisture, clogging the exhaust openings, and preventing their efficient operation.

Time is generally an important factor in mining operations and losses in this respect are usually of more importance than in other directions. It is, therefore, essential that the proper precautions be taken to ensure freedom from interruptions which are too often caused by freezing of the pipe lines or drills. In a case of this kind which came to the writer's attention late last fall, operations at a large eastern mine were held up and the miners forced to sit around and "swap" stories for two hours while waiting for the pipes to be thawed out and this did not happen on a cold day either, although it was damp and muggy.

The Importance of Cool Compressed Air.

Air discharged from the cylinder of a compressor is hot in comparison with the atmosphere and on entering the supply pipe-lines heats them to some extent. This heating effect, travelling further along the pipe lines with the continued operation of the compressor, causes them to expand gradually, with the result that when the compressor is shut down for the night, in the cooler atmosphere they are subjected to an equivalent but more violent contraction. Although this effect may not be readily noticeable, it is likely to result in strained and loosened joints, with consequent loss of efficiency through leakage.

Aftercoolers—The Remedy.

It is a well known fact that atmospheric or free air always carries moisture (the amount varying with meteorological conditions in different localities) and also has the capacity to absorb more up to the time that its saturation point is reached.

The moisture carrying capacity of air increases rapidly with rises in its temperature, and decrease, but not quite so rapidly, with increases in pressure. As the pressure will always be at the highest point just as the air is leaving the compressor, if we can reduce its temperature to the lowest point, the air will be in a position to give up so much of its moisture that there will be little or none left to cause trouble when lower pressure and mayhap higher temperatures are reached further along the line. It is thus evident that the remedy for these conditions lies in reducing the temperature of the air after it leaves the compressor and often before it enters the pipes, to as low a point as possible, which will not only prevent all of these troubles, but will ensure better all-round distribution efficiency as a whole. Some cooling takes place in the intercooler of a compound or stage compressor, and with the larger and better designed inter-coolers used on modern compressors, more of the moisture is removed by this means than was possible with the older types. The air receiver also cools the air to some extent, and serves as a receptacle for the collection of moisture from the air which passes through it, and for this reason is fitted with cocks by which the moisture can be drawn off at intervals.

In the simplest form of compressed air power plant, the receiver is the only means of removing moisture from the air that is employed. Too much reliance should not be placed on the receiver for this purpose, however, as when located close to the compressor, as it should be; and the consumption of air is heavy, the temperature of the receiver shell will usually be such that little or no condensation can occur. In some cases, the temperature of the receiver becomes so high that oil carried from the compressor cylinder becomes ignited, causing serious fires or explosions. It is, therefore, better to depend on some means of colling and drying the air after it has left the compressor, and before it enters the receiver and supply lines, and this is where the after-cooler "fits in".

What The Aftercooler Will Do.

Aftercoolers cool and dry the air more thoroughly than is possible with the best type of receiver, and so reduce to a minimum the troubles which follow the use of wet air, and in addition remove some of the oil which might be carried into the receiver and perhaps to the pipe lines, to the detriment of the air-supply hose. While clean air is of considerable importance in open-cut mining, quarrying and contracting, it is especially so in tunnels and shafts where oil in the exhaust of rock drills or coal cutters tends to vitiate the air.

One of the principal functions of an air receiver is to compensate for the pulsating effect of each stroke of the compressor piston and prevent rapid fluctuations in the air pressure. For this reason the receiver should have sufficient capacity to prevent any material rise in the receiver pressure by the volume of air forced into it at each stroke of the compressor piston.

If the air is allowed to pass directly into the supply pipes there will not be sufficient space for its immediate accommodation and the pressure will momentarily run up far in excess of the average pressure in use accompanied by a periodic acceleration of flow. This results in an increase in the frictional resistance of the pipes and at the end of each stroke the compressor piston is required to force the air out of the cylinder against a pressure temporarily greatly in excess of normal, increasing the power consumption and putting an unnecessary strain on the compressor. In a single cylinder compressor the discharge pulsations are more violent than in stage compressors, as the total discharge must take place from a cylinder of larger diameter in a smaller portion of the stroke than is the case with the high-pressure cylinder of a multi-stage compressor where the discharge valves open earlier in the stroke and the diameter of the air pipe is about one-half of that of the cylinder. In this respect the installation of the aftercooler, since it increases the available receiver capacity, will be of considerable benefit, especially in intermittent work, such as running rock-drills, pneumatic tools, hoists, etc., and will assist the governor or regulator of the compressor in maintaining a steadier pressure.

Construction of the Aftercooler.

Aftercoolers usually consist of a cylindrical steel shell with cast-iron heads supported on cast foot-pieces and surrounding a nest of iron or brass tubes, the ends of which are either expanded or fitted with copper ferrules and caulked into steel tube plates at each end of the casing, provision is made for expansion and contraction. Water enters the lower set of tubes, traverses each row and leaves at the top of the shell, while the air enters and leaves at the top surrounding the tubes in transit, and travelling in a direction opposite to the water. Baffle plates are arranged so as to cause the air to cross and recross the tubes several times. An open funnel is generally placed in the water discharge to show the amount of water flowing and facilitate its adjustment. The moisture collected from the air is prevented from escaping with it by a plate in front of the air-discharge opening.

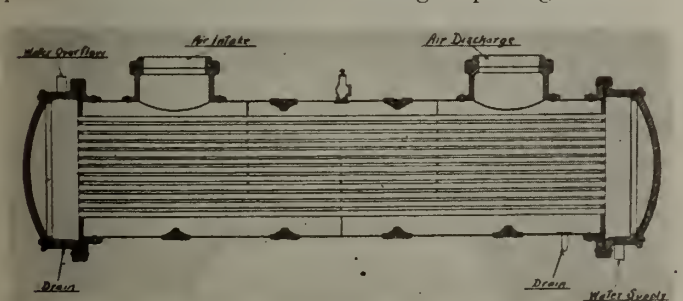

Fig. 1.

There is some difference of opinion as to the respective merits of iron and brass tubes for this class of service. Brass is a better conductor of heat than iron, but on the other hand, galvanized iron tubes are usually rougher and present more surface to the air so that there is probably little or no difference between them in cooling effect. Vertical aftercoolers are sometimes prefered on account of the smaller floor space which they occupy, but aside from this, there is no reason for using one style in preference to the other. While aftercoolers of different makes vary in minor details the essential principles of all are the same and their construction will be more readily understood by referring to Fig. 1.

Sizes and Capacities.

Aftercoolers are usually equipped with pressure gauge, safety valve, flanged pipe connections, water fittings and drain cocks. When properly designed and supplied with the requisite amount of water they will readily reduce the temperature of the air passing through them to within 15 or 20 degrees of the entering cooling-water. The temperature and quantity of the latter required depends on the cooling effect desired. The following figures, which are based on good cooling results with air at 80 to 100 pounds gauge pressure when compressed by a two stage machine, will be found accurate for use with aftercoolers of the type described:

Temperature of Cooling water	Gallons per hour per 100 cu. ft. of Actual free air per min.
50 degrees Fahr.	120
60 " "	150
70 " "	180
80 " "	210
90 " "	240

Afercoolers are made in a number of different sizes, the capacity of which varies with the temperature of the cooling water and whether the air to be cooled is obtained by single or multistage compression. This point will be seen more clearly by examining the table in Fig. 2, giving the sizes and capacities of Ingersoll-Rand Aftercoolers.

An aftercooler may be suspended from the ceiling or mounted on, or under, the floor, as may be most convenient from the standpoint of economy of floor space or ease in making the necessary connections. It should be placed between the receiver and the compressor and as close to the latter as possible. Pipe of amply large size should be used in making the necessary connections and care should be taken to provide piping by which the moisture may be drained off at intervals. It is good practice to make connections from the compressor to the aftercooler and from the aftercooler to the receiver one or two sizes larger than that leaving the receiver, using reducers to make the actual connections if necessary. Elbows should be avoided, any bends that are necessary being made by giving the pipes a wide sweep.

In some localities water is scarce and where this condition exists, it is often possible to use the cooling water from the aftercooler for hot boiler-feeding, increasing the efficiency of the plant and adding to its economical operation to some extent through the recovery of waste heat.

While an aftercooler will not eliminate all of the moisture from compressed air, —(the best results in this respect, especially in the case of large installations, being obtained by the use of an aftercooler in conjunction with a number of small secondary receivers or moisture traps placed at intervals along the supply lines)—it will be found that in the majority of cases the aftercooler alone will dry the air to such an extent that the troubles due to wet air and the consequent inconvenience and low efficiency which follows are entirely done away with.

In addition to this, the installation of the aftercooler often results in increased economy in power consumption with no outlay other than the cost of the aftercooler, the necessary connections and a moderate sup-

ply of cool running water. It is thus evident that the inclusion of an aftercooler when securing estimates on a new compressed-air plant, or the addition of one to a plant already in existence, is a subject well worth the attention of anyone desirous of obtaining the highest efficiency from their compressed-air equipment.

AIR AFTERCOOLERS

80 TO 100 POUNDS AIR PRESSURE

Number	Size of Aftercooler		Actual Square Feet of Cooling Surface	Pipe Connections			Maximum Capacity of Aftercoolers in Cu. Ft. of Free Air per Minute with Cooling Water at								Shipping Weight lbs.	
	Diameter Shell Inches	Height or Length Feet and Inches		Air		Water Inlet and Outlet	60° F.		70° F.		80° F.		90° F.			
				Inlet, Inches	Outlet, Inches		Single Stage Compression	Two Stage Compression	Single Stage Compression	Two Stage Compression	Single Stage Compression	Two Stage Compression	Single Stage Compression	Two Stage Compression	Domestic	Export
HORIZONTAL TYPE "HK"																
1	14	10'-0"	55	5	4	1	253	360	230	330	207	297	186	268	1800	2160
3	20¾	10'-6"	152	8	6	1½	705	1170	640	1051	575	957	518	860	3000	3600
5	22½	14'-6"	305	10	8	2½	1410	2360	1280	2135	1150	1920	1035	1725	4200	5000
7	30	17'-8"	757	14	10	3	3500	5840	3180	5299	2880	4750	2590	4270	8500	10200
9	39	19'-0"	1497	18	14	5	6900	11500	6283	19479	5650	9400	5100	8450	16100	19300
10	45¼	19'-0"	2012	18	14	6	9300	15500	8450	14084	7600	12650	6850	11350	19700	23700

Fig. 2.

Annual Meeting of the Mining Society of Nova Scotia

May 4th & 5th Glace Bay, Nova Scotia.

The 28th Annual Meeting of the Mining Society of Nova Scotia will open in the Club Rooms of the Dominion Coal Company in the morning of May 4th. Business will include consideration of motions to alter the date of the Annual Meeting of the Society and to change its name.

In the afternoon, the President, Mr. A. J. Tonge, General Superintendent of the Dominion Coal Company, will deliver the presidential address. The following papers are expected to be read:

"The Application of Hydraulic Stowing to Undersea Coal Workings with special reference to the Sydney Coalfield" by Walter Herd, Mining Engineer of the Dominion Coal Company.

"Generating Steam by use of Open-Hearth Furnace Waste Gases" by E. G. Mackay, Superintendent of Blast Furnace Department, Nova Scotia Steel and Coal Company. "Conservation in Drawing Mine Timbers" by P. G. Prendergast, Manager of Dominion No. 3 Colliery. "The Plate Mill of the Dominion Iron and Steel Company" by W. H. Graham, Superintendent of Construction, Dominion Steel Company.

A Smoker will be held on Tuesday evening in the Club Rooms.

On Wednesday morning, Mr. H. Y. Russel of the Canadian Explosives Company is expected to give a talk on the manufacture of explosives. Mr. Angus W. Macdonald, Employment Agent and Superintendent of Welfare Work of the Dominion Steel Corporation, will give a paper on "Labor Turnover in Industrial Plants, and what can be done to minimize it. A paper on "Longwall Mining and Conservation" will be presented by Mr. J. H. Cunningham, Papers are expected to be given by Mr. John Preston of the Nova Scotia Steel and Coal Company, and by Mr. F. E. Notebaert, Mining Engineer of the Acadia Coal Company. The papers read at the Toronto Meeting of the Canadian Mining Institute on "Transportation of Coal" by Mr. M. A. McInnes, President of the Lackawanna & McCrory Coal Company, and formerly a District Superintendent of the Dominion Coal Company, and by Mr. F. W. Gray, on "Canada's Coal Supply," will be open for discussion.

At noon on Wednesday, the Members and visitors will be guests of the Dominion Coal Company at luncheon.

On Wednesday afternoon a meeting will be held in the Savoy Theatre, to which the public will be invited when a paper on "Coke and By-Products" will be given by Mr. F. E. Lucas, Economy Engineer of the Dominion Steel Corporation, and a paper on Colliery Power Plants, by Mr. W. S. Wilson, both of which will be illustrated by lantern slides and moving pictures. Prof. Sexton, of the Halifax Technical College will speak at this meeting on the Vocational re-training of Workers in Industry.

No specific arrangements have been made for visits to plants or mines, but arrangements will be made by the Secretary for any persons who wish to visit any of the neighboring collieries or steel plants.

ANGLO-PERSIAN COMPANY'S OPERATIONS IN NEW BRUNSWICK.

It is reported from Moncton, N. B. that that the Anglo-Persian Oil Company has struck a moderate flow of gas in a bore near Coal Branch, Kent County. Boring for oil has for some time been proceeding in this locality by the Anglo-Persian Co.

NOVA SCOTIA ACCIDENT PREVENTION ASSOCIATION

The Workmen's Compensation Act of Nova Scotia provides that an association of employers for the prevention of accidents may be formed under the auspieces of the Compensation Board, and that such rules as may be decided upon by the Association for the purpose of preventing accidents, shall, if approved by the Board, become compulsory upon employers in the Province.

An organizing meeting was held last year, and recently the first annual meeting of the Association was held in Halifax.

The newly elected officers of the Association are as follows:—

President: George D. Macdougall, General Superintendent, Nova Scotia Steel & Coal Co., New Glasgow.

GEORGE D. MACDOUGALL.
President of the N. S. Accident Prevention Association, and Vice-President, Mining Society of Nova Scotia.

1st Vice-President: F. E. Lucas, Economy Engineer, Dominion Steel Corporation, Sydney.

2nd Vice-President: J. E. Lucas, the Halifax Shipyards, Ltd., Halifax.

Secretady-Treasurer: H. B. Thompson.

An Executive Committee is composed of the Chairmen of the respective trade sections, these being as follows:—

Mining, A. J. Tonge, General Supt., Dominion Coal Co.,; Lumbering and Woodworking, R. E. Dickie; Metal Trades, R. B. Stewart, Maritime Bridge Co.,, New Glasgow; Building Construction, A. S. Curry, Rhodes Curry, Ltd., Amherst; Public Utilities, J. H. Winfield, President, Maritime Telephone Co.; Transportation and Navigation, G. W. C. Hensley, Pickford and Black, Halifax; Miscellaneous, C. V. Managhan, Moirs Ltd., Halifax.

The meeting was addressed by the past-President, Mr. C. D. Dennis, Rhodes Curry Ltd., who described the organizing meeting held last April and outlined some of the difficulties which it had been necessary to overcome in commencing the work of the Association. Mr. A. F. Lucas then addressed the meeting, and was followed by Mr. F. W. Armstrong, Vice-Chairman of the Compensation Board, and Mr. John Mackeigan, auditor, who explained the financial position of the Board, and outlined the manner in which it was hoped the Association would be able to assist the Board in controlling and reducing accidents and the assessments.

F. E. LUCAS.
Vice-President N. S. Accident Prevention Association.

As all the officers of the Association are men who hold responsible positions of superintendence in the main divisions of industry comprised within the scope of the Compensation Act in Nova Scotia, it may be anticipated that such regulations as may commend themselves to the Association will be enforced. The Association will also form a nucleus and a directing force for first-aid work, "safety-first" meetings, and similar activities that have had such excellent results in the reduction of the accident rate in other industrial communities. Nova Scotia is to be congratulated on the formation of this Accident Prevention Association, and on the personnel of the officers.

Canadian Oil Exploitation and Prospects

The world's supplies of petroleum are to-day everywhere attracting the attention and serious consideration of Governments and industry. The continued source of supply and control of that supply, the vastly increasing demand for liquid fuel as the motive power for transportation of all kinds by land or water, from the humble car now owned by the average citizen to the latest type of battleship of the British Navy bunkering over 1,300,000 gallons, for power and lubrication in the world's factories, for lighting purposes and for surfacing the enormous road mileage which must be maintained to meet conditions of modern mechanical transport, are questions of vital interest throughout the world, and here in Canada point the way to a field of opportunity and effort whose importance to the country as a whole can hardly be exaggerated.

With two of the large oil producing fields, Mexico and Russia (sources of 20 per cent of the world's supply), temporarily handicapped by unsettled conditions, with the probable early decline of the United States fields (the source of 60 per cent of the world's supply), reports which come to hand of prospecting and drilling activities of the approaching season in the vast potential oil fields of Western Canada are of greater national importance than almost any other proposed line of development.

Canada's Annual Production.

According to Government statistics, Canada's annual oil production up to date stops short of 310,000 barrels (90 per cent from the Ontario fields) in comparison with over 330,000,000 barrels produced by the United States. A leading United States Geologist (J. D. Northrop) writing in a recent issue of the Engineering and Mining Journal, states, "petroleum production in the United States is expected to reach its maximum this year and to decline steadily thereafter," and in another issue of that journal the same authority states, "Canada is the only country in which the petroleum industry may be said to be controlled by foreign (United States) interests."

Beyond calling attention to this latter statement this article is not concerned with the question of political control, but is an attempt very generally to summarize those conditions which tend to a conservative optimism as to the vast oil possibilities to-day hidden in the unexploited sedimentary strata of Canada.

Area of Possible Oil Fields.

If we take the map of Canada and very roughly draw a line from east of Great Slave Lake passing through Lake Athabasca down to the north end of Lake Winnipeg, along the east shore of that Lake to its southerly end, thence to and along the North shore of Lake Superior to the Soo, and thence along the northerly shore of the Georgian Bay to Parry Sound, thence due east to the St. Lawrence River, and along the northerly bank of that river to its mouth, we shall have divided the Dominion into two vast areas, that lying to the northward of our line being regarded as generally hopeless for oil prospecting, that lying westward and southward being from its geological formation rich in promise for the finding of productive oil fields within the economical range of practical drilling.

If we further examine the Geological map of this latter area, we find that the great oil-bearing strata of the North American Continent, which in the United States have been productive of the richest and most prolific oil reservoirs of the world, contributing in fact over 60 per cent of the world's total oil supply, constitute the principal geological formations and outcrops of this vast Canadian territory.

From the U. S. Geological Survey

KNOWN AND POSSIBLE OIL RESOURCES OF THE WORLD

A diagrammatic index showing distribution and relative size of oil supplies for the future, as estimated according to present information

All of these Geological formations contribute in the various oil fields in the United States to the vast total production of that country.

It requires, therefore, no more than an average share of optimism to predict that Canada's future as a world oil producer is certain, and only awaits the assured result of time and capital expended on the scientific location of favorable structures of these formations and their subsequent exploration by the drill.

The Western Provinces.

In the Western Provinces attention in the past has chiefly been divided between the possibility of commercial development of the bituminous sands exposed on the Athabasca River, commonly called the "Tar Sands," and the search for petroleum in the vast regions of the Mackenzie River Basin, north and south of Edmonton, in Northern, Central and Southern Alberta, in the Peace River and Great Slave Lake Districts, whilst recently reports are to hand of organization for prospecting and drilling in the districts of Kootenay and Vancouver, B. C.

The Athabasca Tar Sands.

The outcrop area of the "Tar Sands" of the Athabasca River has been estimated to extend from 750 to 1,000 square miles, and the deposits probably extend considerably further to the southward under heavy cover. Various estimates have been made of the probable oil content of these sands which have been reported to range in thickness from 140 to 225 feet, and to contain 25 per cent of oil, but in fact the numerous shallow wells drilled have only obtained small amounts of black viscous oil showing on analysis a high percentage of light oils. The more volatile and valuable constituents of this petroleum have long since disappeared and, as the flow has ceased, the rocks from which it issued are probably exhausted, in short these tar deposits are all that remain of a vast oil reservoir now spoilt and wasted. Further, the horizontal stratification of these deposits is entirely against the probability that they will in themselves be found to contain reservoirs holding large pools of pay-oil, since the entire absence of folding in the strata is unfavorable to the large accumulation of such reservoirs and moreover, denudation by ancient glacial action has exposed the oil sands to the atmosphere, so that in the course of ages, evaporation of the lighter oils has taken place, leaving only the heavy tarry residue, now in evidence, dispersed throughout these vast deposits.

Commercial Value of Tar Sands.

Hence it is likely that for years to come, the commercial value of these tar sands will be limited to their development as bituminous road making material for which purpose their suitability has already been demonstrated in the city streets of Edmonton, and the economics of the question are being fully investigated by the Department of Mines of the Dominion Government. Improved methods of distillation may make the recovery of the oil content of these deposits a commercial proposition as also may the future exhaustion of producing oil wells, but this latter is too far ahead to be of interest to the present generation.

In the Athabasca District, at Pelican Rapids, the Canadian Geological Survey sank a shallow well in 1798 and tapped a heavy flow of gas, and later, at the same place, the Pelican Oil and Gas Company met a heavy gas flow in a shallow drill hole. In 1917-18, the Imperial Oil Company sank two wells along the Alberta and Great Waterworks Railways and the Tapley Syndicate put down a third in the same territory. These tests were made by practical men but success was not attained, a small show of tarry oil being obtained at depths of about 1,000 feet. These results however do not in any way disprove the presence of pay oil in the vast fields to the south of this area which are so far from the outcrops that even the most expert explorer has little data to guide him, and drilling "in the dark" is the only test that can be resorted to.

Scientific Study of Structures.

The first essential therefore for the successful dis-

covery of liquid oil accumulations is the location of suitable structures of the oil bearing sands, and their exploration by drills, those beds distant from the area of outcrop of the Athabasca sands offering better prospects than those in the immediate vicinity, as also do the regions Northwest of Edmonton and Athabasca Landing where favorable structures which are independent of these tar sand leakages are known to exist. Whilst numerous widely separated wells have been sunk there has in the past been a tendency to locate them without particular regard to testing the main structural features or the promising horizons, but recently considerable work has been done in the direction of scientific geological study of these structures. The Geological Survey of the Department of Mines, as well as such large commercial organizations as the Imperial Oil Company, The Standard, The Shell, and the Anglo-Canadian Oil Companies, are accomplishing good pioneer work in locating the regions which show the folded geological structures of the petroliferous sands most favorable to success in oil drilling, and particular attention has been paid to the Peace River district of Northern B. C. and to the Great Slave Lake district.

The Peace River District.

The upper cretaceous formations of the Peace River District are reported as consisting of a gentle homocline not favorable to formation of oil reservoirs, but further West the survey parties report more promising conditions of sharp folding and domes.

The above does not in any way disprove the existence of Peace River oil reservoirs in the underlying Devonian sands, these being non-conformable to the upper cretaceous deposits which alone have been explored by the drill to date. Indeed, the very fact that these Devonian beds are deformational to the upper beds may be an encouragement to further prospecting of this district, since, if the formation bed has a gradient it may go far to neutralize possibly unfavorable conditions created by the homoclinic structure of the overlying beds. Moreover, this homoclinic structure is not necessarily unpromising for oil reservoirs provided that the gradient is sufficient to allow of gravitational segregation of the water, oil and gas; elsewhere conditions of sand porosity and cementation have resulted in the isolation and accumulation of large oil reservoirs in such homoclinic structures, and indeed some portion of every anticline, the formation usually reported on as most favorable for oil, is in itself a homocline.

The Peace River Oil Company, the Tar Island Oil and Gas Company, the Consolidated Oil Fields Ltd., the Victory Oil Co., and the Northern Pacific Oil Company have all had drills in this region penetrating to depths of from about 1,000 feet to 1,300 feet. Their general experience has been the finding of small quantities of heavy tarry oil, and, in an effort to reach the lower Devonian formations, encountering heavy flow of gas or water which must be shut off before further exploration can proceed. This difficulty is however purely physical, and the Three Creeks Oil Company are reported to be now installing large pumping units to deal with this obstacle.

Southern Alberta.

In the district around Calgary considerable drilling has been done, and in some cases small flows of from 15 to 30 barrels a day, ranging from very light to heavy oil, have been obtained. Geological opinoin is that in this territory the rapid descent of the oil-bearing strata from the faulted and folded areas created by the mountain uplift has placed these strata at so great a depth in this district as to make drilling a doubtful commercial undertaking. Some experts also hold the opinion that the very light finds of oil in the Calgary field are indications that the original source of the oil, the parent reservoir, was at a great distance, and that the oil in its lateral movement has been subjected to so great filtration as to have rendered it an unpromising prospect. New methods of distillation of these light oils may however give them an added value and revolutionize opinion in this respect, converting the class of oil into a valuable source of supply of motor fuel spirit.

The principal companies which have undertaken Alberta Oil Company. The Prudential Oil Company, and the Calgary Petroleum Products Company, most of the wells being in the Sheep River area.

South and Southeast of Edmonton.

Examination of the vast districts southeast of Edmonton lying between the North Saskatchewan and the Belly Rivers have determined that the reported anticlinal folds of the upper cretaceous structure do not exist in Central Alberta. The homoclinic structure of this area may be responsible for the difficulty hitherto experienced in locating any large accumulation of petroleum oil, but the area is vast and the absence of anticlines does not disprove the existence of such reservoirs.

It is said that the Imperial Oil Company, The Shell Oil Company, and some other interests will spend large sums in drilling in this field during 1920, and the activities of such experienced oil men show how great is their confidence in the promise of this region.

Kootenay and Vancouver Districts.

The Amalgamated Oil Co., Ltd., and the Crow's Nest Oil Company are reported to have acquired extensive rights in the Kootenay District, and to be either actively engaged in drilling or preparing to do so in 1920, and on the International Boundary near Vancouver, a Company known as the Boundary Bay Oil Company is reported to have drilled to a depth of over 700 feet, and to have produced a small flow of oil, whilst in the same district the Pitt Meadow Oil Wels Company and the Empire Oil and Natural Gas Company have sunk wells, and the Spartan Oil Company has drilled a test hole near Burnaby Lake to a depth of about 2,000 feet, at a point where one of the most important oil seepages occurs.

It is difficult to analyze the geological promise of the Kootenay District in regard to large oil reservoirs, owing to the faulted and fracture-displayed nature of its structures. The reports of the Dominion Government Geological Society show large outcrops of Carbonaceous limestones (elsewhere a prolific source of oil) and of post-Cambrian rocks, and petroleum has actually been found in these regions, and verified by Dr. Selwyn as far back as 1891. Geologists have reported that in this region, the ancient limestones have been thrust forward over cretaceous beds in which the petroleum may have originated, and which may yet be the source of unknown quantities of oil. In this connection the following quotation from the Dominion Government Geological Sulvey Annual Report of 1898 is illuminating having regard to present day activities above noted.

"The indications certainly seem to be sufficiently promising to warrant some outlay in the work of sinking test wells, notwithstanding the generally disturbed and broken character of the formations of the region," and it may here be noted that the most productive of the United States oil fields, that of California, is of diversified geological structure complicated by faults, outcrops, and igneous intrusions.

In the Vancouver district, oil and gas seepages have been known for some years past though their origin has not been demonstrated, but it has been thought that they may indicate oil pools in the sedimentary rocks underlying the Fraser River. Few natural outcrops of these rocks exists, but it is thought that they are folded in a series of anticlinal and synclinal folds favorable to accumulation of oil pools, and it is reasonable to suppose that they are an extension of the structures of the same deposit known to exist further south of the International Boundary, and a striking general resemblance may be noted between the geological structures of this district and those of the great producing oil fields of California, which have been estimated to contain seventeen billion barrels of fuel and asphaltic oils.

The Fields of Eastern Canada.

This review would be incomplete without reference to the oil fields of Eastern Canada, in fact the Devonian formations of Ontario are at present producing the greater part of the output of the Dominion and have been producing since 1857. In this province the Mosa oil field in Middlesex County is the largest producer and contributed 108,988 barrels in 1918 to the provincial total of 288,760. This production is reported by Government Geologists to be from the crest of a dome of the Delaware limestone (corniferous) at depths of about 300 feet. This productive field developed from an abandoned prospect as a result of careful study of structural formations followed by practical drilling, it is quoted as proof that the possibilities of the Ontario oil fields are far from exhausted.

There are eleven other oil fields in the province, all producing from shallow wells in the Devonian formations. In the opinion of some experts, deeper lying formations in Ontario, which have not yet been explored by the drill, may prove to be extensions of the Lower Devonian and Silurian formations which constitute the great oil fields of Pennsylvania and Central Ohio.

The Maritime Provinces.

In New Brunswick and Nova Scotia oil possibilities have attracted attention since 1859, but competition with the enormous output of the adjacent United States oil fields has done much to discourage production. The New Brunswick Petroleum Co., in about 1900, drilled over 70 wells in the South Eastern district of the Province and obtained a small flow of pay-oil from the Carboniferous and Devonian formations. More important are the oil shale deposits in Albert County, which comprise the residuum of a petroleum field exhausted through seepage.

These petroliferous shales may yet have high commercial value when modern methods of distillation shall render the recovery of their by-products commercially possible such a development may be indicated in the near future in the recovery of motor fuel spirit through new process. In 1908 these oil shales were tested for yield of crude oil and Sulphate of Ammonia in the retorts of the Pumpherston Oil Co., Scotland—the average yield being 40.09 gallons of crude oil and 76.94 lbs. of Sulphite of Ammonia per ton of shale—the result comparing favorably with Scotch shales, which have been successfully worked for many years. In Nova Scotia efforts to find oil were made as early as 1864, but without commercial results. Various seepages occur and favorable geological Devonian and Corniferous formations are noted in certain districts, but the structures are not considered promising, having been badly broken up and contorted. Oil shales have been known in this province for over 60 years; their analysis yields somewhat similar results to those of New Brunswick, but lower in Ammonium Sulphate, they are at least as good as the successfully operated Scotch deposits. The remarks as to their probable development which have been made above in connection with the Albert County deposits of New Brunswick, apply equally here.

WILL DEVELOP ATHABASCA OIL FIELDS IN ALBERTA.

Anglo-Dominion Petroleum Company will spend much money in exploring the 340 square miles of oil lands under lease.

(From Our Toronto Correspondent.)

Exploration and development of the Athabasca River oil region in Northern Alberta on a big scale is foreshadowed by A. F. A. Coyne of the Anglo-Dominion Petroleum Company of London, England, who has arrived in Toronto from England. Mr. Coyne has come over from the company in charge of seven geologists, one of whom is W. P. D. Stebbing, F.G.S., and the part is enroute to the West, where they will immediately start geological investigation of the 340 square miles which the Anglo-Dominion Company have under lease. Equipment is about ready for the operation of thirty oil rigs.

Mr. Coyne states his company has appropriated two and a half million dollars for the first twelve months of exploration and operation and further large sums will be spent as occasion demands. The British Government is vastly interested in the exploitation of Canadian oil fields and is lending every support to any enterprise that promises to free the British Dominions from dependence on the United States for oil. The London market realizes that Canada is a country of great mineral wealth and both the Government and financial groups, representing various mining industries, are ready and willing to back any legitimate scheme that promises a fair return on the money invested. The Anglo-Dominion Petroleum Company has already acquired the Athabasca gas franchise and is applying for the Edmonton franchise.

Connected with the Anglo-Dominion Petroleum Company are Alexander Duckhan, chairman of the Board of Directors of the Trinidad Central Oil Fields; Ballie Underdown, director of Trinidad Central, director of the U.S. Cable Co. and President of the British Motor Manufacturers' Association; Henry Antrobus, Wallis Wood and other well-known British financiers. W. R. Martin, of Medicine Hat, holds the position of field superintendent and Martin & Phillips of Medicine Hat holds the position of field superintendent and Martin & Phillips of Medicine Hat have entered into a five year contract with the company for the drilling of the wells.

COAL AN IMPRESSIVE QUESTION IN CANADA.

Reference was recently made in these columns to plans being discussed in Canada for shipping Nova Scotia coal up the St. Lawrence River and Lake Ontario for distribution to points in the Province of Ontario now dependent on the United States for coal.

Whether this plan is feasible or not, it would seem that the high price of anthracite will tend to restrict its use in some parts of the Dominion. In fact, some of the Canadian papers are expressing fears that the growth of the country may be interefered with by the price of fuel in the more remote sections, where a high freight rate enhances the cost to the consumer. It is even suggested that part of the population may be forced to emigrate.

Under the stimulation of railroad building and industrial activities, the settlements in Canada have been pushed far back into the interior. Only a minor portion of the requirements can be met by water-borne deliveries, and in exact ratio as the settlements extend up towards the north the need for fuel incrcasse. So we may readily believe that the fuel bill is becoming a very important matter, the more so as Canada has generally been on a lower price and wage basis than the United States in all particulars, especially in the smaller communities.

Psychologically a coal bill at the rate of $18.00 a ton at some small town in northern Ontario creates about the same impression as a bill at the rate of $25.00 a ton in New York.—"Saward's Journal," New York.

STEEL COMPANY OF CANADA INCREASES ITS COAL HOLDINGS.

A significant item in the Annual Report of the Steel Company of Canada is the President's statement that the Company has consolidated its holdings with two companies in the United States, and now owns a third interest in a single block of coal lands comprising 4,438 acres. Mining is to be carried on through a centrally located shaft, which will effect a saving over present methods.

NEW MINING COMPANIES

The International Prospecting and Developing Company has been granted a provincial charter for the purpose of engaging in a general mining business with head office at Ottawa. The company is capitalized at $1,000,000 and the provisional directors are R. F. Kelly, M. J. O'Connor, A. G. Midford, U. Chatelain, and C. G. Cummings.

Another company to be granted an Ontario charter is Algomont Mines, Limited, with head office at Toronto. The capital is fixed at $4,000,000. Toronto people are named as the provisional directors.

DOMINION STEEL COMPANY DRILLING FOR IRON ORE

The Dominion Steel Company is drilling for iron-ore near Loch Lomond Cape Breton, about 30 miles from Sydney. Outcroppings of high-grade hematite are present, and diamond drilling is being undertaken to prove the extent of the deposit

THE LATE PROFESSOR LAPWORTH.

A Distinguished English Geologist.

Prof. Charles Lapworth, LL.D., F.G.S., F.R.S., died on Sat. at his residence, 38 Calthorpe-road, Edgbaston, in his 78th year Prof. Lapworth was for more than 30 years one of the most accomplished members of the professional staff of Mason College and the University of Birmingham, and had a wide reputation as a geologist. Born at Faringdon, Berkshire, in 1842, Prof. Lapworth was educated at the Training College of Culham, near Oxford. Then he became a schoolmaster at Galashiels. It was while he was at Galashiels that he began to study geology, and in 1870 he read his first scientific paper before the Geological Society of Edinburgh. This led to his acceptance of an appointment at St. Andrew's University, and he stayed there from 1875 until 1881, when he went to Birmingham as Professor of Geology in Mason College. It was not until 1913 that he decided to retire from the active work of his profession, and the council of the university, in accepting his resignation,passed a resolution in which they thanked him for his long and assiduous services, and recorded the fact that the geological surveys of the Empire owned some of their methods to the genius of Prof. Lapworth, whose name was of more than European reputation. Then followed the conferment upon him of the honor of Emeritus Professor. In 1883 he was accorded the distinction of LL.D. of Aberdeen University, and in 1912 of Glasgow also, while some time prior to that he became M.Sc. of the University of Birmingham. In 1887 he was awarded the Bigsley gold medal of the Geological Society, and in the following year was elected a Fellow of the Royal Society, while the Council further recognised his work in 1891 by conferring upon him their Royal gold medal. In 1889 he received the Wollaston medal of the Geological Society, while in 1905 he was the Wilde medallist of the Manchester Philosophical Society. As far back as 1892 he was the president of the Geological Section at the annual meeting of the British Association; from 1902 to 1904 he was the president of the Geological Society; in 1895-96 he was a member of the council of the Royal Society; and when the Royal Commission was formed in 1902 to enquire into the coal resources of this country he was appointed a member of that body, while in addition for a very long period he was the consulting geologist on matters of mining and civil engineering —particularly with reference to the water Bills of Birmingham, Gloucester, Harrogate, Leicester, etc. Prof. Lapworth's contributions to scientific literature were voluminous. He published altogether 40 or 50 original papers in the annals of various societies, giving accounts of his discoveries and conclusions. The important group of fossils known as the graptolites, which lie at the foundation of the study of the older fossiliferous rocks of geology, were first reduced to order by him and his classifications. In the West of England he similarily worked out the true arrangement of the rocks and fossils and the type districts of Shropshire and elsewhere, and in the Midlands geologists are familiar with his discovery of Cambrian rocks and fossils in the Nuneaton and Lickey district. Prof. Lapworth leaves a widow, two sons, and a daughter.

—"Colliery Guardian."

Northern Ontario Letter

THE SILVER MINES

Under pressure of what is reported to be an attempt on the part of some of the European countries to bring about a decline in the price of silver, the quotations for the metal have again become unsteady. Mindful, however, of the outstanding fact that consumption is greater than production and that the visible supply is daily becoming less, the silver producers still cling confidently to the belief that the law of supply and demand must inevitably run its course and that in such a case the quotations could scarcely be expected to decline to any very great extent, while there is great promise of another upward swing following the expected failure of Europe to break the market.

Now that the annual statements of all the leading mines in Cobalt have been issued for the year 1919, it is impossible to review with a full measure of accuracy the extent of the prosperity enjoyed during that interesting period when silver prices averaged away above any previous record in the history of Cobalt. It is interesting to note that in the majority of cases the value of the output compared favorably with that of the preceding year, despite the fact that the mines lost an average of at least seven weeks due to last Summer's labor strike.

Having maintained its output in 1919 almost on a par with 1919, and having actually increased its ore reserves during the period, the McKinley-Darragh is now on a fair way to round off another prosperous year in 1920. About the end of April or the first week in May, the big oil flotation plant will be set in operation, and should result in further materially increasing the revenue.

The annual statement of the Nipissing Mining Company for 1919 is one of the factors that holds out considerable assurance of improved economic conditions. The report shows that in spite of the added expense due to curtailing operations on account of the strike, the company succeeded in reducing the cost of production by upwards of 3½ cents on each ounce of silver produced. Total production for the year amounted to 2,905,475 ounces, so that the saving due to the decline in costs amounted to $101,691. The value of the year's output was $3,553,958, and the net operating profit amounted to $2,717,312 which was the highest in the history of the Nipissing Mining Company. Following is the official summary of the company's operations at Cobalt during the year:—

"The year 1919 was a remarkable one in the silver industry. The official price of $1.01½ per ounce, set by the United States Government, remained in force for the first four wonth's of the war. Early in May, however, both the United States and British Governments removed all restrictions on the price and on the exportation of silver. Due mainly to the strong demand from China, the price thereafter gradually rose to the maximum of $1.37½ quoted in New York on Nov. 25th

"The New York official average for the year was $1.1112 per ounce. Nipissing received $1.1371 United States currency, f.o.b. Cobalt for 1919 shipments.

"The miners of Cobalt went out on strike July 23rd, and returned to work September 8th, but the mill could not be started until September 24th. This two month's shut down was mainly responsible for the drop in the year's production to 2,905,475 ounces, which is the lowest production (in point of ounces) since 1908.

"The net operating profit, however, was the largest in the history of the company amounting to $2,717,312. The cost of production was 35.6 cents per ounce, compared with 39.02 cents in 1918. The company received for the silver produced during the year, including the inventory sold since January 1,1920, an average of $1.2077 per ounce.

"The low grade ore assayed 27.09 ounces per ton; the average in 1918 was 23.81 ounces. The profit was 72.42 per cent of the gross values of the production.

"Exploration met with better results than usual, so that the ore reserves are up 350,000 ounces from a year ago.

"Wages have been increased 82½ per cent since 1915, but Cobalt did not escape the epidemic of strikes which passed over the country. Since then, mine committees elected by the employees treat with their respective managements regarding local questions, and in addition a central council composed of mine managers and one employee from each mine, discuss questions affecting the camp as a whole. It is hoped that the new arrangement will work out more satisfactorily for all concerned."

Surplus of the Nipissing Mining Company was $4,372,952 at December 31st, 1919.

The Beaver Consolidated Mines has declared a dividend of 3 p.c., payable May 31st, after a lapse of two or three years as a non-dividend payer. The statement has been made that the Kirkland Lake Mine is now on a profitable producing basis, and this is believed to be the reason for the resumption of dividends on the Beaver. The latter company, purchasing the Kirkland Lake Mine, and financing its development found its resources taxed to the limit during that period , and, now with the Kirkland Lake Mine on a paying basis, the Beaver is free to give returns to its shareholders. From this date forward, the Beaver will only receive the benefits of the profits made from the operation of the Beaver mine, but will also stand to receive the return of the $404,000 which the Beaver advanced to the Kirkland Lake, plus seven-eights of the total profits from the operation of the Kirkland Lake Mine. As yet, of course, net profits on the Kirkland Lake enterprise are not large, but promise to increase considerably, selling that the President of the Company states that the broken ore underground will average around $12 to the ton. It is stated that the mill on the Kirkland Lake operated 21 days during March and recovered $16,145.

While it is stated that the Kirkland Lake Mine is on a paying basis, yet the margin is obviously narrow, for these reasons: In Februrary the mill treated 2,439 tons of ore, or an average of about 84 ton a day, according to official figures. It is understood that production amounted to about $19,000, which would indicate an average recovery of around $7.80 a ton. Mr, Culver estimates costs at $7.50 per ton.

The Keeley Mine, in South Lorrain is making good headway. The milling equipment purchased a few weeks ago from the Coniagas Company was transported to the Keeley before the winter roads broke up, and has left the Keeley free to carry out the work of installing the mill with the least possible delay.

Late advice from the Triangle property in Auld township in the Elk Lake district tends to show that continued encouragement is being met with at depth where heavy leaf silver is being encountered in a one-inch vein, and with good values extending well back into the wall rock.

It is believed that the recent shipment of twenty tons of ore from the Castle property of the Trethewey Company, in Gowganda, will yield between $40,000 and $50,000. The enterprise appears to be already on a self-supporting basis.

The Coniagas Mines will disburse a 2½ p.c. dividend plus a bonus of equal amount on May 1st. The disbursement will amount to $200,000 and makes a total of $9,840,000 paid to date by this company. The Coniagas has produced to date about 27,500,000 ounces of silver, and has ore reserves good for three years in advance of current production.

It is estimated that arrangements will be made to commerce operations at an early date on the Bailey-Cobalt mine, the litigation in connection with which was recently concluded.

Negotiations which may be of far-reaching importance are being carried on between the Temiskaming Mine Managers' Association and a workmans' committee with the object in view of inaugurating a system of sick benefit insurance.

ORE AND BULLION SHIPMENTS

During the week ended April 16th, three Cobalt companies shipped an aggregate of approximately 385,-455 pounds of ore. The Mining Corporation with four cars was the heaviest shipper, this company having decided to ship an average of about one car daily for some little time. Following is a summary:—

Shipper	Cars	Pounds
Mining Corporation	4	260,860
O'Brien	1	64,595
La Rose	1	60,000
Totals	6	385,455

During the corresponding period, the leading producing companies continued to withould their bullion from the market, no shipments of refined silver being made apparently on the strength of the belief that the present recession in quotations for the metal is but temporary.

Following is a statement of ore shipments over the T. and N. Railway for the month ending March 31st. (In tons of 2,000 lbs.):—

Cobalt Proper	Tons
Coniagas	141.23
Dominion Reduction	31.00
Hudson Bay	30.46
La Rose	43.93
McKinley-Darragh	103.05
Northern Customs	43.14
O'Brien	32.13
Temiskaming	36.00
	460.94

The above shipments were made to the following Companies:—

CANADA

Deloro Smelting & Refineing Co., Marmoro	248.12
Coniagas Reduction Co., Thorold	141.23

UNITED STATES

American Smelting & Refining Co., Perth Amboy	30.46
Pennsylvania Smelting Co., Carnegie	41.13
	.460.94

PRICE OF SILVER

March 2nd. Highest	132.000
March 12th. Lowest	117.000
Average	.125.551

THE GOLD MINES

On account of the enforced curtailment of lumbering operation caused by the spring break-up, a large number of men are seeking employment in other industries. The situation promises to benefit the gold mines in that the high wages being paid by the producing gold mines offers big attractions as compared with other work in the most northerly districts. It is thought possible that the aggregate tonnage treated by the leading mines will increase during the next month or two.

In June of 1919 the Hollinger reached the peak in point of number of men available. The same causes are again at work, and the same effect is anticipated. At that time the management was able to accumulate a big reserve tonnage of broken ore from which to draw for milling requirements toward the end of the year when a decline in the number of available men declined.

It is intimated unofficially that the Dome management has undergone a change, and that Mr. Depensier is now general manager, with Mr. Dowsitt as assistant manager. Mr. J. Jorden is mill superintendent, with F. Horne as assistant. It is also stated that the Dome will employ mucking machines underground and that hopes are entertained of being able to bring the mill up to close to 1,400 tons daily.

At the McIntyre, the tonnage being treated and the high average mill heads points to the probability of the output for the fiscal year to end June 30th to exceed two million dollars for the first time in the company's history. It has been officially stated that net profit for the period may be expected to exceed one million dollars. In addition to this, the development of the downward continuation of the main ore body at a depth of over one-quarter of a mile is serving to maintain high ore reserves in spite of the large production. A continuation of the present results is expected to result in the interim dividend disbursements to be made at increasingly frequent intervals.

With the mill on the Porcupine Crown operating at full capacity, and with half a year's mill requirements in broken ore lying on the stulls, the company is on a fair way to pile up a substantial surplus in a remarkably short time. This view is strengthened by the fact that average mill heads are in the vicinity of $11 to the ton.

At the Wright-Hargeraves mine at Kirkland Lake a number of men have been taken on preparatory to the commencement of the big construction program. The work at hand will consist of de-watering the mine and preparing the various working faces for production pending the completion of the mill

The question of re-opening the Tough-Oakes mine is still more or less unsettled, with the indications pointing toward a beginning early in May, although this has not yet been definitely decided.

A new head-frame is being erected on the Kennedy-Boston property. A small steam driven mining plant is also being installed. This work is preparatory to continuing the shaft from its present depth of 100 feet, to a depth of 150 feet at which point considerable drifting will be done. About 5,000 logs have been cut and will be turned into lumber right away in the Company's small sawmill. This lumber will be used in connection with the construction of necessary camp-buildings.

In the Fort Matachewan district, the Matachewan Gold Mines, Limited, is being explored by use of three diamond drilling machines, one of which is owned by the company, and two of which are working under contract. It is planned to do about 6,000 feet of drilling and to complete this program by about August. The results achieved will have a vital bearing on the future course of the company.

WELLAND SMELTER CHANGES HANDS.

The Cobalt Smelter at Welland that has been operated since 1912 by Metals Chemical Company has been purchased by The Ontario Smelters and Refiners, Limited. The plant is being altered to suit the requirements of the new owner's process and they expect to begin smelting operations early in May

The Ontario Smelters and Refiners, Limited, will continue treating all grades of Cobalt silver ores that carry cobalt in commercial quantities. Their process of extraction has the advantage over some other processes in that it gives almost a complete recovery, not only of this silver and cobalt contents, but also the nickel, arsenic, antimony and copper.

The daily capacity of the Welland Smelter is fifteen tons. It is well equipped with cupola, mechanical furnace, crushers rolls, ball mills and chemical department.

CLAIM RECORDING FEES REDUCED IN ONTARIO

By the new mining act introduced by Hon Harry Mills, Minister of Mines in the Ontario Legislature, there is a reduction of from $10 to $5 in the fee charged for recording a claim by a miner for himself. The fee for recording a claim staked out by someone else has been increased from $10 to $15. Another amendment is that no licensee can stake out more than three mining claims for himself or more than six for any one else in any one mining division a year. Every licensee who stakes out a claim by sending a sample to the provincial assayer at Toronto with one departmental coupon in the case of gold, silver, copper, lead or metallic iron and by sending two coupons he can get one assay made without cost for the tin or tungsten.

SECOND INTERNATIONAL MINING CONVENTION SEATTLE, WASH.

The Second International Mining Convention on the Pacific Coast was held at Seattle, April 7th to 10th. The outstanding feature of this Convention was the attention paid to the problem of gold mining occasioned by rising prices of labour and commodities and the fixed price of the metal. Governor Emmet D. Boyle of Nevada spoke on the question from the miner's standpoint and Mr. Frank A. Vanderlip of New York presented the banker's viewpoint.

The attendance and mineral exhibit from British Columbia were fully representative. The West Kootenay Prospectors' Association was represented by its President, Mr. John Mullholland, and the East Kootenay Association by the Secretary, Mr. J. H. Huchcroft. The concentration of the exhibits and meetings under one roof made for the greater success of the meeting.

The next and third convention is to be held in 1921 in Portland.

ASSOCIATED GOLDFIELDS MINING CO., LTD.

The Annual Meeting of this Company was held in Toronto on April 16th., several hundred shareholders being in attendance.

Dr. G. A. Mackay, President of the Company, in his address to the shareholders said that a dividend might be expected next year. Liquid assets at the end of 1919 were reported as being $1,048,862, with total liabilities of $11,164. During the year $169,258 was expended in mining. A large part of this expenditure is being credited to assets as capital expenditure on development. The President said the ground for the first milling unit of 1,000 tons daily capacity had been broken at Block "D" and actual construction begins at once. The building of an additional unit will be deferred until more is known about the labor situation and transportation facilities. The President annuonced the Company's intention to proceed with the development of further sources of hydro-electric power, and mention was made of the sinking of a new 500-ft. shaft on Block "C."

The shareholders expressed confidence in the management of the properties, re-electing all the old Board of Directors. It was decided to extend the present stock pool until January first next, or until thirty days after the commencement of operations at the new mill.

The most important statement made was that in addition to the low-grade ore bodies on which the Company's milling equipment plans were based, two lenses of ore averaging $11.15 a ton had been discovered. These lenses were ascertained to be 2,000 feet long, from 50 to 150 ft. wide, and had been proved to a depth of 500 ft. without indications of cutting out.

It was announced that Dr. H. C. Cooke, formerly of the Geological Survey, had been retained as the Company's geologist.

Housing for 200 men has been erected during the past year, and sufficient accommodation for a force of 500 men was contemplated before the end of the Summer. A private hospital, under the direction of the Company's physician, and a number of cottages for married employees were proposed.

BOOK REVIEW.

MICROSCOPIC EXAMINATION OF THE ORE MINERALS. W. Myron Davy and C. Marson Farnham. First Edition. Mc. Graw-Hill Book Co., New York. 154 pages with Indices. 6 ins. by 9¼ ins. Cloth Boards.

This work deals with the technique of polishing and examining the specimen, and with the photomicrography of polished sections. The main feature of the volume is a series of determinative tables, to which a thumb index is given. The index is arranged as to order of reagents used in identification. A number of supplementary tests are detailed. The examination of polished specimens of ores is in the work referred to as "mineragraphy" following the analogy of the better known term of metallography. The work is intended for advanced students and for professional reference in the laboratory. The printing, indexing, and general arrangement of the work leaves nothing to be desired.

BRITISH COLUMBIA LETTER.

Stewart, B. C.

It is announced that certificates of incorporation have been issued to two companies for the operation of an express service by hydroplane between Stewart, B. C. and Long Lake, the latter being situated close to the Premier Mine and other prospects of the Salmon River section, Portland Canal District. Roy C. Price is mentioned as the organizer and the manager of the enterprise and it is said that finances are being advanced by business men of northern British Columbia and that terminal facilities have been arranged for.

Dale L. Pitt, manager of the Premier Mine, has returned to the property accompanied by two engineers, Messrs Hansen and Trojanowski, of the American Smelting and Refining Co. Mr. Pitt states that it is the intention to continue diamond drill development. The two engineers named are to supervise plans for the construction of a new mill. The company proposes to continue the shipment of high grade ore and to mill the low grade, transportation in the summer being by wagon road.

The Pacific Coast Development Co. is carrying on development of the Big Missouri and is taking in supplies over the snow so that the possibility of transportation difficulties in the summer will be obviated. The Alguncian Development Co. also is shipping in equipment both for mining and for the maintenance of camps while on the Forty Mine recent showings have been developed of a very promising character.

P. W. Racey has been appointed engineer in charge of the properties of the Silver Creek Mines, Ltd., Salmon River.

White Horse, Y. T.

A body of high grade copper ore has been disclosed at the Copper King Mine near White Horse and a considerable quantity has been sacked ready for shipment with the improvement of weather conditions.

Alice Arm, B. C.

A. J. T. Taylor, managing director of the Taylor Mining Co., having returned from Alice Arm states that it is expected that the railway will be cleared of snow and the shipment of ore by rail rendered possible sometime early in the month of May.

Hazelton, B. C.

The opening up of a new vein of two feet of good milling ore is reported by the operators of the Silver Standard Mine. Development is continuing. Necessary alterations and repairs have been made to the Mill and a short time ago operations were commenced, some silver-lead and silver-zinc concentrates already being ready for shipment. Because of this early start the milling season will be six weeks longer in duration this year.

Princeton, B. C.

The Canada Copper Corporation plans to commence milling at its new plant, Allenby, B. C., by next August. It is estimated that over 600 men will be employed this summer at the Copper Mountain Mine and at the Mill.

Kamloops, B. C.

A car of high grade ore from the Joshua Mine of the Donohue Mines Corporation awaits shipment to the Trail Smelter. Additional concentrating machinery is to be installed to bring the capacity of the plant up to 25 tons a day.

Sheep Creek, B. C.

The Motherlode Mill, of the Nuggett Gold Mines, Limited, which combines the ball, stamp and tube principles, is being overhauled and will be ready for work in May. The ore body under development continues to show up well and the Company is looking forward to a successful season.

Ymir, B. C.

The Mining Corporation of Canada has taken up its bond on the Yankee Girl Gold Mining Property, Ymir, B. C., and development, it is stated, is to be proceeded with on a considerable scale. Last December this company took a conditional bond on the Yankee Girl and subsequently A. W. Newberry, a New York Mining Engineer, made an examination. It is understood that there will be a new incorporation known as the Texas Yankee Girl Mining Company, under which the mine and adjoining mineral property will be developed and operated.

Grand Forks, B. C.

The Provincial Government has decided to undertake some diamond drilling on properties of the Franklin Camp, situated close to Grand Forks. The Mitchell Diamond Drill Contracting Company is preparing to start work under the direction of P. B. Freeland, District Mining Engineer, as soon as weather conditions permit.

Trail, B. C.

Employees of the Consolidated Mining and Smelting Company of Canada at Trail, B. C. have been experiencing difficulty in securing housing accommodation. So marked has the problem become that not a few have had to makes homes for themselves at Rossland and Nelson, communities some distance away from the scene of their daily labors. Recently the Company recognized their employees troubles by announcing a decision to help those who wished to build homes in Trail by making loans for the specific purpose of meeting the cost of construction. The chief points of the Company's plan are that advances will be made to married employees up to $2,500, the total allowed in no case to be over 80 per cent of the estimated value of the lot and the building, that the sum granted shall be repayable both as to principal and interest in monthly instalments extending over four, six, or eigth years; and that the loan shall be secured by a first mortgage on the property. While the Company expresses the wish that those building adopt of the one standards plans which are being provided this is not being made a necessary part of the agreement.

Ore receipts in gross tons at the Consolidated Mining and Smelting Company's Trail Smelter for the week extending from the 22nd to the 31st of March last were 7,271 tons, making the total for the year 73,246 tons.

Victoria, B. C.

An amendment has been passed to the Iron Ore Bounties Act of British Columbia extending the period of its operation to 1925. This legislation empowers the Provincial Government to pay a bounty of $3 a ton on pig iron manufactured in British Columbia from local ore and $1.50 a ton on pig iron produced from ore produced outside the Province.

The British Columbia Government proposes a radical innovation this year for the stimulation of interest in the mining industry and for the assistance of returned soldiers. Last year $2,000,000 was voted to provide funds for the bonusing of local industry. Not all of

this was loaned and the Provincial Legislature is being asked to supplement the appropriation by some $500,000, of which $50,000 is to be set aside for the financing of returned soldiers desirous of going into the hills in search of minerals. The details have not yet been worked out but Hon. Wm. Sloan, Minister of Mines, is understood to contemplate the sending out of about thirty parties this summer, each party to be composed of two of whom one shall be an experienced prospector and the other a man who, by reason of his overseas service, is entitled to special consideration. In the case of each party the government will take the place of the provider of the time-honoured grubstake. Discoveries will be recorded as provided under the Mineral or Placer Acts and the government, no doubt, will expect to be reimbursed where the prospectors meet with success. More particulars will be available later but meanwhile it may be stated that the authorities feel that, although this is an advanced policy, attractive theoretically but somewhat doubtful as to the results to be expected on practical application, it may serve the twofold purpose of inspiring the prospectors with renewed energy and enthusiasm and giving a hand to those veterans who feel that they wish to change from former sedentary occupations to a life in the open.

The "Allied Forces Exemption Act" of British Columbia has ben amended at the present session of the Provincial Legislature in order that its provisions may continue in force until 1921. It also is made to apply to placer claims whether held by record or lease under the Placer Mining Act. This simply means that returned soldiers who held mineral or placer properties in this Province at the time of their enlistment are given a further period to get on their feet before the obligations set out in the Mineral and the Placer Acts are applied to them.

The construction of a concentrator at the Sunlock Group of Mineral Claims, Jordan River, Vancouver Island, will not be proceeded with immediately, such a decision having been reached at the recent annual meeting of the shareholders of the Coast Copper Co., Limited. The recommendation of the board of directors to make a bond issue of $500,000 was endorsed. This fund is to be used on further development and when the ore reserves assure a daily output of 500 tons, and construction conditions are satisfactory, a concentrator will be installed. The President's report stated that the work of the year had practically doubled the ore reserves and that new locations now give the property a total of twenty-three claims and several fractions with a total area of about 968 acres. Test shipment sent to the Trail Smelter during the year proved the Sunlock ores to be readily amenable to the flotation process of concentration. Development, it was decided, will be continued; ore blocked out; and, such as may have to be mined, stored, so that when the time comes to provide a concentrator there will be available and in sight a sufficient supply to maintain operations indefinitely. T. W. Bingay, is the president and A. N. Skill the secretary while the old board of directors was re-elected as follows: W. R. Winter, W. O. Miller, P. W. Racey, Stuart Campbell, and W. M. Archibald.

Texada Island.

The Calumet and Arizona Mining Company is reported to have purchased the Cornell, a copper property belonging to the Van Anda Group, which was located some 20 years ago and worked for a period. The property was bonded to the present purchasers two or three years ago. It is the intention to instal the plant necessary to clear the main shaft of water and then to prospect by drilling about 2,000 feet of diamond-drill borings. This work will be undertaken this summer.

MANITOBA LETTER.

By C. A. MILLICAN, Winnipeg.

The Gold King Mines, Ltd. has acquired a half interest in two claims lying south of, and between the company's holdings and Hole River Lake. These will give the company frontage rights in the Lake about half a mile long, and have been secured chiefly with that object in view.

Mr. Victor Mattson, who owns these claims, and who is in charge of operations in the Gold King properties has so much faith in the district that he declined an offer for the full rights. Up to date there has not been much prospecting done on them, but Mr. Mattson evidently expects to find some rich veins, hence his reason for obtaining a half-interest.

It is the intention of Marigold Mine to discontinue sinking in the near future and devote available funds for surface stripping. An assay of ore from the bottom of the 30 feet shaft shows value of slightly over $10 per ton on a 6 ft. vein.

Mr. Beckman, Managing Director of the Gold Pan Extension Mine, has returned from a trip to the property. Mr. Beckman states that the buildings are all completed, and active mining operations are being carried on.

The four drill compressor is not yet working, but sinking is being carried on by hand drilling for the present. Very shortly the compressor will be in commission when sinking will proceed at the rate of 100 feet per month.

The vein in the shaft is 5 feet wide, composed of quartz and schist, between well defined walls. A crew of fifteen men are at present working, sinking being carried on by double shifts.

Work is progressing steadily at the Gold Pan Mine. The drift to the south at the 200-foot level is now about 115 feet from the shaft.

A movement is on foot to organize a Trading and Transportation Co. to handle the business of the Rice Lake District. Undoubtedly there will be a heavy movement, both in people and supplies, in that section of the country this season.

OTTAWA WILL NOT DISALLOW BRITISH COLUMBIA LEGISLATION REGARDING DOLLY VARDEN MINE.

The Minister of Justice has refused the application for disallowance of the legislation of the Province of British Columbia regarding the Dolly Varden Mine. Solicitors for the Dolly Varden Mines Co., Ltd., the original owners, will now seek to establish through the Courts that the Act passed by the B. C. Legislatures was ultra vires, and that the persons presently in charge of the mine are liable for damages for trespass and to account for all monies realised from the working of the mine.

Associated Goldfields Mining Company, Limited

HEAD OFFICE: TORONTO - MINES: LARDER LAKE, ONT.

CAPITAL - $5,000,000

ANNUAL MEETING, APRIL 16, 1920

PRESIDENT'S ADDRESS TO THE SHAREHOLDERS:

To the Shareholders:

Your Directors have much pleasure in submitting their report of the operation of the Associated Goldfields Mining Company, Limited, for the year ending December 31, 1919. Accompanying the report are statements as to the physical condition of our mining properties at the time of this annual meeting, and reference to the company's development and construction policies.

It is with considerable pride that your Directors call attention to the enviable financial position of the company. At December 31, 1919, the company's liquid assets were:

Cash on hand and in the banks	504,778.44
Victory Bonds	93,883.96
Notes receivable	450,000.00
Total	$1,048,662.40

Total liabilities were:

Trade accounts payable....	$6,897.32
Wages accrued	4,266.75
Total	$11,164.07

Of the authorized capital of 5,000,000 shares of a par value of $1, there remained in the treasury at the end of 1919, 1,073,588 shares.

To bring these figures closer to the date of this meeting, we have certificates from the banks, showing cash on hand at March 31, 1920, $737,580.55; Victory bonds, $87,821.84, and notes receivable, $275,000. Therefore, after large expenditures for labor, supplies, materials and equipment during the past three months, we had at March 31 approximately $1,100,000 in liquid assets.

Mining Expenditures.

During the year 1919 more money was spent on developing the properties than in all previous years combined. The sum of $169,258.62 was expended, the chief expenses being wages, supplies, diamond drilling and freight. A large portion of this sum has been considered a capital expenditure and has been transferred to assets as capital development.

Mining Results Obtained.

Splendid results were obtained during the year, and the physical condition of our three main mining properties was greatly improved.

At Block "B" mining work has been carried on vigorously, and highly satisfactory results are being secured on the three hundred, four hundred and five hundred foot levels. It is felt that development and exploratory operations should be carried on further before engineers draw conclusions as to the character and extent of the ore bodies and the type of mining and milling operations most suitable for their treatment.

High-Grade Ore Bodies.

On Block "C" and "D" our endeavors to develop a large body of ore, approximating $5 a ton in value, have been very successful, and these endeavors have been unexpectedly satisfactory in that we have located and partially bounded two wide lenses of considerably higher grade ore.

Underground workings and diamond drilling have shown these high-grade lenses to have a known length of 2,000 feet each, and each averages from 50 feet to 150 feet in width. Diamond drilling shows these bodies to exist at least 500 feet below surface. The average value of these high-grade lenses, over the areas covered by these dimensions, is $11.15 a ton.

As development and exploration of these two high-grade lenses is still proceeding, and the boundaries have yet to be exactly fixed, it is not deemed advisable to present at this date an estimate of the total tonnage of high-grade ore here existing, but there is unquestionably sufficient high-grade ore to supply for years a mill of 2,000 tons daily capacity.

Low-grade Ore Bodies.

These high-grade lenses are enclosed in an exceptionally extensive body of low-grade ore, with a width of from 400 to 500 feet. The removal by selective mining of the high-grade material will not interfere with the later mining and milling of the low-grade material on the large scale originally planned.

The company now finds itself in the enviable possession of high-grade ore sufficiently proven and developed as to fully warrant the immediate commencement of a mill of at least 1,000 tons daily capacity. We possess enough ore of high value to assure profits from milling operations of this size, comparing well with the probable profits from the treatment of a much larger tonnage of lower grade material. Therefore returns will result earlier than anticipated.

First 1,000 Tons Milling Unit.

The ground for the first milling unit of 1,000 tons daily capacity has been broken at Block "D," and actual construction begins at once.

A decision as to the building of an additional and adjoining unit of 1,000 tons depends on a study now being made as to probable labor conditions of the near future, and as to how far delivery of mine and mill equipment will be affected by the transportation facilities existing. Your directors desire to emphasize that the construction of first units is in the nature of steps toward the ultimate aim of gold mining plants of an aggregate daily capacity of 10,000 tons.

Railway Facilities.

The company's consulting engineer, in advising the construction immediately of the first milling plant, also advises that the most complete development of the properties and the largest production of gold, of which our mines are capable, depends on the building of a branch line from the T. & N. O. Railway to Larder Lake, a distance of twelve to sixteen miles, according to which route is chosen. This question of railway facilities is under the consideration of your Directors.

To Develop Additional Power.

To provide sufficient energy for enlarged mining and milling requirements, as well as other demands, the Directors have decided to proceed immediately with the development of further hydro-electric power.

New 500-foot Shaft.

Work at Block "C" on the sinking of a three-compartment shaft has been commenced. The first objective is 500 feet. Stations, stoping-levels, electric tramming levels, ore pockets, etc., will be established at intervals. From this shaft will be developed and drawn a large part of the high-grade ore referred to above. As these bodies to a considerable extent have been opened and prepared for stoping in our existing underground workings, there seems every reason to expect that with the workings from the new shaft producing ore, a large tonnage will be accumulated when milling operations commence, and that a constant supply of ore will be maintained.

When weather permits, the diamond drills will be brought from underground, and further exploration of ore bodies will be resumed from surface, the immediate object being to learn the total length of the high-grade lenses.

Accommodation for 500 Men.

During the past year the company constructed accommodation for 200 men, and these living quarters and dining-halls will compare favorably with the best in the mining districts of northern Ontario. As the scope of our operations is increasing rapidly, the company is proceeding with the construction of further quarters, so that, by summer, 500 men may be accommodated. Among the new buildings will be a private hospital, under the company's resident physician, and a number of cottages for the married men of the staff.

Appreciation of Staff.

The Directors desire to express their appreciation of the loyal and able services of all members of Associated Goldfields forces. The company is very fortunate in its possession of the services of Mr. A. J. Moore, the consulting engineer He brought to his work with us the benefits of a long and thorough technical education and the experience gained in thirty years of managing some of the largest mining and metallurgical operations on this continent

Dr. H. C. Cooke Engaged.

To its staff of mining engineers the company, your Directors are pleased to announce, has been able to add Dr. H. C. Cooke, who for many years was with the Geological Survey Dominion of Canada. Dr. Cook is now engaged in his duties as the company's geologist Two other graduate mining engineers are also on our technical staff.

In conclusion, your Directors wish to assert that since our last meeting they have accomplished all that they set out to do, and much more than they anticipated doing. At the properties the discovery and development of gold-bearing bodies has exceeded their most optimistic expectations. In the important matter of financing the company to the stage where its mines are adding to the country's production of gold the Directors desire to say that their work is already completed. No further stock need be offered for subscription. On November 11th, 1918, the day of the armistice, the company had $5,000 on hand above the liabilities. At the time of our last annual meeting, on April 10th, 1919, the company had on hand $160,000. Since this last date approximately $260,000 has been expended at the properties, and to-day the company possesses cash, bonds and similar resources of $1,100,000.

With gold-bearing bodies of large dimensions, and profitable values proven, there remains the task of bringing the company's mines to the broadest stages of production and fullest return on investment. Now that ample financial resources have been secured, we have complete confidence that our mine management and forces will successfully accocmplish this task.

For the Directors:

G. A. MacKAY,
President.

The Board of Directors was re-elected.

Geo. A. MacKay, President; A. A. McFall, Vice-President; A. Singer, J. Dinwoody, D. H. McCartney.

The following were elected members of the Advisory Board: James Langskill, Geo. H. Smith, A. N. Burns, Senator V. Ratz, G. M. Hendry, Capt. J. J. Walters, Jas. Dohson, Samuel Harrop, F. W. Fisher, Robert Smith, W. T. Taylor, Chas. D. McGregor, Walter Page, Orrin Kolb, Simon Sinclair, W. T. McClain, Alfred Singer, John H. Taylor, Dr. R. K. Anderson, M.P., Scott L. Cowley, B. Stone, W. H. Smith, W. H. Despard, J. Robinson, A. B. Rose, Henry Goldwater, J. A. Wilson, M.D., W. A. Johnson, William Schnelder, C. W. Schiedel, F. Powell, A. J. Gough, Jos. Bamford, S. B. Gundy, F. Jacobi, A. Butler, S. W. Jenckes, H. H. Stevenson.

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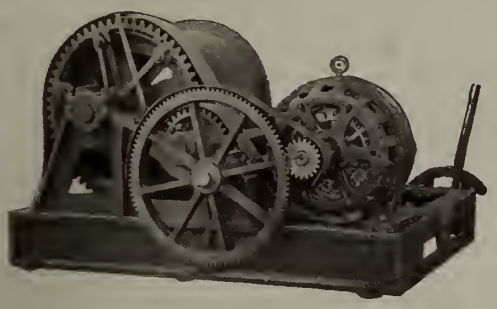

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We are specialists in the building of Hoisting Machinery of all sorts. For nearly a quarter of a century we have been designing and building Hoists, and have developed a Hoist that we are really proud of—proud because of the record of good work they have done, and are doing in mines, quarries, and other classes of work from one end of Canada to the other.

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THE CANADIAN INSTITUTE OF CHEMISTRY

The Canadian Institute of Chemistry came into being in May, 1919, by vote of chemists of Canada assembled in convention, and shortly after, the first meeting of the original members was called when the following officers and Council were elected:—

President: J. Watson Bain, University of Toronto.

Vice-Presidents: George Baril, M.D., Laval University; Dr. A. McGill, Chief Chemist Dept. Trade and Commerce, Ottwa; R. D. Mc. Laurin, University of Saskatchewan.

Councillors: G. R. Ardagh, University of Toronto, Dr. J. S. Bates, Price Bros., Ltd., Kenogami; Dr. Horold E. Biglow, Mt. Allison University; S. J. Cook, Dept Trade and Commerce, Ottawa; J. A. Mc. D. Dawson, Dept. Trade and commerce, Vancouver,; Dr. L. F. Goodwin, Queen's University; I. Grageroff, Canadian Explosives, Ltd.; A. Lehmann, University of Alberta; Matthew A. Parker, University of Manitoba.

At the present time the Institute numbers 113 Fellows, and three Associates, together with H. R. H. the Prince of Wales, who graciously consented to become an Honorary Fellow.

Mr. Harold J. Roast (393 Guy St., Montreal) is the Secretary-Treasurer.

The Institute represents Canada on the Board of the inter-allied Chemical Union.

The following extracts from the Constitution set forth the objects of the Institute and the qualifications required for membership:

Objects of the Institute:—

"A" To raise the profession of Chemistry to its proper position amongst the other learned profession, so that it may attract a larger proportion of the best intellects and thereby secure a supply of trained Chemists adequate to the growing industrial needs of the country.

"B" To form an organization immediately available for consultation by the Government.

"C" To protect the public by gathering together a body of men who may be consulted with confidence.

"D" To look after the professional well being of the Chemists by:—

1. Having a registration bureau for Chemists.
2. Having social centres for Chemists and Chemists only.
3. Maintaining an employment bureau for Chemists.
4. Having centres for the interchange of Scientific experience, by both papers and lectures.
5. Maintaining a clearing house of available chemical knowledge, including a library and suitable register that would enable the central bureau to put one Chemist in touch with that other chemist, who might be able to assist him in his particular problems (leaving it to the parties interested to arrange details as to recompense or otherwise).

"E" To secure such Government recognition as may from time to time be deemed advisable.

"F" To maintain a professional association for professional men.

"That the membership consists of two classes: Fellows and Associates, of either sex, the former having the right to use the letters F.C.I.C., and the latter having the right to use the letters A.C.I.C.

"That the following be the requirements for Fellows:—

(a) One who shall be of the age of twenty-five or over, being a graduate of a recognized University, having a four years course in Chemistry or Science, and who can satisfy the Council that Chemistry, Pure or Applied, has been his major subject, and who has been actively engaged in the pursuit of Chemistry in a responsible capacity for two additional years.

(b) One who shall be of the age of twenty-five or over, being a graduate of a recognized University, giving only a three year course in Chemistry or Science, who can satisfy the Council that Chemistry, Pure or Ap-

plied has been his major subject, and who has taken another year's training in Chemistry, at a University, and has had in addition two years experience in Chemistry in a responsible capacity in a laboratory approved by the Council, or under the direction of a Fellow of the Institute. If the additional year at a University is not taken, then three years training in a responsible capacity in a laboratory by the Council.

(c) Those who do not qualify under (a) or (b) being of the age of twenty-five or over, shall have held a position of responsibility in Pure or Applied Chemistry for not less than five years and shall be examined by a Board appointed by the Council. The Candidates shall be examined on the theory and practice of Chemistry with special reference to the branch of Chemistry in which they have been engaged. This examination may be waived at the discretion of the Council if the Candidate was engaged in Chemistry at the date of the inauguration of the Association and has held a position of professional responsibility for not less than eight years.

"That the following be the requirements for Associates:—

Persons being under twenty-five years of age who would otherwise be eligible for membership as Fellows under provisions a, b, and c, the requirements under a and b regarding the practice of Chemistry in a responsible capacity for two years being waived.

"An Associate upon reaching the age of twenty-five years may become a Fellow providing he is recommended by three Fellows and has been engaged for at least two years in the practice of Chemistry pure or applied, and is otherwise eligible as a Fellow.

"An Associate upon election to a Fellowship shall pay the difference between the initiation fee for Fellows and Associates.

"The Council reserve the right to refuse admission to any applicant, or to remove any member for sufficient cause.

Fees:—The entrance fee for Fellows be Ten Dollars and Anual Fee Ten Dollars.

The Entrance for Associates be Five Dollars and the Annual Fee Five Dollars.

METAL QUOTATIONS.

Fair value for ingot metals at Montreal, April 30th 1920:

	Cents per lb.
Electro Copper	24
Castings Copper	23½
Lead	11
Zinc	10
Tin	71
Antimony	13
Aluminum	40

UNDERGROUND TEMPERATURES IN THE KENT COALFIELD.

In the course of an article on the Kent Coal Field in the "Financial News" (February 13), Dr. William Galloway gives some particulars in regard to some of the deeper seams encountered in the course of development. Thick seams have been found at Barfreston (3,318 feet depth, 9ft. 6in. thick); Stonehall (3,332ft., 8ft. 7in.) and Maydensole (3,760ft., 5ft. 8in.). These depths verge upon the maximum of 4,000ft. below which the Royal Commissions of 1871 and 1904 thought that coal could not be worked in this country on account of the increase in temperature of the strata. The Commissioners estimated the rate of increase (geothermic gradient) to be 1 deg. Fahr. for every 60ft. of additional depth below a plane parallel with, and 50ft. below, the surface, at which the temperature of the strata does not fluctuate, and is the same as the mean annual temperature at the surface, namely, about 50 degs. Fahr. in Kent. Some seams will probably be found at a greater depth than 4,000ft. in Keut, more especially south of Stonehall and under the Channel, and for that reason the following observations of the rock temperature in Snowdown and Tilmanstone collieries are of interest. Those made in the Beresford seam at Snowdown and Tilmanstone, and in the Hard seam at Snowdown, were taken with the thermometer, and in the manner specified by the Committee on Underground Temperature of the British Association; that in the seam at 3,011 ft., at Snowdown, with an ordinary thermometer placed in a bore-hole in the coal:—

	Temp. Fahr. Deg.	Av'ge depth. Ft.	Geothermic gradient. Ft.
Beresford at Tilmanstone and Snowdown	74	1,500	60
Hard (Snowdown)	80	2,240	60
Seam at 3,011ft.	90	3,011	75

The geothermic gradient from a depth of 50ft. below the surface to the Beresford seam is 1 deg. Fahr. for every additional 60ft.; that from the Beresford to the seam at 3,011ft. is 1 deg. for every additional 94ft. This decrease in the gradient with increasing depth is not unusual. If it holds good in other parts of the field, and at greater depths, the temperature of 113 degs. Fahr. will not be reached in Kent until the depth is rather over 5,000 ft., or 1,000ft. below the limit imposed by the Commission.

Wood Mining Tanks
Of All Descriptions
Wood Stave Pipe
ILLUSTRATION SHOWS DORR THICKENER TANKS 50 FEET DIAMETER. MADE FROM B.C. FIR. INSTALLED BY US.
Pacific Coast Pipe Co., Limited
1551 Granville Street, Vancouver, B.C.

:-: EDITORIAL :-:

The Choice of Underground Illumination

A recent advertisement of a welll-known type of oil safety-lamp under the caption "Fortunate Escape from Fearful Disaster" relates that on February 27th a blower of gas filled the workings of the Ponthenry Mine in Gwendraeth Valley, South Wales, and extinguished all the lamps. It is assumed that the fortunate escape of all the workmen, save one, was due to the use of the oil safety-lamp, and the advertisement proceeds: "One shudders to think what would "have happened if the pit had been fitted with elec- "tric lamps wherewith the men could have gone on "working until they had all been fatally overcome "with gas." The supposition is a very large one, and is open to a good many qualifications.

The writer recollects an occurrence of this nature in South Yorkshire, where a blower of gas issuing from the floor fouled the intake air up to the fan-drift itself. The workmen in the district affected remained at work until their lamp gauzes were red-hot. The boys at work became frightened quickly and made for the slope-mouth, but the men had to be fetched out by the officials. There was little doubt of the nearness of a disaster in this instance, and one defective lamp would have caused an explosion.

In the absence of particulars as to the nature of the gas in the blower at Ponthenry Mine, it would be useless to comment on the rapidity with which the safety-lamps are stated to have been extinguished, and, if the gas were methane, then it must have been in tremendous volume, containing a non-explosive atmosphere (and of course non-respirable) near the blower, and an atmosphere of limitless explosive possibilities on the fringe of the gas-filled district where admixture with air in explosive proportions presumably existed. Under such circumstances the extinction of the oil-flame lamps was not an unmixed evil, as it lessened the danger of explosion in escaping from the mine should a defective lamp have been present. At the same time, the men lost their lights. and presumably had difficulty in escaping in the dark.

What would have been the conditions had the mine been worked by electric lamps? There would without doubt have been provided the necessary number of oil-lamps, in the hands of officials, for the very purpose of detecting a condition of the mine atmosphere dangerous to life. Such a condition might arise from the presence of inflamable gas, but might also be caused by the presence of carbon di-oxide, which the oil-lamp would show; or the presence of carbon mon-oxide, which the oil-lamp would not indicate. Warning would have been given and the men could have escaped, but without running the danger of causing an explosion at the point where an explosive atmosphere existed.

We believe the incident quoted in the advertisement referred to is just as good on example of the dangers of the oil-lamp as it is of the electric lamp. The electric lamp has only one drawback to its general use in collieries, and that is its inability to detect atmospheric changes. This drawback can be easily overcome by appointing officials, who would carry both oil and electric lights, to observe atmospheric conditions and take the necessary measures.

The chief defect in the oil safety-lamp is the insufficient and partial nature of the illumination it gives, and there is no question at this date but that the oil safety-lamp is the cause of miners' nystagmus. The evidence accumulated on this point by Sir Josiah Court, and recently published, is overwhelmingly convincing, and it is an instance of the paralysing effect of an accepted idea that the oil safety-lamp should have remained for so many years in general use, despite the unsatisfactory nature of the illumination it afforded. The portable cap--light type of electric storage-battery lamp affords an ideal illumination for the miner, and as the idea gradually gains force that any form of **flame** is objectionable in a colliery, whether it is protected by gauzes or not, the electric miners' lamp will come more and more into favor. Only those who have had experience of colliery lamp-house reports know just how many things can happen to an oil-flame safety-lamp to make it anything but what it purports to be. The additional expense connected with electric lamps, as compared with flame lamps, is not of sufficient importance to cause hesitation in adopting the electric lamp once it is acknowledged that the incandescent light is safer than the flame.

Propagandists of Hate

Propaganda may be cunningly disguised, but it is usually possible for the discerning reader to distinguish the well-timed and recurrent contributions of the propagandist from the ordinary news of the dailies and periodical press.

It is not difficult, therefore, to detect in the unusual amount of space that the newspapers of the United States and those of the British Empire are devoting to oil occurrences and their exploitation the influence of the powerful rival groups of interests that seek the domination of the oil occurrences of the World.

There is nothing that is inherently wrong, or even novel, in this quite apparent condition, if the protagonists of the competing interests will confine themselves to proper limits of discussion. In astuteness and vision, the financiers of the United States and those of the British Empire are a fair match. They have many times in the past pitted their wits against each other, or have combined them against a common rival, as may have seemed to them at the time desirable, without rancor, and according to the ethics of the business game. All they have hitherto asked has been a fair field and no favor. Each has placed a premium on brains, and has been willing to pay good men well for services rendered.

Latterly, however, another and a less worthy spirit seems to have obtained prevalence, although it has not yet obtained predominance. This spirit is traceable to injudicious, provocative and short-sighted propaganda, emanating from private interests, but purporting to express national and racial ambitions. Strangely enough, this overdone and false expression of national aims is a product of the war. It might have been thought that the example of the Prussian, who discussed world trade in terms of military strategy, and made such an awful mess of his grandiose plans, would have cured the other nations of a similar wicked obsession, but on the contrary, the virus has spread, and those who before the war were business friends and won the war together, now see their comradeship endangered by newspaper writings that dilate upon ordinary competitive business affairs much as an Economic Committee of the Prussian General Staff might have reported to their War Lord.

There are some phases of a nation's internal economy that call for publicity, and the inculcation of a national concern; such as for example, the fuel problem of Canada. This is a question of national defence, because it is essentially a question of national existence. Public discussion of such matters is desirable, and should be frankly undertaken in the open. Our friends in the United States—that is all those whose friendship is worth having—will take no umbrage if Canada undertakes to become thoroly self- supporting wherever it shall prove possible. They will admire us for so doing, and conversely they will secretly despise us if Canada unnecessarily places herself in a mendicant attitude. On all such questions open discussion is possible, because the matter is one of public interest.

But apart from pressing matters of our own internal economy, of which coal is the most typical instance, nothing is to be gained, and much may be lost by irresponsible discussion in the newspapers of the supposedly high strategic aims of the political leaders of the United States and the British Empire, aims that do not exist, but which, correctly interpreted, will be found to bear on the real aims of rival oil interests. Apparently these people do not care whether they embroil the United States and Mexico in war, or whether they split the alliance between Britain and the United States that won the war, but looks like losing the peace; causing some people to wonder whether civilization can even yet be saved, and whether it is really worth saving, if all the people of North America have gained from their fighting comradeship has been the absorption of the Prussian viewpoint.

The journalist, or paid propagandist, who endeavours to cause friction between the United States and the British Empire is a most dangerous criminal, and he is especially dangerous in Canada. We suggest that cables from London Sunday newspapers, which appeal to an audience which is not representative of the sentiment of the British Empire, and is certainly not representative of Canadian sentiment, should be read with large allowances; and that, similarly, items appealing to similar audiences in the United States, relating to the malgin purposes of the British in securing oil concessions in the Himalayas or round the Great Slave Lake in Canada, for example, should be generously discounted. Also, it would be much better for the oil interests, and for the peace of the world, if these gentlemen would be frank about their commercial aims, and would discontinue their pretence to pose as the champions of national aims, and as the exponents of grandiose schemes that are not one whit better morally, and just as likely of success, as the proposals of Von Bernhardi in "Der Naechste Krieg".

Bolsheivism is originally a reflex of the disillusionment of deceived men who have seen their genuine love of country prostituted to base uses by rulers who dreamed and planned wickedness. This is the grain of truth behind the puzzling belief of labor that capital caused the war, and those who play fast and loose with patriotism for purely commercial ends are toying with the same forces which were unloosed in a recent war that is still runnings its course despite official peace treaties.

ECONOMIC DEPENDENCE OCCASIONS POLITICAL SUBSERVIENCY.

It is not necessary, in a Canadian paper, to discuss the taste of Senator Underwood in speaking of the Crown Lands of Canada as though they were an adjunct of his own country. Canada believes she has the right to decide what she will do with her own, and any talk of retaliation by the United States is a challenge to Canada's sovereignty and a threat against the comity of nations.

The threat to place an embargo on coal and sulphur will be of interest to our readers only as a further instance of the necessity for Canada to become self-supporting in the matter of coal supply. The Canadiad coal market is not really a question of much importance to the United States' producer. A country that can mine 700,000,000 tons of bituminous coal, and 90,000,000 tons of anthracite annually, and could probably with ease reach an output of a billion tons annually if it so desired, is not likely to worry much about the small tonage it imports into Canada, although that tonnage from the Canadian point of view is a question of the supremest importance. It is nothing to the United States, but it is life to Canada.

This paper has endeavoured to present the national aspect of coal production in Canada, and we have urged that dependence upon a neighbour for a raw material that is a prime necessity of national existence must inevitably lead to political subservience. This is exactly the threat implied by Senator Underwood, who, because Canada is so largely dependent upon the United States for coal, argues that this fact gives the United States a lien and a prescription upon our pulpwood resources.

These may be harsh words, but they are not harsher than the facts warrant. If Canada, through desire for ease, and a disinclination to tackle the difficulties of our fuel problem, puts herself in the position of a poor relation, then we must put up with insults and reminders of our dependency.

Senator Underwood does not mention, when he puts United States' cotton against Canadian pulpwood, that cotton is an annual crop, and that our pulpwood is a heritage that carries an entail, and is not replaceable.

Canada can buy cotton elsewhere within the British Empire. She can produce all the sulphur that is necessary from her own mines. And she can produce—if not all the coal our country requires—very much more than Canada has ever yet produced.

It is not so long not ago that Mr. McAdoo suggested the purchase of the British West Indies by the United States. Mr. Mc.Adoo had apparently overlooked Mr. Wilson's pronouncement on the handing over of populations to foreign jurisdictions, which of course was only a pronouncement, and is not yet a part of international law. But what is most disturbing about Mr. Mc.Adoo's suggestion is that anyone in his position could conceive that there was any power resident within the British Empire that could "sell" British soil and British citizens and voters. Citizens of the United States, no matter how exalted their position in their own country, have no right to discuss the internal politics of Canada, the West Indies, or any other part of the British Empire. If they do, then they presume, and lay themselves open to the dangers of minding other peoples' business.

It is not likely that the United States, through its official representatives, will be associated either with Mr. Mc.Adoo's suggestion, or Senator Underwood's remarks, because the limitations of national sovereignty are well understood, and such suggestions would receive the answer they deserve. It is not surprising to know that Senator Underwood, when asked as to the attitude of the State Department, said "he believed it was one of hostility". In other words, it is a correct attitude.

The lesson is that no country should voluntarily, and unnecessarily, place itself in a position of economic dependence. In the matter of coal supply, Canada has done this.

CONSOLIDATED MINING AND SMELTING COMPANY ADOPT GROUP INSURANCE FOR EMPLOYEES.

Today about eighteen hundred employees of the Consolidated Mining and Smelting Company of Canada, Limited, are protected under the Group Insurance system of the Sun Life of Canada.

Announcement to this effect has just been made, the Consolidated Mining and Smelting Company taking out a group insurance policy covering the men of the British Columbia plants including the big smelting plant at Trail, B.C.

The Consolidated Company treated every employee alike, this in spite of the fact that a number of miners are employed by them, the officials decided to pay the large extra premium in order to bring all under the group system of insurance.

Group Insurance is rapidly making headway in Canada and the policy just issued calls for the payment of $500 to the widow or relatives of every employee, who has been working for the company for six months, the amount of insurance increasing $100 for every additional six months' service, with a maximum of $1,500.

The company have a number of returned soldiers and sailors in their employ. The length of service of these men for the company before the outbreak of war will be taken into consideration. This is an exceptionally good feature, which the returned men appreciate.

Correspondence

Peace River Oil Formations.

The Editor

"The Canadian Mining Journal."

Dear Sir:—

The following paragraphs appeared in the Journal of April 9th, page 292, which are part of Mr. D. B. Dowling's address before the Annual Meeting of tthe Canadian Mining Institute.

> "On the plains most of the prospecting has of late years been centred in the Peace river valley, where several wells averaging eleven hundred feet in depth pass through sands impregnated with heavy oil. The flow is necessarily slow and although the presence of oil seems to be proven, no production has been attempted possibly on account of the trouble with water which can generally be attributed to insufficient or defective casing, and to lack of restraint on the part of the operators in drilling through the oil sand into the water bearing bed which lies below it."

> "The belief that is so general among the drillers, that the really profitable oil horizon is in the limestone of the Devonian which lies beneath the oil impregnated sands of the lower Cretaceous has led indirectly to the spoiling of several possible productive wells in the Peace River field, as with the object of reaching the limestones, borings have been continued below the heavy oil of the Cretaceous into the water-bearing beds which overlie the Devonian limestone."

The writer has had for a considerable period conditions, as exist in the Peace River District, under investigation, and does not admit of the correctness of Mr. Dowling's statement.

In reading Mr. Dowling's address other references are made to the possibilities of finding oil in the middle Devonians, and I quite agree with Mr. Dowling as to such a possibility; but in my mind should oil be found in this formation, it will occur merely in segegated pools, and therefore will not lead to an oil field of great production. The characteristics of the field would be more or less similar to the Western Ontario field, which field is not to be depreciated in any way, but if a similar field were found in the Sub-Arctic regions (comparatively speaking), it would have little commercial value, owing to conditions of transportation, population, etc. Such a field, however, would be a great boom to the immediate vicinity.

Without doubt the management and operation of drilling in this Northern region have been carried on very inefficiently, and I believe this condition to be wholly responsible for the failure in reaching a point where the wells could be claimed even a successful prospect.

Personally I know of no operators who have ever had the intention of drilling to find oil below the limestone. (This of course with the exception of those wells which were started at the limestones). Such a decision might have been formulated after close examination of logs, once the limestone was reached. Further, I know of no information which would lead one to believe that the sandstone in which the large flow of water and natural gas was encountered was a sandstone directly above the limestone, but indeed to the contrary. I have been informed that one well, after sinking through about thirty feet (30 ft.) of this water and gas bearing sandstone, reached a quite impervious shale, but which they were unable to drill into more than five feet (5 ft.) before the high pressure above caused their casing to fail. The claim was made that previous to failure no water was entering their well, while in this shale. (I cannot vouch for the correctness of this information.)

The occurrence of heavy oil at various depths, and last the heavy pressure of gas and water, when considered in connection with conditions existing in other oil fields, brings out that the only decision possible of any operator would be to continue drilling to prove conditions as far as the limestone. It is not at all unlikely that the water and gas-bearing sandstone would be found considerably above the limestone and separated from it by considerable thicknesses of more or less impervious shale. If under this pressure these conditions existed, and if the formation immediately above the limeston were of a porous nature, it is not out of the way to state that conditions are well suited for the accumulation of oil in large quantities. (It must be understood that other characteristics of the field are to be taken into consideration in making this statement.)

The lot of the engineer is not the easiest, as it is quite impossible to foretell the existence or otherwise of oil, but it is quite possible for him to select locations after very detailed investigations where conditions are structurally best suited for successful operations.

From the result of detailed surveys I believe the limestones will not be reached at the location immediately below Peace River Crossing (Tar Island anticline), till about sixteen hundred (1600 ft.) and possibly more. The water and gas pressure was encountered at about eleven hundred (1100 ft.), which allows considerable leeway for conditions as outlined above.

If Mr. Dowling's position and reputation were other than they are, namely: the very best, I would not criticize in any way the statement, but when given publicity Mr. Dowling's statements are serious, and I believe in this case would bear considerable influence in affecting adversely the continuation of legitimate operations in the field mentioned.

The heavy oil encountered may at some later date prove to be of commercial value, but I distinctly doubt its value at the present date. It is regrettable that the operators did not take better care of their casing, so that the high water pressure could be controlled, and even now strenuous efforts should be taken so that this water pressure can be excluded from the upper oil bearing strata.

Mr. Dowling's statement concerning other possible fields in the West is very timely, and he is to be congratulated on the clearness of his argument.

Yours truly,

G. M. PONTON.

Ottawa, April 17, 1920.

Calculations on Inclined Haulages

JOHN S. WATTS, New Glasgow, N.S.

The purpose of this article is to give a full and clear account, of how to calculate the horse power to handle a given amount of coal, or other material on an inclined slope or haulage plane.

The formulae and directions given in the technical books, on this subject, neglect to take into account the power or pull required to accelerate the loaded trip, and the time required to accelerate and declerate the load, both of which have a considerable influence on the total time taken to make a trip, and therefore upon the daily output of the slope.

The simplest, and most usual case, is that of a straight incline at the same grade the whole length, and the factors that are known are, the grade and length of the incline, and the daily output required.

Generally also the weight and carrying capacity of the cars are known, or are fixed by conditions in the mine.

The first point to be decided is the maximum speed of hoisting, which depends upon the condition of the track, the better the quality of the track, and of the car wheels and journals, the higher the speed at which the cars can be safely run.

If the mine is a small one, it will be cheaper to purchase one of the standard hoisting engines, in which case the speed must be that of the hoist of the required power.

However, in the absence of any reasons to the contrary, it may be taken that 500 feet per minute, will be a "safe and sane" speed at which to run the trip, and is average practice.

Having the maximum speed at which the hoist will run, and the daily output required, we can now estimate approximatively the time it will take to make one trip, and from that the number of cars we must haul per trip to get the desired output.

In making this estimate, allowance must be made, for the time taken to accelerate the trip to full speed, and for bringing it to rest. Also for the time necessary to change the trips at top and bottom.

It is necessary at the first attempt to make the above estimates, but after working out the calculations on that basis, we can cut and try again for the final result.

In referring to the grade of the incline, there are three systems of stating its amount. for example we may say, 1st, that the inclination is 1 in. 20, meaning that the vertical rise is one foot for each twenty feet of horizontal length; 2nd, that the inclination is 5 per cent, that is the vertical rise is 5 per cent of the horizontal length; 3rd, that the inclination is at an angle of 2°-52′ to the horizontal.

All three of the above examples, represent actually the same inclination, and the third method is the one required for the basis of our calculation.

The first way of stating the grade of the incline can be converted into the third, that is degrees, by noting that the second quantity, that is 20, is the cotangent of the angle. By looking up a table of cotangents, we find that 20 is the cotangent of the angle of 2°-52′.

Similarly, the second way, can be converted into degrees by noting that the percentage of the grade ÷ 100 = the tangent of the angle, from a table of tangents we find .05 is the tangent of the angle 2°-52′.

To calculate the total pull on the rope, we have the following:—

(1) Pull due to weight of loaded trip = Weight of loaded trip × sine of angle.

(2) Pull due to friction of loaded trip = Weight of loaded trip × coefficient of friction.

(3) Pull due to weight of rope = Weight of rope × sine of angle.

(4) Pull due to friction of rope = Weight of rope × coefficient of friction.

(5) Pull due to acceleration of trip =

$$\frac{\text{Weight of loaded trip} \times V}{G \times T}$$

(6) Pull due to accceleration of rope =

$$\frac{\text{Weight of rope} \times V}{G \times T}$$

Where, V = maximum velocity in feet per second.
G = acceleration due to gravity = 32.16.
T = time of acceleration, or time taken to reach the maximum velocity in seconds.

Taking each of the above formulae in rotation:—

(1) Presents no difficulty.

(2) We have to know the coefficient of friction which is the absence of information from actual test on the cars in question, may be taken as being between .004 and .02, the lower figure being sufficient when the cars and tracks are in good average condition. The higher coefficient will only be correct under the worst conditions, such as frozen bearings, worn journals and uneven track. Under the usual conditions, the coefficient of friction to be used, is that of the cars in motion, not the coefficient required to start the cars from rest. This is because the pull allowed for acceleration plus the pull allowed for the moving friction, will be together greater than the pull required to start the cars from rest. This latter pull is only momentary, and the acceleration does not commence until after the cars are started moving.

(3) We require to know the total weights of the rope, and to get this we must estimate the size of rope that will be required and correct this later if necessary.

(4) Includes the coefficient of friction of the rope on its guide rollers, and in the absence of more precise information may be taken as .002, which is about correct for rope carried on rollers spaced about 25 feet apart. It should be noted at this point, that in No. 2 and No. 4 formulae, the friction will be reduced as the angle of the slope increases. This reduction is very slight for angles under 15°, and need not be considered unless the slope is steeper than that. For steeper slopes, the correction is made by multiplying the answer as calculated by formulae No. 2 and No. 4, by the cosine of the angle.

(5) To work out this formulae, we have to know the time, T, which we will allow for acceleration. And, as in the majority of cases, an empty trip is going down, while the full trip is coming up, this time of accceleration cannot be less than that taken by the descending cars to reach the maximum velocity under the action of gravity. This time can be calculated from the formulae:

$$T = \frac{V}{(\text{sine of angle} - \text{coefficient of friction}) \times G}$$

(6) Needs no comment, except that, of course, T is the same time as in No. 5.

Now adding together, the results of our calculations in formulae Nos. 1, 2, 3, 4, 5 and 6, we get the total maximum pull on the rope, which multiplied by the maximum speed of the hope in feet per minute, and divided by 33,000, will give us the brake horse power required in the hoisting engine.

However, as most of the makers of hoisting engines, specify the actual pull on the rope, that their engines will deliver, we do not usually need to specify horse power at all.

If the horse power must be given, one third should be added to the Brake Horse Power, as calculated above, to find the Indicated Horse Power required. This one third being necessary to overcome the friction of the gearing and engine.

Now to calculate the actual total time taken for one trip, we have

The time of acceleration = T
" " " maximum velocity = T_1
" " " deceleration = T_2

The time of acceleration, we have already, being T in formula 5.

The time of deceleration, cannot be less than that in which the cars will come to rest by the action of gravity, which is

$$T_2 = \frac{V}{(\text{sine of angle} + \text{coefficient of friction}) \times G}$$

To find T_1, we must first calculate the space travelled over during the times of acceleration and deceleration which is

$$\text{Space during acceleration period} = \frac{V \times T}{2}$$

$$\text{Space during deceleration period} = \frac{V \times T_2}{2}$$

Adding these two lengths together, and deducting the sum from the total length of the slope, we have remaining the length to be travelled at full speed, and the time required will be that length divided by the maximum velocity, which added to the times of deceleration and acceleration, will give the total time of the haul. To this amount must be added the time required to change trips, and from the sum, we can calculate the number of trips per day.

From the above calculations it will appear that the period of maximum load is during the accceleration period, and that during this time the engine receives no assistance from the empties going down, as they are simply gathering speed under the action of gravity, that is on an incline of regular grade.

The incline that would give a nearly uniform load on the engine, would be one that started off at the bottom on a low grade, changing to the regular grade at the point where the maximum velocity is reached, and, at the top, increasing the grade so that the empties would assist the engine in accelerating the full trip.

If the reasoning in the calculations set out above is understood there will be no difficulty experienced in making the calculation for an incline with varying grades.

Sometimes it is required to know what output can be expected from an engine which will deliver a certain pull on the rope, at a given speed, and this problem can be solved as follows:

Calculate the pull due to the weight of the rope, its friction, and acceleration by formulae 3, 4 and 6, and deduct the sum of these amounts from the total available pull on the rope, the balance will be the pull we have left to take the weight of the trip, its friction and acceleration, which pull is divided up as follows:

From formula 1. Pull due to weight of trip = weight of trip $\times$ sine of angle.

From formula 2. Pull due to friction of trip = weight of trip $\times$ coefficient of friction.

From formula5. Pull due to acceleration of trip = weight of trip

$$\times \frac{V}{G \times T}$$

As the sum of these three pulls, must equal the available balance left, we have

Balance of pull, available for trip = weight of loaded trip $\times$

$$(\text{sine of angle} + \text{coefficient of friction} + \frac{V}{G \times T})$$

For the first attempt, we must estimate the time of acceleration, T, and correct if necessary.

The above formula transposed becomes

$$\text{Weight of loaded trip} = \frac{\text{Balance of pull available for trip}}{\text{sine of angle} + \text{coefficient of friction} + \frac{V}{G \times T}}$$

Having the weight of the loaded trip, we can calculate the time taken for the haul, on the same lines as given above, and thus arrive at the daily output.

A ZOOLOGICAL CURIOSITY.

"The complaint was made that men came to the district and asked inflated prices for shares, far above the market value, and it was argued that the new exchange would tend to obviate this system of sharks feathering their nests."—"Punch" from a Lancashire paper.

First Annual Report of the Explosives Division of the Department of Mines, 1919

The first annual report of the Explosives Division of the Department of Mines is issued. The formation of this Division has been under consideration since 1909, so that it took exactly ten years to get this much required undertaking commenced, although its necessity has been undenied since the Explosives Bill was drafted in 1910, and although both in the United States and in Gt. Britain such supervision over the manufacture and use of explosives in mines has long been in force.

The Explosives Act was assented to in June 1914, but was not proclaimed as effective until 1st of March this year.

The staff of the new Division is composed of the Chief Inspector, Lt.-Col. G. Ogilvile, R.A., Mr. J. G. S. Hudson, Dr. A. E. MacIntyre, and Mr. G. B. Frost. With regard to the qualifications of these officers, Col. Ogilvie states:

Staff of the Division

"Concurrently with my appointment as Chief Inspector on April 15, 1919, the services of Mr. J. G. S. Hudson, Explosives Engineer of the Mines Branch, were made available and placed at the disposal of the division. Mr. Hudson, while on the staff of the Mines Branch, and in addition to his duties, been engaged in the work connected with the enquiries which gave rise to the first drafting of the Explosives Act, including a tour of inspection with Captain Desborough, and had subsequently conducted such inquiries as were then possible into the circumstances attending accidents with explosives. His acquaintance with the circumstances and conditions which have led to the introduction of the Act, and his previous experience in the coal mining industry, with the application of explosives thereto, give an added value to his services with the division and to his assistance in the task now before us.

We were fortunate in obtaining the transfer from the Department of Militia and Defence of Dr. A. E. MacIntyre , to take up the appointment of Chief Explosives Chemist. To a thorough chemical training at the West of Scotland Technical College, Glasgow, and at the University of Jena, Dr. MacIntyre has added many years of study and research in the chemistry of explosives, combined with practical experience in the working of the Dominion Arsenals at Quebec and Lindsay—of which latter he was acting superintendent when transferred. I consider the division is particularly fortunate in having secured for this responsible post one in whom is combined to a rare degree the highest technical qualifications with an appreciation of what is practicable in the application of the teachings of the science of explosives.

To the chemical staff was added on June23, Mr. G. B. Frost, B.A., formerly inspector and chemist in the Explosives Section of the Imperial Ministry of Munitions Inspection Department, in which capacity he showed his eminent fitness for the efficient conduct of duties as will involve on him in his present positions."

Preliminary to the formation of the Division it was necessary to visit the several provinces and to harmonize the work and regulations of the Division with the already existing statutory and mining regulations of the provinces.

The report deals with Orders-in-Council which have been issued at the instance of the Division governing the classification of explosives, the equipment and nature of explosive factories, explosive magazines, the storage of explosives in small quantities, the packing and conveyance of explosives, licensing of explosives manufacture, importation of explosives, facilities for testing, and tabulation and investigation of accidents originating in the use of explosives.

So far as the mining industry is concerned, the interesting part of the Report is the reference to facilities for testing explosives, this being the original necessity which led to the formation of the division and caused various mining bodies to advocate it.

In this connection the Report states:

"The analysis and tests which require to be carried out on an explosive to determine its suitability for classfication as an 'authorised explosive,' are such as may be carried out in a well equipped laboratory, and as a temporary measure, the premises at the corner of Kent and Vittoria street have been secured, and will shortly be equipped in a manner that will suffice to meet our immediate requirements.

The examination of the large number of explosives which are now being made and which will come forward for test will impose an abnormal volume of work on the chemical staff at the commencement, and in order that the time necessarily taken in completing this will not interfere with the normal manufacture of, and trade in explosives made in Canada, it is proposed, except where there may be special reason to the contrary, and pending the completion of the tests, to provisionally authorize the explosives of Canadian manufacture in use.

The provision of equipment for a testing station in which the suitability of an explosive for use in coal mines may be determined is a larger question, and one which has been receiving careful consideration. Involved in it is that of the best design of the equipment to be obtained, and it is hoped that in a short time we may, in coming to a decision on this matter, have the benefit of a knowledge of the result of researches now in progress elsewhere. In any event, tests of the first importance will be those which will be carried out in a 'gallery' to determine the maximum charge of an explosive that can be detonated without igniting certain mixtures of gas and air, or causing a coal dust explosion, therein. Amongst others also will be tests designed to give a measure of the relative power of the explosives under examination.

As a result of tests of these natures those authorized explosives, which satisfactorily meet them would be put on the "permitted list" of explosives which may be used in coal mines. The composition of these explosives and the results of the essential tests will be published—although the composition and results of tests of authorized explosives not on a permitted list will be kept strictly confidentiol.

The establishment and equipment of a testing station for the tests of "permitted" explosives must of necessity take some time, and is an undertaking of vital importance. If one may anticipate a little, I may forecast that, apart from the conduct of routine tests, such a station should enable considerable ex-

perimental and research work to be carried on, which would be of value to manufacturers in their efforts to provide suitable explosives for use in mines, and, in furnishing both the manufacturing and the mining industries with helpful information, further fulfil its primary function of promoting the safety of the mine worker".

It will evidently be some time before Canada can issue its own list of "permitted" explosives, but it is gratifying to know that at last an organization has been formed and is actively working towards the preparation of a schedule of mine explosives that will accurately list their composition, the proper weight of charges, their behaviour in explosive mixtures, their ballistic properties, and other information which it is desirable should be at the disposal of mine managers.

Practically every notable coal mine explosion in Canada, and most of those in the United States, has had its proximate cause the flame and shock of some form of blasting powder or explosive, so that the necessity for accurate knowledge of the characteristics of explosives is beyond any question.

The Explosives Division of the Mines Branch has before it a lot of necessary and probably very hard work, and, while its formation is better late than never, it is impossible not to regret that the Division was not formed in 1910 when the Explosives Bill was introduced at Ottawa.

ATTEMPT TO UNIFY LABOR LEGISLATION

Ottawa Conference Will Point Out Desirable Elements in Existing Laws

The various provincial and federal laws affecting labor will be considered by a delegation representing capital and labor, and the Government of each Province of the Dominion which will wait upon the Government at Ottawa in the near future, with a view to making the laws uniform for the whole country as far as possible, making due allowance for varying conditions. The attention of the federal authorities will be called to the variation in the provincial labor laws, affecting the Minimum Wage, Mothers' Pensions, Workmen's Compensation, Factories' Acts, Labor Bureaus, hours of labor, child labor, all legislation regarding arbitration and conciliation in labor disputes, and other matters affecting the workers of this country. It is hoped that as a result of this conference some agreement on necessary and desirable changes in the existing laws will be arrived at in order that the proposals may be submitted to the various Provincial Governments and the Federal Government for approval.

The Workmen's Compensation Act varies in important details for the different provinces. The Saskatchewan Act allows a workman compensation to the extent of 100 per cent of his wages during enforced idleness arising from injury. In Ontario only 55 per cent of the wages are allowed, and the amount differs in the other provinces. The Ontario Act contains clauses offering special benefits to the workmen which are absent from the other acts. It is the purpose of the meeting at Ottawa to select the best ideas from the different acts, and apply a uniform act as far as possible to the whole Dominion. All forms of labor legislation will be considered with a view to the selection of the best element of the different laws that would apply to the various provinces.

BRITISH CONTROL OF OIL RESOURCES

Sir E. Mackay Edgar, in explaining Great Britain's control of the oil resources of the world, says that within a few years the United States will be paying British oil interests $1,000,000 annually for oil for the United States Navy and for home consumption.

"With the exception of Mexico and to a lesser extent, of Central America, the outer world is securely barricaded against United States invasion in force," he said. "There may be small, isolated sallies, but there can never be a massed attack. The British posi- is impregnable."

Sir Mackay declares that all known oil fields and all likely or probable oil fields outside the United States are in British hands or under British management or control, or financed by British Capital.

Great Harvest Certain

"We shall have to wait a few years before the full advantages of the situation begin to be reaped," he said, "but that that harvest eventually will be a great one there can be no manner of doubt. To the tune of many million pounds a year the United States before very long will have to purchase from British companies and to pay for in dollar currency,, in progressively increasing proportion, the oil she cannot do without and is no longer able to furnish from her own stores.

"Apart from Mexico," Sir Mackay Edgar continues, "it is almost a case of the British first and the rest of the world nowhere. I should say two-thirds of the improved fields of Central and South America are in British hands. In Guatemala, Honduras, Nicaragua, Costa Rica, Panama, Colombia, Venezuela and Ecuador a decisive and overwhelming majority of petroleum concessions is held by British subjects, and will be developed by British capital. The Alves group, whose holdings encircle practically two-thirds of the Carribbean Sea, is wholly British, working under arrangements which insure that perpetual control of its undertakings shall remain in British hands.

Properties Widely Distributed

"No United States citizen and no United States group has acquired, or ever could acquire, any such position in Central America as that which enterprise and personality have secured for Mr. Alves, or take again that greatest of all oil organizations, the Shell group.

"It owns exclusive or controlled interests in every important oil field in the world—in the United States, Russia, Mexico, the Dutch East Indies, Roumania, Egypt, Venezuela, Trinidad, India, Ceylon, the Malay Straits, North and South China, Siam, the Starits Settlements and the Philippines.

Note:—

The foregoing news despatch may be quite true, but the judiciousness of this kind of propaganda is much to be doubted. It is quite unnecessarily provocative, and takes altogether too many things for granted. The "Sunday World" of London, in which Sir E. Mackay Edgar writes, is not a newspaper that commands a judicial audience, but it must puzzle even its readers to understand just what is feared from the United States, or what is to be understood by the phrase: "United States' Invasion in force." Are London journalists trying to emulate Mr. W. R. Hearst, or to find trouble for Sir Auckland Geddes? And have they forgotten the Argonne?—Ed.

Book Reviews

"MINERS' DISEASES." Record of the Researches of Dr. J. Court, of Staveley, England, into Miners' Nystagmus and Ankylostomiasis.

This little book was printed for private circulation, and is the record of the life's work of a medical man whose residence in a colliery district occasioned an interest in miners' diseases that has had results of definite value, particularly in diagnosis of the predisposing causes of miners' nystagmus, in recognition of which Dr. Court was recently knighted.

Rr. Simeon Snell, an eminent eye surgeon, and, shortly before his death, President of the British Medical Association, had propounded the theory that miners' nystagmus was caused by a strained position of the eye-ball of the miner in the operation of "holing" or undercutting the coal by the handpick. Dr. Snell's persistence in his theory, and his acknowledged eminence in his profession, for a good many years led to its general acceptance, but Dr. Court, as the result of painstaking researches pursued underground, and the examination of underground and surface workers of all grades employed in naked-light mines and in safety-lamp mines, obtained convincing evidence that nystagmus was the result of deficient and partial illumination, and that the steady growth in the number of cases reported was the result of the increasing substitution of the oil-flame safety-lamp for torches and candles. Later Dr. Court had the satisfaction of having his resources confirmed by an exhaustive investigation, carried out by Dr. Leonard Hill, under the direction of Dr. John Haldane of the Home Office, and the medical profession has now for some years ascribed nystagmus to defective illumination. The definiteness with which this fact has been established is in large measure due to Dr. Court's first-hand and early investigation of the matter under actual working conditions, and has had as a result the installation of electric hand-lamps in English collieries on a large scale in substitution for the oil-flame safety-lamp.

Confirmation of Dr. Court's researches is to be found in the appearance of miners' nystagmus in Nova Scotia since the general introduction of safety-lamps about 1904. Up to that time no cases of nystagmus had been recorded in Nova Scotian collieries.

Dr. Court has been good enough to state that he has found many nystagmus cases suffer from the glare of the white light of the electric lamp, and for their relief he has advised the use of light-amber coloured glass in front of the electric bulb, or the use of Crookes' glass. Very satisfactory results have been thus obtained.

Another ailment of miners to which Dr. Court directed early attention was Ankylostomiasis, a variety of what is known on this side the Atlantic at the hookworm disease. A series of articles on this disease was contributed by the writer to the "Journal" shortly after its appearance in present form in 1907. The disease had only one outbreak in Britain, namely at the Dolcoath Tin Mine, and suitable precautions have so far kept it out of British collieries, although should conditions of deep mining and compulsory watering of the roadways ever bring about the necessary predisposing conditions of heat and moisture in British mines, its re-appearance might be anticipated.

Canadian collieries, in their present stage of development are usually too cold to breed this parasite, or, if they are hot, they are usually dry. The disease is undoubtedly present in the southern States, but so much is now known about the habits of the parasite, and the necessary precautionary measures are so elementary, that with due care, the "miners' worm disease", as it was termed in Europe, should be easily eradicated from any American mines in which it may have obtained entrance. Prophylatic measures are entirely those of ordinary sanitation.

Dr. Court is a representative of a fine school of men, namely, the "colliery doctor." Earlier in his career his theories seemed to conflict with the financial interests of colliery owners, and were used to some extent by miners' leaders to oppose the introduction of safety lamps. He has had the pleasure of seeing his work commended by both miner and coal-owner, as the result of a painstaking and undeviating search for facts, and in this fashion has earned that recognition which is the crowning reward of the scientist. —Ed.

FATIGUE OF THE VISUAL ORGANS IN COAL MINERS: (La Fatigue de l'Appareil visuel, chez les Ouvriers Mineurs). By Dr. M. Stassen, Liege, Belgium.

Dr. Stassen's volume reviews the history of miners' nystagmus, describes the conditions of work underground, and assembles the conclusions indicated by statistics obtained during a comprehensive survey which comprise all the mines in the Province of Leige, and all the cases coming under observation of the nystagmus clinic at Mines Hospital at Liège. Dr. Stassen undertakes as the result of his investigations to establish the cause of miners' nystagmus — a disease of which the most prominent symptom is oscillation of the eyeballs—as *the result of a pronounced fatigue of the entire apparatus of vision.* He examines also the connection of nystagmus with the occurrence of accidents at work. The preventative and curative measures to be adopted are discussed, and also the principle of workmen's compensation in cases of nystagmus.

Medical writers on nystagmus have been sharply divided into two schools, namely, those who ascribed the cause of the disease to a strained position of the eyeballs at work, and those who attributed it to a deficiency of illumination and the fatigue arising from an attempt to see in the dark. The supporters of these two viewpoints are found in Britain, Belgium, France and Germany, and Dr. Stassen reviews with authority and in an interesting manner the progress of the medical literature on the subject. The large amount of attention given to this disease by British authorities is evident from the bibliography and the nomenclature associated with the disease.

Dr. Stassen discusses at great length the conditions of the coal miners' work, which he has observed under actual conditions, having, as he says, many times followed the miner from the daylight to the working place and back again. His studies have convinced him that the *work of a coal-miner imposes upon his visual organs a general fatigue, such as no other profession is exposed to.*

The miner descends in the cage, his eyes being adapted to the sunlight; the pupils, the visual ac-

commodation, and also the pressure upon the labyrinth of the ear being such as required by the atmospheric pressure and light conditions of the surface. In descending the shaft all these change abruptly, setting up reactions that irritate and tire the visual apparatus, and the nerve centres of both eye and ear, which are particularly to be observed in collieries having deep shafts with rapid hoisting time. Further adjustments of the visual apparatus are necessary before proceeding to the working place, known to miners as "getting the eyesight." The illumination underground is insufficient to enable the miner to distinguish objects clearly, and the visual apparatus is again strained in the endeavour to use the adaptation powers of the eye to their fullest and to an unnatural extent. During a prolonged stay underground the glare and the flickering of the miners' lamp exert a further irritating effect, and rapid changes are needed to regulate the admission of light to the retina. In coming out of the mine, into the daylight, reverse adaptations of the visual apparatus and the inner ear are caused. Dr. Stassen names many other circumstances of the miners' work that he considers to be the source of fatigue of the visual apparatus, but generally, he appears to prove that it is not one circumstance, but a combination of many, that causes nystagmus. All the causes, however, seemed to be included in the conditions of deficient illumination obtaining in coal-mines underground.

Dr. Stassen states that after examining many miners, suffering from varying forms of eye-trouble, by a process of elimination, he has found but one cause of nystagmus, and consequently but one mode of amelioration, namely, *that a sufficient and necessary cause of nystagmus is the deficient condition of coal mine illumination.*

The standard types of miners' lamps, oil and spirit-flame safety-lamps, and electric lamps, are discussed at length as to their effect upon the causes of nystagmus.

Dr. Stassen finds that nystagmus tends to increase the number of accidents, to lessen the value of men as workers; and he also finds that accidents to men afflicted with nystagmus intensify the trouble under certain conditions. He denies, however, that nystagmus can ever be a trautmatic consequence of injuries, but is essentially "a professional malady, engendered by an accumulation of causes of irritation and fatigue of the eyes occasioned by bad conditions of lighting."

Prevention of nystagmus is possible only in one way, namely, by the improvement of the illumination underground. Not only should the amount of illumination be greater, but its diffusion must be improved, and the light provided should be steady, without glare and shadows as far as possible. The use of suitably tinted glass, or glass with a ground or "mat" surface, is recommended. Good results have been obtained at the Hasard Collieries in Belgium by glasses tinted a yellowish-green.

Dr. Stassen mentions that his investigations and the proposals for ameliorating lighting conditions in Belgian collieries, were interrupted by the war, but will be immediately resumed. This is a typical instance of Belgian fortitude, and calls to mind that in Liège many additions have been made to the world's knowledge of how to combat the dangers of the coal mine.

COST OF MINING BITUMINOUS COAL IN THE UNITED STATES.

Figures for January 1920.

Reports received by the Federal Trade Commission from 1,589 bituminous operators in various parts of the country, covering the month of January, show that the average cost of production in that month was $2.32 per net ton. This compares with an average of $2.04 for the year 1918.

The figures do not include interest, selling expense tax and certain other items which enter into the cost of mining and marketing soft coal.

Of the total production cost per ton in January by far the largest item was labor, amounting to $1.74, as compared with $1.49 in 1918. The largest production cost reported—$3.52—was in Arkansas.

The increase in the average cost of production in 1920 as compared with 1918, the statement said, was attributable to two causes—the higher wage scale put in effect in November, 1919, and a small decrease in the January output as compared with the monthly average in 1918.

The average sales prices for January was $2.78 per ton, as compared with $2.60 in 1918, in the case of 1,272 identical companies. This gave a gross margin of 46 cents a ton in January, as against 56 in 1918, from which selling expense, interest, excess profits tax and other charges not included in cost of production, as reported, must be deducted to give the operators' net profit.

The reports were submitted in response to the Federal Trade Commission's order of January 31, which the Supreme Court of the District of Columbia has decided is not enforceable.

Average cost of production, per ton, in various bituminous districts during the month of January, 1920, is reported as follows by the Federal Trade:

ILLINOIS.

District No. 1	$2.84
District No. 2	2.19
District No. 3	1.98
District No. 4	1.84
District No. 5	2.45
District No. 6	2.09

INDIANA.

District No. 1	2.07
Brazil Block	2.68

MARYLAND.

Average for State	2.60

OHIO.

District No. 1	2.82
District No. 2	2.51
District No. 3	2.08
District No. 3a	2.03
District No. 4	2.37
District No. 5	2.54
District No. 6	3.15
District No. 7	2.76
District No. 8	2.12
District No. 9	2.13

PENNSYLVANIA.

Southwest District	2.22
Central District	2.49

WEST VIRGINIA.

Pocahontas	1.98
Tug River	2.58
Thacker	2.35
Kenova	2.84
Logan	2.10
New River	2.63
Kanawha	2.23
Putnam County	3.45
Coal and Coke and Gauley	2.36
Fairmont	2.43
Pittsburgh Seam District	2.12

IMPROVEMENT IN WATER-SPRAYING DEVICE FOR HUMIDIFYING MINE AIR

Considerable interest attaches to the "Daniel Wakall" improved water blast, an appliance designed by Mr. J. Daniel, of the Government Mining Areas Company, on the Eastern Rand, for the purpose of better allaying dust and deleterious gases in mine air, by utilizing water under pressure causing it to split into fine particles by striking solid surfaces, and subsequently atomized by compressed air. The device consists of an outer shell or casing, fitted internally with a plug valve, with two passages, one for the airway and the other for the water. In the air passage a non-return ball valve is placed. The airway connects with a cylindrical sleeve admitting the compressed air to an inner chamber through slots at the back end. Within the chamber is fixed and air regulating spindles, with cone-shaped face, forming a valve with the inner front head cone surface of the sleeve, acting as a valve seat. The extension of the spindle beyond the valve face it a distributing cone. The water passage connects with an annular chamber surrounding the front head of the sleeve, which has a cone face forming a valve with the outer casing as a valve seat. The screwed spindle is rotated within the sleeve, and the screwed sleeve carrying the spindle rotates with the casing. The plug valve is operated by a removable key.

The functions of the device are as follows:—Compressed air and water under pressure are connected to the device by the usual pipe fittings. The key operating the plug valve is rotated through a quarter of a turn, admitting the air and water into their respective chambers. The screwed sleeve is rotated back to form the required aperture between the casing and the sleeve to determine the quantity of water used. The spindle is similarly adjusted within the sleeve, controlling the quantity of air used. The water under pressure issues from the chamber in a cone-shaped jet, and, striking the spindle, is split into fine particles. The compressed air issuing from the centre behind the water immediately projects the fine particles of water on to the head of the spindle, which deflects the atomized water into a cone-shaped stream, the degree of atomization being controlled by the adjustable apertures of both the air and water. The non-return valve placed in the air passage of the plug is to prevent the back pressure of water entering the compressed air mains when the air pressure fails, or, for economic saving, is cut off after the blast has been in operation for a certain length of time. The removable key operating the plug valve can only be separated from the casing when the blast is turned full on. As the device is placed in direct connection with the air and water services, without any intermediate valves between the mains and the devices, the return of the key to an official is a direct proof that the water water blast has been put into operation. The claims for the device are as follows:—(1) The adjustable sleeve regulating the quantity of water used. (2) The adaptability for clearing the water aperture in the event of its being choked, by rotating the screwed sleeve in the casing and flushing the aperture clear. (3) The regulating spindle allowing any quantity of compressed air to pass. (4) Any desired combination of quantities of air and water producing every degree of atomization from a dry fog to the state in which the particles of water rapidly fall out of suspension. (5) The retaining valve in the air falls to atmospheric automatically closes when the air falls to atmospheric pressure, thereby ensuring the inability of any back water pressure entering the air mains. (6) The inability to remove the key except when the water blast is in operation.

THE HUFF ELECTROSTATIC SEPARATOR.

At the recent meeting of the American Electrochemical Society in Boston, opportunity was given to the members to visit the testing and demonstration plant of the Huff Electrostatic Separator Company at Arlington Heights, near Boston. The Huff separator uses electric current of high voltage and low amperage to separate mixtures of dry materials having different electrical conductivities, either by repelling part of the material vigorously, or allowing part of the material to be electrically released more quickly than the rest when passed over an electrode.

Some of the materials shown to the visitors in original form, and as concentrates and tailings, included garnetiferous sands, fine anthracite coal mixed with sand and dirt, graphite ore, micaceous rocks, molybdenite ore, abrasives, aluminum slag, barytes and lead ore, and, amongst other things a mixture of ground automobile tires separated into rubber and cotton particles.

While the electrostatic separation process has admitted limitations there would appear to be a wide field for its use because of the exactness and nicety of the separation, the small and inexpensive plant required, and the comparatively small power cost. For the separation of graphite the process seems excellently well adapted, as a comparison of the flaky and unctuous-feeling product of electric separation with Ceylon "chip" revealed. For separation of minerals contained in sands the process is well adapted, as it is also for the separation of abrasives from sands, or form the dross of artificial abrasive manufacture.

The usefulness of this method of separation in connection with any given natural or artificial mixture of materials cannot be determined with any exactness except by actual testing, but trial with a small sample will enable an opinion to be given as to the suitability of the method in each case, and the Huff Company state it has not been required to dismantle, as yet, any plant which was recommended for ore-dressing by its engineers as the result of tests.

PROBLEMS OF PROSPECTING AND STAKING IN THE YUKON.

Progress is being experienced in the field of prospecting as well as in all other fields of human endeavor. The world stands still in no respect.

Time was when prospecting was confined to the picturesque individual who roamed the hills and vales with pick, shovel and pan. He served his day well, and to a large degree his kind have yet a large field and a large service to render the world. While recognizing his economic position in the mining world of yesterday and of today, recognition also must be given to the fact that a new form of prospecting has come into vogue with the innovation of modern mining equipment the last few years.

The new equipment has made it possible to work properties of low grade which the earlier individual miner could not touch. Wholesale methods are now contrasted with those of the individual sphere. Any business conducted on a vast scale reduces costs to the minimum and brings within workable range many low grade propositions which are thus made to yield their wealth to the world.

Keystone drills, diamond drills, and other new methods of testing make it possible to sink and determine values accurately now on ground which years ago could not have been touched. Dredges, hydraulics and other big operating equipment and, in the Arctic, the new cold water thawing process have brought grounds which formerly were considered hopelessly low grade into the desirable range. On the vast low grade areas, however, the individual operator is not prepared to proceed. A number of individuals must band themselves together in order to combine their financial strength to make it large enough to acquire capital to obtain the necessary equipment. When they do so they become co-operative prospectors and miners, or in other instances may be denominated companies.

Where the individual would have to leave large areas untouched, the company or co-operative mining enterprise can proceed. When such low grade grounds are made productive, the company is not alone the beneficiary. Operation of low grade properties first calls for labor. The first earnings of a mining company go into labor. That is the first dividend from the enterprise. The law recognizes the bill of the laborer or worker for service as the first that must be paid.

Large companies operating in the Yukon the last twelve years have taken millions from the ground which could not have been extracted profitably by individuals. Had there not been a way provided for the large concerns to handle this low grade property on the large scale on which they did work, Klondike would have been a dead camp years ago. Millions of yards of auriferous gravel have been turned over by dredges and hydraulics on which individuals had to cease operations prior to the coming of the gold ships.

Now the gold ships have worked out scores of miles of placers of known dredge values in Dawson and vicinity. One company's fleet already has been reduced from nine to only two working dredges for this season. That company will ship the dredges from the camp if it does not obtain new ground of workable values. Some of its dredges already have gone. Another is to leave Iditarod this season, and work of dismantling it will begin at once. When the dredges leave, the pay rolls diminish and men no longer reap any returns from ground which is too low grade for individual operation.

It appears there are many low grade properties in the territory which under the cold water thawing should prove profitable to work. Dredge companies now want, it seems, to test some of those tracts, and, if proved satisfactory, start operation on them.

The proposition has been advanced that five-mile tracts be allowed to be staked by large companies and that they first be permitted to prospect the tracts. It would be a shame for any large company to get privilege to close any virgin creek carrying original values in the garden spots such as Eldorado, Bonanza, Hunker and similar Klondike creeks, and no steps should be taken which would thus deprive the individual in any such possible new field. And it is to be hoped every precaution will be taken against such contingency arising.

On the other hand, it would be a poor business to drive dredges from this region because the people willing to test low grade ground could not have the opportunity. It is well known that in the past some large concerns tried to acquire good sized tracts by individual staking, and that parlor prospectors and chair-warmers staked claims here and there in the tracts with hopes of getting good prices. They did not stake the ground until the large companies started to prospect or move in that direction, and after the large companies moved off the individuals in most, if not every instance, moved away.

It also is to be remembered that on some of the creeks in this territory practically hold-up methods blocked some of the largest dredge operations of this camp, and that several miles of good placers on two or more creeks where dredges attempted to undertake work now lie idle because one or two individuals on each of those creeks intervening with small strips of ground.

The hold-up staker and the parlor prospector have been quite as much of a detriment to the pay roll and production totals of this camp as the concessionaire who held the ground from the individual operator. Both deserve the condemnation of this camp. The genuine prospector who gets into the hills, the man who punches the hills and valleys full of holes, the big companies willing to risk their investments in order to open this country and create employment, all deserve encouragement.

Surely Yukon is going to do her best to find the solution for keeping the old-time individual mining going in every suitable district and the new class, modern large operations, also humming.

Where there is a will there is a way.—Dawson Weekly News.

METAL QUOTATIONS.

Fair prices for ingot metals, Montreal, 27 April.

	Cents per pound.
Electro Copper	24
Casting Copper	23½
Lead	10¾
Zinc	11
Tin	72½
Antimony	13
Aluminum	40

Nova Scotia Notes

Dominion Coal Company to re-open Morien Colliery.

The decision of the Dominion Coal Company to re-open the Morien district for coal production has been a foregone conclusion for some time. Mining operations in this locality have witnessed many vicissitudes although time was when Morien was the business place in Cape Breton, and in the front rank as a coal producer. As the successor to the Boston and Morien Coal Company, which in its turn succeeded the Gowrie and Blockhouse Company, the Dominion Coal Company became possessed of the very extensive submarine field of the Morien Basin, and by purchase from the Cumberland Railway and Coal Company the Dominion Steel Company acquired the land areas of the basin, which were later turned over to the Dominion Coal Company, who in 1911 opened the collieries now known as Nos. 21 and 22, designed to extract a tongue-shaped area of shallow coal which is the remnant of the rather sharp synclinal basin that finds its apex about five miles inland from Morien, and extends seawards in a fan-shaped extension.

It is interesting to note that Mr. Belloni, a pioneer coal operator in Cape Breton, who formerly operated the Blockhouse Seam at Morien, is still alive and in good health in New York.

The Dominion Coal Company owns a branch line to Morien, connecting with the Sydney and Louisburg Railway, and for some time has run workmen's and passenger trains enabling some of the workmen at Collieries Nos. 21 and 22 to reside at Morien in the colliery houses there.

When the Morien Colliery was operated by the Gowrie and Blockhouse Colliery, vessels were loaded by means of an aerial conveyor which connected with a loading pier standing out in deep water in the Bay. This arrangement has long been dismantled, and will not of course be used again, as there is now rail connection.

Between Morien Basin and the Glace Bay Basin lies in the course of a pronounced anticlinal ridge which can be traced by the folded and broken outcrop of the Millstone Grit across country to the neighborhood of Sydney. Presumably a wide tract of barren rock intervenes between the seaward continuation of the Glace Bay and Morien Basins, but under the waters of Morien Bay itself it may be expected that a large body of workable submarine coal exists. The identity of the Morien seams with relation to those of the Glace Bay side is not determined, but it is surmised that the Blockhouse Seam at Morien is the equivalent of the Hub Seam at Glace Bay.

Manitoba Letter

By Chas. A. Millican, Winnipeg.

One thousand pounds of ore, taken with a view of having a fair sample, so that a reasonably accurate and representative assay value could be obtained was shipped recently from the Bingo Mine to Ottawa. Mr. Myers has received word that this sample has produced at the rate of four and one fifth ounces of gold or about $100.00 per ton at present values. Mr. Myers expresses great satisfaction at this return. He expects to have a Mill run of from 30 to 40 tons early this summer run through the Mill on the Rex property, which adjoins.

Extensive underground work is being undertaken on the Rex Mine this year. Towards the latter part of the season the Company intends to treat all rock taken out. The Mill has a capacity of 80 tons per day.

Over one hundred men are engaged on preliminary work on the Flin Flon Mines and $85,000 has already been spent for machinery. Work is being rushed ahead. The Longyear Co. of Chicago has the contract for sinking on two shafts and are reported to be making good progress.

A regular air passenger and parcel freight service is to be established during the coming summer between Winnipeg and the Rice Lake gold fields by one or more of the Winnipeg Aviation Companies. The Winnipeg Airco, Limited, are contemplating taking moving pictures from the air of all mining camps, water routes and other transportation channels. The present intentions are to have these pictures exhibited locally in connection with the Province's natural resources, and later, released in other parts of the Dominion. The Airco Company's aerodrome is located at River Park, Winnipeg.

The matter of Provincial police protection in the different mining areas will receive the attention of the Provincial police Commissioner. Heretofore there has been a sad lack of proper protection for those camps may have been temporarily idle, and the unwritten miners' laws that usually prevail in mining camps have been, on several occasions, very severely offended against. It is hoped that, from now on, miners and prospectors may feel a greater sense of security in these districts.

Incorporation has been granted by the Provincial Government to Angus McDonald Mines, Limited (Non Personal Liability), a mining concern with an authorized capitalization of $3,000,000. Provisional directors named in the charter are: Frank M. Ruggles, broker; Wiliam Martin, Jr., broker; G. C. McTavish, barrister, and others.

The head office of the company is to be in Winnipeg and powers granted the company are wide enough to permit it to enter into any kind of business connected with mining, development, brokerage or otherwise for the flotation of companies.

The division of the stock is to be 600,000 shares at $5.00 each.

SOVEREIGN PROFITS $16,872

Annual Meeting of the Company Shows Satisfactory years Operations.

At the annual meeting of the shareholders of the Sovereign Porcupine Mines, Limited, held in Toronto on April 22nd, the financial statement showed that during the period ending January 31st, 1920, $16,872.43 wes expended in exploration and development. President Moodie, in his address to the shareholders, stated that over 4,000 feet of diamond drilling was carried out on the company's property, which lies adjacent to the Hollinger Consolidated. Mr. Moodie also stated that the operations on the north claim were discontinued owing to the existence of forest fires and work transferred to the south claims, where a considerable amount of trenching and stripping was carried on, with the result that an excellent vein, heavily mineralized, was uncovered.

Northern Ontario Letter

THE SILVER MINES.

The fourth week of April will be remembered in Northern Ontario, particularly in the precious metal mining areas, as marking the commencement of the turn in the tide of the post-war readjustment of economic conditions. The ticker all week carried a message of uneasiness in the stocks of the big industrial concerns, which have literally wallowed in prosperity since the late war began. At times, quotations for these shares declined almost precipitately, thus reflecting the fact that they may now be entering upon a period of re-adjustment to normal, and that the voyage from artificial prosperity to normal may not be altogether smooth sailing.

In the North, actual enthusiasm has been manifest. Precious metal is in great demand. The difficulty has been that it has cost a lot to produce it. The messages from the south which tell of the downward movement in the industrial stocks, as well as an actual break in the price of provisions, including corn, pork, etc., carry hints at least of cheaper material, and offer some promise of actual curtailment of work in many centres to the end that men must seek employment elsewhere. It is here, that the belief is entertained that the exodus from centres of industry created by war's necessity will be to the centres of such basic industry as the precious metal mines of Northern Ontario.

Meanwhile, the quotation for commercial bar silver remains at a figure well above the average for any previous year in the North's history, while as is well-known, the price of gold must inevitably remain unchanged—it is the standard of value, the yardstick of the monetary status of the nations.

The embargo on freight between Canada and the United States has caused a temporary curtailment of ore shipments across the border. Much of the ore which ordinarily goes to smelters in the States to be treated, is being held in Cobalt. In the meantime, however, no serious consequences result, for the reason that the greater volume of the ore is treated in Canada, and that going to the United States is but a certain class of ore of small quantity which is found difficult to treat, and its deferred shipment does not interfere in any way with the operations of the mines.

Bullion stored at the mines is believed now to amount to more than at any previous time in the camp's history. It is thought, however, that the delay in the expected upward trend in prices may cause at least a limited quantity of this bullion to be marketed at a reasonably early date.

According to an official statement, the Chambers-Ferland mine of the Aladdin-Cobalt Company, shipped ore steadily during the month of March to the Dominion Reduction plant for treatment, and realized a comparatively large net profit. The average content of the ore approximated 20 ounces of silver to the ton. Shipments are continuing during April at the rate of between 30 and 40 tons daily. In the meantime, underground work is being centered on a new ore shoot in a vein which appears to bear relation to the old vein No. 15. This ore shoot is stated to be about four inches in width and has been drifted on for upwards of fifty feet, showing values ranging from $5 to $4,000 to the ton.

At the annual meeting of the Trethewey-Cobalt Company, it was stated that the Castle property of the Trethewey, in Gowganda, had produced upwards of $50,000 to date, this amount having been contained in two shipments sent out since the beginning of the year. Another shipment is forecasted for late June. Some $40,000 was produced from a drift just 70 feet long at the 100-ft. level, at which point some 250 feet of drifting has been done. A prosperous future is predicted by the manager, I. S. McReavy.

An unofficial report in Cobalt intimates that Stuart M. Thorne, who was manager of the Trethewey prior to enlisting for overseas service during the late war, will again resume his former duties, it having been generally understood that he would be re-instated immediately after his return from overseas. Concerning Mr. McReavy, it is general knowledge that his work at the Trethewey mine has been highly efficient, and that as a result of his two year's of activity in the Cobalt camp he has been singled out as perhaps one of the most successful of the rising young engineers.

The Mining Corporation of Canada is stated to have decided to take up bonds which it recently obtained on the Yankee Girl mine in Ymir, B.C. It is stated that instructions have been issued to prepare the mine for operation, the sum involved being estimated at $400,000.

Proposed amendments to the Mines Act of Ontario are having a more or less rough passage through the Ontario House, at least in the case of the proposal to alter the schedule of recording fees. The Minister of Mines is endeavoring to change the recording fee from $10 to $5 for each claim staked and recorded by a license holder for himself, but would increase the fee from $10 to $15 in the case of where one license holder stakes claims on behalf of another license holder. The contention is being put forward by prospectors that such an alteration would be harmful to the mining industry. It is pointed out that the great majority of prospectors in the field are kept active through being grub-staked by business men and mine workers, the prospectors agreeing to stake claims on behalf of those grub-staking them. It is also shown that as was the case with such mines as the Hollinger Consolidated and the Dome Mines, they were located by prospectors working on a grub stake arrangement. It is thought that although the bill has passed its second reading, the above proposed alteration of fees will be omitted before it is given its third reading. As regards the other amendments, they appear to have met with fairly general favor.

Robt. Lyman, manger of the Seneca Superior mine at the time of its successful and spectacular career, has secured a lease on the Rochester mine and proposed to carry out a comprehensive development campaign. Work, when commenced, will be carried on through the shaft of the adjoining Lumsden mine.

At the Oxford-Cobalt property the work of development is well under way. The contractors are at work on the shaft which is being driven from surface to the 200-ft. level. At the time of writing, the shaft is down 20 feet. Two machines are employed.

Authentic information received today is to the effect that the formation of the Bailey Silver Mines having been completed, and with the Bailey mine officially estimated to contain upwards of half a million ounces of silver ore in sight, arrangements have been made to commence work at once, and that by June it is hoped to have a carload of high grade ore ready for shipment.

The Bailey Silver Mines was formed for the purpose of purchasing the old Bailey-Cobalt Mine as well as the plant of the Northern Customs Concentrator, both purchases of which have now been completed, the above mentioned concentrator to now be known as the Bailey Mill.

Ore at the Bailey is estimated to amount to 23,186 tons containing 510,294 ounces of silver, which consists of actually developed ore, and does not take into account that contained in the dumps, and in further probable ore in the mine. The property, though closed down on account of litigation since 1914 is regarded as one with a big future. In addition to this, it is stated that the concentrator taken over is making net profits at the rate of $75,000 a year from customs work done for other companies.

Directors of the new company include the following: A. J. Young, of Toronto, is president; Alex. Fasken, Toronto, Treasurer; and J. R. Booth, of Ottawa, Vice-President, with F. J. Bourne as General Manager.

Ore and Bullion Shipments.

During the week ended April 23rd, three Cobalt companies shipped an aggregate of seven cars containing close to half a million pounds of ore, the Mining Corporation being the heaviest shipper, with one car a day, as announced in advance recently in these columns.

Following is a summary:

Shipper.	Cars.	Pounds.
Mining Corporation	5	345,909
La Rose.	1	84,660
O'Brien.	1	60,075
Total	7	496,644

During the corresponding period, the Mining Corporation sent out 99 bars containing 100,004.90 fine ounces of silver bullion. This is the first heavy shipment of bullion to go out in several weeks, the tendency being to hoard up the output with the expectation of another upward move in quotations for the metal.

THE GOLD MINES

The gold miners' view with equanimity the gyrations of quotations for shares in the big industrial concerns in the more thickly populated centres to the south. The general impression exists that the present is the beginning of the post-war era of readjustment which is to spell for the gold mining industry perhaps the most prosperous period in history.

The important announcement is made this week officially to the Canadian Mining Journal correspondent that the Cassel Cyanide Company of Glasgow has made application for the incorporation, under Dominion and Provincial charters, of a company to be called the "Cassel Cyanide Company of Canada, Limited," to handle the Canadian business of the Cassel Cyanide Company, of Glasgow, Scotland. The directors of the Canadian company will be Sir George Beilby, F.R.S., Glasgow; Colonel Sir Edward Allen Brotherton, of Bart, M.P. for Leeds; William Neill, Glasgow; Rupert G. Bruce Toronto; Major Fred A. Peacock, Montreal, and William Evan Simpson, Boston Creek. It is proposed to establish head office in Montreal, and to have Northern Ontario headquarters located at Timmins, in the Porcupine gold district.

It is unofficially reported that the Hayden-Porcupine mine may resume work this year on a large scale. The property is situated in the township of Ogden, some three or four miles south from the Hollinger mine. In the period prior to the shortage of labor caused by the war the property was explored in a fairly big way, and the developments are stated to have been sufficiently encouraging to warrant continued work.

The Hollinger, McIntyre and Dome, as well as the Porcupine Crown all continue to work on a fairly uniform scale, with indications of conditions improving gradually. It is thought that the improvement taking place will be found to be permanent, and that the end of this year will witness all the producers working at full capacity.

During March, the Lake Shore mine at Kirkland Lake, produced $45,133.18, making a total of $130,-687.92 for the first quarter of the year, or at the rate of well over half a million dollars a year. The total output from this mine in its as yet, short career amounts to $809,271.97. Mill heads have averaged approximately $25 a ton for every ton of ore handled since the mill started operation, thus winning for the mine the reputation of being the highest grade gold mine among the important gold producers in Canada.

With the Lake Shore setting such a pace, and with the Kirkland Lake Gold Mines now also said to be producing value in excess of costs, the gold mining industry of Kirkland Lake is steadily taking on added importance. In addition to this is the actual construction of the large Wright-Hargreave mill now under way with the likelihood of the Tough-Oakes mine resuming work next month. Added to this, also, are a number of other important properties where work is resulting favorable. These include the Ontario-Kirkland where the shaft is now being driven from the 300-ft. to the 450-ft. level, and where considerable commercial ore has been developed. Another is the Bidgood where the work of sinking a central shaft from surface to a depth of 300 feet is now underway.

At Boston Creek the Miller Independence Mines has turned on electric power and is now in a position to carry out its big development programme with the maximum of speed. While cross-cutting is being done at the 500-ft. level to open up the downward continuation of the main orebody, work is also being done in the incline shaft along the rich deposit known to occur there. Specimens of ore sent from the Independence to the Toronto University were found to contain "calverite," as in these columns from time to time. Confirmation of the occurrence of this, the highest grade gold telluride known is regarded as being significant, in that it occurs in such spectacular quantities.

Prospectors just in from the Skead township district declare that the prospectors and miners in that district have commenced the work of cutting a road to the railway by way of Boston Creek. Failure of the government to grant the assistance has resulted in the property owners themselves taking the matter up. It is still hoped to induce the government to finance the construction of a bridge over the Blanche river. The distance to the railway over this route is only about twelve miles as compared with some 25 miles over the old road to Englehart.

British Columbia Letter

Alice Arm. B. C.

A tunnel that has been driven on the Muskateer Mineral Claims by A. McGuire for J. D. Meenach, of Seattle, Wn. It is reported that this work disclosed some high-class ore.

Satisfactory results are said to have been obtained by the diamond drilling which has been in progress on the Tiger Group for some time.

Prince Rupert, B. C.

Attention has been drawn by the Prince Rupert Board of Trade to the limonite ore deposit of the Copper River District situated near Copper City and in proximity to the city of Prince Rupert. In this connection reference is made to the coal fields of that locality, it being claimed that these contain the finest coking coal of the Province. The business men of Prince Rupert fear that the Provincial Government and individuals or corporations, in their investigations of the iron and steel possibilities of British Columbia will overlook that these resources, together with "water powers and all necessary fluxes," are to be found in the northern section of the Province.

Princeton, B. C.

The Horn Silver Mining Co., situated in the Similkameen District, is operating again after a period of idleness, weekly shipments of from 45 to 50 tons being sent to the Tacoma (Wn.) Smelter. The lessees are working on a vein varying in width from eighteen inches to six feet, the ore of which contains considerable gold and silver values. An aerial tramway carried the ore from the mine to the bunkers whence it is transportated by wagon to the railway.

Grand Forks, B. C.

It has been officially announeed that the Granby Consolidated Mining and Smelting Co. will dismantle its mine plant at Phoenix, where the mines have been idle for some months. Those parts that can be used either at the Company's collieries, Cassidy, Vancouver Islands, or at the copper smelter, Anyox, will be shipped. Some sections will be disposed of on the ground and the remainder will be stored at the Grand Forks Smelter. Not since the mines of Phoenix ceased to be worked last June have the people of the district given up hope of seeing them resume operation. Authorities have given it as their opinion that there are 3,000,000 tons of ore available still, of which several thousand tons is of good grade. The establishment of a concentrator for the treatment of the remainder has been talked of but the plan clearly now has been abandoned. Phoenix thus will become one of those phantom mining towns not infrequently found in mining sections of the American continent. Its streets, its houses, and its places of business will continue practically deserted and no longer will the clear mountain air of what was the town of greatest altitude in British Columbia re-echo the clange of industrial activity. The Phoenix properties were opened more than twenty years ago during which time there have been shippd about 13,000,000 tons of orc to the Grand Forks Smelter, which ore is estimated to have had a gross value of about $56,000,000.

Rossland, B. C.

The surface equipment of the White Bear Mine was destroyed by fire recently. Flames first were seen bursting from the compressor house. This soon was wiped out after which the mine shaft and some unoccupied houses were reduced to ruins. The transformer house was saved by packing snow about it.

Slocan City.

That a stringer of ore has been opened up on the fifth level of the Ottawa Mine, near Slocan City, which assays from 800 to 3,000 ounces of silver per ton, is the effect of a report from this camp. The showing was observed during the cleaning out of a drift and it was thought that it contained about a sack of ore. Development, however, appears to have disproved this as 10 cars already have been taken out and what is now referred to as "one-sack slope" has been exposed for 20 feet with a width up to 18 inches.

Trail, B. C.

The British Columbia town of Trail, smelter centre of the Consolidated Mining and Smelting Company of Canada, proposes introducing daylight saving this summer without regard to what action may be decided upon elsewhere. The Company's clocks were set ahead an hour at midnight on the 15th of April. Employees in and around the smelter expressed a preference for this arrangement and the management acquiesced.

Ore receipts at the Trail Smelter for the week, April 1st-7th inclusive, were 4,588 tons, making the total for the year to date 77,834 tons. The independent shipperspers were the Donohus, Nicola, 35 tons; the Eemerald, Salmo, 41; the Josie, Rossland, 172; the North Star, Kimberley, 86; the Ptarmigan, Athlamer, 25; and the Spokane Trinket, Ainsworth, 46. The Sullivan Mine, Kimberland, contributed 3,978 tons of zinc and 205 tons of lead ore.

Victoria, B. C.

When Hon. D. T. Pattullo, Minister of Lands in the Provincial Government, asked the Provincial Legislature to endorse a vote of $25,000 to continue the investigations inaugurated last year by Prof. Gwillims into the oil possibilities of the Peace River District of British Columbia he stated that the explorations up to date encouraged the belief that oil would be found in quantities in this section. The government's policy, he asserted, was to see that this oil wealth, if it existed, should accrue to the whole people. A reserve had been declared on oil on the crown lands of that district and if oil was dicovered the government would consider the advisability of itself going into the oil producing business, using the profits to pay off the provincial debt. The vote was passed although several private members expressed the belief that private enterprise would make a more thorough exploration and that it would be the wiser policy to let those wishing to do so to undertake the work, it being understood that a royalty would be payable to the government on anything that might be discovered.

The Minister of Justice, Ottawa, has announced that there would be no disallowance of the Dolly Varden Act of the British Columbia Legislature under the terms of which the Taylor Mining Co. acquired possession of the Dolly Varden Mine, Alice Arm, certain mining equipment, and a line of railway from tide-water to the property, the latter at the time of the change of ownership being within a short distance of completion.

Immediately this information was received R. T. Elliott, K.C., legal representative of the original Dolly Varden Mines Company, took the necessary steps to have the validity of the Provincial Legislation, and the title of the Taylor Mining Company to the property, tested in the British Columbia courts.

Mr. Elliott has issued two writs, one asking for a series of declarations setting aside the Act and all proceedings taken under its provisions and the other asking for damages for alleged trespass and for payment to the plaintiff of all money realized from ores produced at that Mine.

The Ward-Hopp litigation, a struggle for possession of the Bullion Mine Property which was carried through all Canadian Courts and even to the Privy Council of the Empire, is nearing its finish. R. T. Ward and his associates have been declared the winners of this long-drawn out legal battle and now there is before the Provincial Legislature a special Bill, entitled the "Cariboo Hydraulic Mining Company Amendment Act, 1920" which renews and extends for a period of thirty years the placer leases of the Company. Mr. Ward, however, evidently has not seen the last of his legal troubles for, as soon as the Legislative Assembly re-establishes the Company's title to the property, he must defend himself in court against an application made by a group of his associates for his dismissal from the position of trustee of the Bullion Mine and for a declaration by the judge of the respective interests of Messrs. Ward et al in the property.

Vancouver, B. C.

There is still hope that the Dominion Government will establish the long promised Ore Testing Plant in British Columbia. Some years ago $300,000 was placed in the estimates to meet the necessary outlay but so far no steps have taken place towards installation. Assurance, however, has been received that the money will be re-voted this year and that action may be looked for.

Dawson, Y .T.

That the placer laws of the Yukon Territory should be amended for the express purpose of encouraging companies wishing to engage in dredging operations is the opinion of the Yukon Development League, which has placed its ideas before the Dominion Government. Such companies, it is maintained, should be permitted to prospect and work low-grade placer areas, former worked by individual miners and now abandoned without molestation. They are hampered and interfered with at present to the point of hopeless disgust by persons who, as soon as they begin to prospect, stake all around and proceed to hold up the companies for excessive prices. Several large dredges representing millions of dollars of an investment are likely to be shipped out of the country if further low-grade placer ground cannot be secured. The League believes that the individual miner should be allowed permits to prospect exclusively on one-mile tracts on virgin creeks for one year with the privilege of first choice in the staking of a discovery claim within that tract. The League also recommends the abolition of the royalty on gold, arguing that as gold has lost half its purchasing power the maintenance of the gold mining industry in the Yukon is threatened.

The Provincial Assayers' Association Board has just completed a special examination of seven candidates who recently completed a five month course of study at the British Columbia University under the auspices of the Soldiers' Civil-Re-establishment Board. Four of those who wrote were successful and will receive certificates entitling them to practice their profession in this Province. They are E. D. Beilby, V. R. Thirkel, T. J. Laing, and F. W. Broughton. The percentage of passes reflects credit on the efficiency of the course laid down for the benefit of returned soldiers as the standard could not and has not been lowered in their favor.

The Collieries.

There has been a marked falling off in the coal production of the Crow's Nest Pass Coal Field of late largely for the reason, no doubt, that comparatively little is required for coke making in comparison with the demands of previous years. At present the ovens at Fernie are idle, those of Michel alone being active. The importance of this change in conditions can be better understood when it is pointed out that in 1918 the coke production of Michel and Coal Creek combined approximated 18,000 tons a month necessitating the consumption of something like 30,000 tons of coal. The explanation of the slackness of the coke market as far as the Crow's Nest is concerned lies in the closing down of the smelters at Greenwood, Canada Copper Corporation, and at Grand Forks, Granby Consolidated Mining and Smelting Company, as well as the fact that the latter Company now is in a position to produce from Vancouver Island coal, and by the use of its by-product coking plant, the necessary fuel for its Anyox smelter. There may be other reasons behind the condition at Coal Creek and elsewhere in that district, where the men have been working little more than half time, but those given may be accepted as chiefly responsible.

On Vancouver Island the situation is different, although there was a period following the strong demand of the winter during which the trade fell off sufficiently to affect to some extent the operation of the mines. During February the Canadian Collieries (D) Ltd. kept their men at work at the three Comox mines for 17 days, at Extension for 22½ days, and at South Wellington for 23 days. The Canadian Western Fuel Company operated its properties at Nanaimo, Harewood, Reserve and Wakesiah for 24 days in February. This also applies to the collieries of the Granby Consolidated Mining and Smelting Co. at Cassidy's, the Pacific Coast Coal Mines, the Nanoose-Wellington Collieries, as well as the Coalmont Collieries in the Nicola-Princeton Field. What the forthcoming season is going to bring to coal operators in the bunker business remains to be seen but it is feared that the exchange conditions are likely to have such an effect on the mercantile trade of the Pacific that the collieries of this Province will find the market unpleasantly quiet. However, the output figures for the Island collieries for the month of March indicate that the market has become brisker and that the production has jumped. This is particularly evidenced in the output of the Pacific Coast Coal Mines and it also is worthy of note that the production of the Cassidy Collieries, Granby Consolidated Mining and Smelting Company, also shows a substantial advance.

The British Columbia coal output for the month of February was as follows:—

CROW'S NEST PASS DISTRICT.

	Tons
Crow's Nest Pass Coal Co., Coal Creek	34,672
Crow's Nest Pass Coal Co., Michel	22,427
Corbin Coal and Coke Company	9,954
Total	67,053

NICOLA-PRINCETON DISTRICT

	Tons
Middlesboro Collieries	8,930
Fleming Coal Company	3,446
Coalmont Collieries	280
Princeton Coal Company	2,633
Total	15,289

VANCOUVER ISLAND DISTRICT

	Tons
Canadian Western Fuel Company, Nanaimo	56,813
Canadian Collieries (D) Ltd., Comox	28,515
Canadian Collieries (D) Ltd., Extension	18,377
Canadian Collieries (D)., S. Wellington	6,450
Pacific Coast Coal Mines, Extension	8,752
Wellington-Nanoose Collieries	2,488
Vancouver Nanaimo Coal Company	1,441
Granby Consolidated Mining & Smelting Co.	14,419
Total	137,255

PRINCE RUPERT DISTRICT

	Tons
Telkwa Collieries	325

The production returns for March are available only for Vancouver Island which follow:—

VANCOUVER ISLAND DISTRICT

	Tons
Canadian Western Fuel Company, Nanaimo	55,769
Canadian Collieries (D) Ltd., Comox	32,587
Canadian Collieries (D) Ltd., Extension	19,277
Canadian Collieries (D) Ltd., S. Wellington	7,219
Pacific Coast Coal Mines, Limited	10,338
Wellington-Nanoose Collieries	1,849
Granby Consolidated Mining & Smelting Co.	17,566
Total	144,605

Victoria, B. C.

The Lignite Utilization Board of Canada is expected to make important advances this year in the development of the Saskatchewan Lignite Coal fields and the furnishing of the people of the prairie provinces of the Dominion with cheaper and better fuel. One of its definite objects is to place the briquetting business on a commercial basis. For the use of the Board there has been appropriated the sum of $400,000 by the Dominion, Manitoba and Saskatchewan Governments. The former is to contribute one-half of the amount while the two latter put up one-quarter each.

Coal lands situated adjacent to the old "Jingle Pot" mine, which recently ceased to produce, are being developed. This property is situated close to the town of Nanaimo. A shaft is being sunk and it is expected that coal will begin to be taken out in a short time. The new company, whose personnel is not yet generally known, has purchased the machinery of the Jingle Pot mine and is making use of it in its development operations.

A dispute as to the title to some 1222 acres of Vancouver Island coal lands was ventilated before a select committee of the Provincial Legislature at the session which has just concluded. This property at present is held by the Canadian Collieries (D) Ltd. It originally belonged to the old Baynes Sound Coal Mining Company and has been developed to a considerable extent, production having been maintained years ago over a lengthy period. In 1904 when the Provincial Government of that day reached an understanding with the Esquimalt and Nanaimo Ry. Co., by which coal rights within the Island Railway Belt were secured for a number of old-time settlers or their descendants in return for which the company was granted further lands in the north-eastern section of the Island, operations had ceased at the Baynes Sound Collieries. The property of the latter came within the limits of the supplementary E. & N. Land Grant. It was found, however, that the latter company did not obtain possession of these holdings, as the Baynes Sound Company's leases still were in good standing at the time of the transfer from the Government to the Railway Company. Thereupon, so it is alleged, representatives of the Railway Company proceeded to stake the property which subsequently had become open. From them it came into the hands of the E. & N. railway and later was transferred to the Wellington Colliery Co. and thence to the Canadian Collieries (D), Ltd. It is the contention, however, of Messrs. E. T., C. H. F., and E. A. Carew-Gibson and E. Priest, that the company's representatives did not stake the land accurately and that they are the only ones who complied fully with the law following the lapse of the Baynes Sound Coal Company's leases. On this ground they are asking for possession. The Legislative Assembly's special investigating committee is understood to have refused this demand, but the claimants assert that they are to carry their case if necessary to the court of last recourse.

Some trouble has been experienced of late in the coal fields of the Province of Alberta because of the government's ruling that only miners acquiescing in the "check-off" for payment of dues to the United Mine Workers of America shall be permitted to work. This order was issued last January, but at first was not strictly enforced by the operators. Recently, however, the Minister of Labor agreed to accept responsibility for the regulation. This brought about an effort at its enforcement, with the result that the miners left work at two camps at Coleman, Alta., and at Blairmore and Canmore.

WHAT CANADA CAN DO BY DEEPENING THE ST. LAWRENCE-GREAT LAKES WATER ROUTES.

Can construct the greatest waterway in the World.

Can made every Lake Port an Ocean Port.

Can place Western Canada 1,500 miles closer to the markets of Europe and of Eastern Canada and the United States.

Can develop electric energy that will make Canada the workshop of the World.

Can enable Nova Scotia to send coal to Ontario.

Can open up the coalfields of Alberta by providing the Western Provinces with the cheap transportation facilities which are essential to her development.

Can forward the day when Alberta will be the greatest industrial and manufacturing province of Canada.

CORROSION IN WIRE ROPES

Experience has shown that wire ropes of compound-construction, subjected to corrosion influences, are likely to deceive engineers as to the strength remaining in them, says a circular issued to managers of mines on the Rand, South Africa. Where reduction of diameter or circumference of the rope has taken place, not accounted for by the evidence of wear, the part of the rope under examination should first be fully loaded and then relieved of the load. Any noticeable difference in circumference under these circumstances and the slakening of the outside wires when the load is off will indicate that internal corrosion has taken place. The extent of corrosion inside the strand can only be estimated by the slackness of the outside wires. The corrosion between the strands can be further examined by untwisting the rope or displaying the strands sufficiently with a marline spike.

Engineers are apt to imagine that reduction in the size of a rope may be due to some collapse of the hemp core. In a test at the mines department mechanical laboratory of a 1.28 in. diameter rope, the hemp core was entirely removed for about 5 ft. of the length. The specimen was gradually loaded up to 30 tons, but beyond a slight increase of the lay from 10½ to 11 in., subsiding after test to 10¾ in., there was practically no alteration in the shape or size of the rope.

In some recent tests of corroded ropes, the following results were obtained:

Original diameter, in.		Original breaking load,	Diameter at test,	Breaking load at test,
Rope.	Wires.	lb.	in.	lb.
1.50	0.099	222,208	1.41	191,960
1.50	0.099	222,208	1.40	166,660
1.50	0.099	222,208	1.30	137,260
1.50	0.099	222,208	1.23	66,880
1.50	0.102	220,000	1.22	97,260
1.25	0.115	148,700	1.23	137,660
1.25	0.115	148,700	1.00	78,920

In all the above-mentioned cases the outside wires were less than half worn, but the internal corrosion was excessive. The wires were brittle also. Experience has shown that the remarks concerning corrosion on the certificate of biannual tests are taken as merely applying to the test specimen and not considered as having a bearing on the state of the rest of the rope.

THOMAS'S DIRECTORY OF AMERICAN MANUFACTURERS.

The eleventh edition of the Thomas' Register of American Manufacturers, dated January 1920, has just been published, in which more than 300,000 names of United States manufacturers of products classified under over 70,000 headings are listed. It weighs 17 pounds and contains 5,980 advertisements, said to be the largest number of advertisements ever printed in a trade publication.

The register is divided into three main sections with an index totalling 176 pages. The classified section (3,340 pages) furnishes a complete list of the makers of every known United States product, classified according to the article, eleven pages alone being devoted to the single item of acids. A capital rating is also given of each manufacturer, showing the amount of capital invested and the approximate size of the concern. About 800 pages are devoted to two other main sections listing the trade name or brands of manufactured products, and to a continuous list of the names of manufacturers in alphabetical order from A to Z, also giving the addresses of head office, branches, names of officers, etc., of the concerns listed.

Thomas' Register lists all names absolutely free of charge and irrespective of advertising support. The purchasing agent and buyers for nearly 25,000 important business houses use it, several hundred of these being Canadian concerns which find it indispensable when buying United States products.

An international trade section, listing exporters and importers, is included in the eleventh edition, together with a directory of banks, commercial organizations and trade papers in the United States and Canada.

The Thomas' Publishing Company, New York, are represented in Canada by the Canadian Buyers' Register Company, 92 Constance Street, Toronto, from whom specimen pages, etc., can be obtained. The price of Thomas' Register in Canada is $17.50, all charges prepaid.

TURNING THE SCREWS ON CANADA.

The United States railway companies have served notice that freight rates on shipments of American goods must be paid in American currency from the point of shipment to any destination in Canada. This arbitrary ruling takes an extraordinary advantage of the exchange situation, since the American roads declare they will not permit reshipment at the border, where Canadian currency could be used at full value for part payment of the freight charge.

The possession of a strangle-hold upon the Dominion permits American business men to indulge in this sharp practice. Canada's dependence on the United States for coal is the root of the whole trouble. It encourages exploitation of the Canadian market with no limit except the forebearance of the exploiter. It permits the foreigner to levy a tax upon the Canadian public which, in the present case, will amount to ten per cent and over.

Here at last is the economic third degree. Question may be raised if any more striking illustration could be imagined to proclaim the meaning of Canada's needless fuel disability. And it happens to come at the very moment when Senator Underwood of Alabama is urging Washington to tighten the coal grip on Canada's throat so that our pulpwood resources may be utilized regardless of our own needs and in the interests of American paper manufacturers.

Foreign exploitation faces Canada allied with Winter. This menace will cast its shadow over the land, and work its repeated hardships, until the people of Canada, led by a vision of national self-sufficiency, utilize the enormous coal deposits of their own Dominion. The very soil of the nation cries out against this self-inflicted shame and offers succor in full abundance.—Montreal "Star" April 29th.

THE HAND THAT ROCKS THE CRADLE RUNS THE "JACKHAMER".

By F. A. McLEAN.

The accompanying photographs taken in the Buxton Limestone Works quarries in England during the war, serves to illustrate the remarkable way in which the women of the Old Land so nobly answered the call and "carried on" when their men folks marched off to "Flanders' Fields." For many years it has been customary to employ women for certain kinds of light factory work such as in textile mills, and electrical works where it was found that their temperament made them of much more value for certain kinds of monotonous routine work than men.

With the coming of the war and its accompanying scarcity of man power, however, women were given employment at various tasks for which it had been long considered that only men were suitable. Thus there were few industries in which female help was not tried out with varying degrees of success. Women doing various forms of office work that was usually done by man, operating elevators, street cars, motor trucks and machine tools in munition plants, were a sight more or less familiar to us all, two or three years ago. So well did some of these women perform their allotted tasks, that in many industries they will probably continue to be employed on work for which it would have been once thought that only their fathers, brothers or sweethearts could properly handle.

WOMEN AT WORK IN BUXTON LIMESTONE QUARRIES

In England, due possibly to the fact that they were stronger than in this country, or to the more incessant demand for labor, women were given much heavier kinds of work than they were in the United States or Canada. Thus, perhaps, it was only natural that women should be used to operate large cranes in shipyards and steel mills, erect and paint structural steel, load trucks and cars, handle heavy timbers, load and tram heavy muck in mines and collieries, excavate for foundations and so on, ad lib., all of which are forms of work that are usually associated in the minds of most people with good strong men.

This photograph also lends emphasis to the wonderful progress that has been made in the development of power rock drilling equipment during the last decade or two. With this idea in mind it is interesting to speculate on what would be the sensation of the immortal shades of the late J. J. Couch and Joseph W. Fowler, were they allowed to visit the earth again and witness the transformation that has taken place in their clumsy drill of the early forties through the ministration and inventive genius of such men as Sergeant Waring, Halsey, Githens, Ingersoll and Leyner.

What a far carry it is from Couch's ponderous drill with its big steam boiler from the invention of which mining methods practically date, to the little "Jackhamer" weighing only a fraction as much and having many, many times the drilling speed and yet withal, so easy to operate and control that even women can run them if necessary without undue fatigue or physical strain.

A VOICE FROM THE NORTH-WEST.

Hyder Miner: The voice of the wildcatter will soon be heard in the land.

Already we read in outside papers glowing descriptions furnished a too gullible press by companies unknown to the North, with claims unheard of outside of the recording office.

A mining man recently returned from Vancouver told "The Miner" that promoters were thicker in the lobby of the Vancouver hotel than second-growth spruce saplings on an old burn. And if this is true of Vancouver, where there is less interest taken in mining than in any city of its size west of the Rocky mountains, what must be the situation in other cities where a real interest is manifested in the country's greatest industry!

We have heard the remark that every mine was, at initial stage of its existence, a wildcat. This is not true. It is true that every mine was at some time a prospect, but there is a vast difference between a prospect with well defined surface showings of ore, which intelligent development may prove to extend to depth, and a wildcat with its few acres of country rock, whose owner staked it because some prospects in the district were showing up well, and whose promoters foist it upon the public with the full knowledge that not a dollar's worth of ore will ever be extracted from it.

However, we are inclined to pity the public with too great a pity. Anybody who will invest his money in mining stocks because of a high-sounding name or glowing prospectus, and without making such inquiries as to any ten-year-old child should have brains enough to make, is not entitled to pity.

There is only one good thing about a wildcatter. The money he extracts from the public he generally puts back into circulation with both hands. As a rule his easiest victims are people who are so tight they wouldn't buy a cheese sandwich for a starving orphan but who pull their money out of the banks when told by some suave gentleman that they can easily double it with no other effort on their part than signing checks.

Many of the companies now organizing are being formed in good faith and the money turned over to them will be expended honestly. Such companies are public benefactors. They undertake mine prospecting and development work which the individual, unless he belonged in the multimillionaire class, could not undertake. If they fail, no one is hurt much because no one has invested much. But if they develop a mine, the money taken from the ground is distributed among the many shareholders, people of moderate means, to whom an augmented income is of some benefit.

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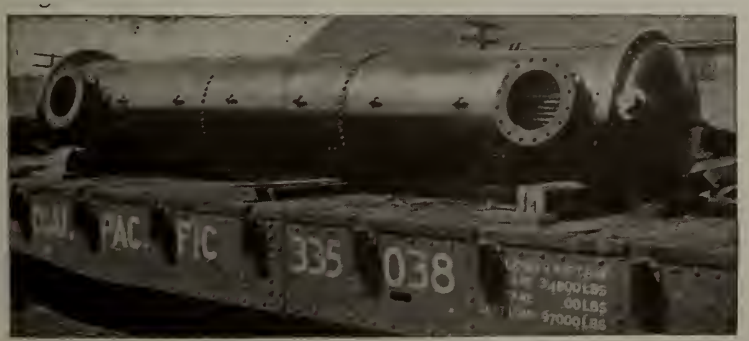

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ONTARIO DOES NOT PROPOSE INCREASE IN IN MINING TAXES IN 1920.

Hon. Harry Mills, Minister of Mines, has stated in the Legislature that he is of the opinion that there will be no change in the Ontario Mining Act this session. The statement was made in reply to a question by Hon. G. Howard Ferguson, who said that he had received several letters from which he had gathered that it seemed to be the general impression that there would be an increase on the tax on mines this year. He thought an announcemtn would have a good effect on the general public interested.

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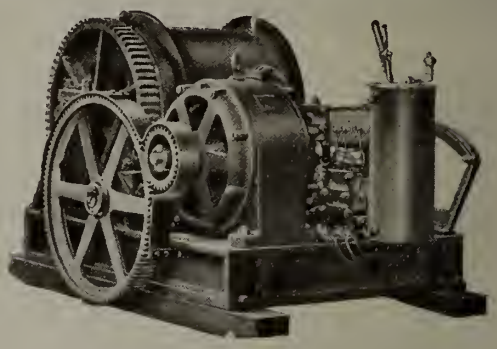

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:-: EDITORIAL :-:

Miners' Nystagmus

A paper was recently read before the Illuminating Engineering Society in England by Dr. Llewellyn on "Lighting Conditions in Mines with Special Reference to the Eyesight of Miners." The discussion which followed was taken part in by eminent eye specialists and authorities on the occupational diseases of the coal miner. Dr. John S. Haldane summarised the causes of nystagmus in words understandable by the laymen when he said it "was fatigue of some sort connected with the miner trying to see in the darkness", in which opinion he was supported by Dr. Shufflebotham, who congratulated the Illuminating Engineering Society on their joint endeavours with the Royal Society of Medicine to combat this nervous disease resulting from deficient illumination.

Dr. H. S. Elworthy suspected that some incurable cases of nystagmus were connected with rays from the violet end of the spectrum, and he gave figures intended to show that the incidence of nystagmus was greater in pits where owing to the colour of the coal there was a large amount of blue reflected from its surface. In this connection the occurrence of nystagmus cases in zinc mines, as noted by Dr. Stassen, is interesting.

Figures were given by Mr. Turner, of the Stafford Coal and Iron Company, showing that with the very best types of clean safety lamps the illumination at the face is only a small proportion of the candle-power of the lamp. In some instances, lamps over eight feet away from the coal-face gave an illumination of less than 0.01 foot-candle on the coal-face.

Dr. Llewellyn thought the miners' lamp of the future would be the electric lamp, and he directed special attention to the cap type of electric lamp, the alternative to which he said was an increase in the lighting power of the ordinary electric lamp to 3 or 4 candle-power, compared to an average of about one candle-power in standard types now on the market.

One speaker stated that the collieries with which he was connected had purchased 10,000 lamps of the "Ceag" type, which had been in use since 1912. He had noticed three things resulting from their use, first, a reduction of nystagmus, secondly, a reduction in accidents, and thirdly, the men were able to get away more quickly from the coal-face.

Mr. E. F. Fudge, speaking as Secretary of the Home Office Committee now enquiring into the question of miners' lamps, said that with the present form of construction there was no royal road by which the candle-power could be increased to the extent sufficient to prevent nystagmus. This applied both to the electric lamp and to the oil-safety lamp. He suggested more white-washing of the face and roads in the mine.

Is it not possible that makers of safety lamps are slavishly following older types, much as in the early days of electric lighting the manufacturers of lighting fixtures followed the design of Victorian gas fixtures? It is only recently that electric-light fixtures have shown signs of emancipation from the influence of gas-tubing. Dr. Llewellyn's remarks on the cap-type of the portable electric lamp show a hopeful tendency. In the United States and in Canada lamps of this type have proved to be excellent and safe instruments. They avoid the sensations of shock, and the effects of the vacillating flame that Dr. Stassen insists are so fruitful a cause of the nervous irritations that combine to cause nystagmus. Dr. Llewellyn stated that the chief symptoms of nystagmus, particularly the backward inclination of the head, were a result of the attempt to get the eyes in a position of maximum stability, convergence and depression, and at the same time to direct the line of vision forward. The cap-type of lamp would seem to admirably suit these requisite conditions of vision, and to supply all the deficiencies of which these symptoms are the proof. In fact, they might almost be quoted as a description of the characteristics of the cap-type of electric lamp with conical reflector.

The very general attention now being paid to the causation and remedy of nystagmus, and the combined efforts of illuminating engineers, eye-specialists and mining engineers above noted, should lead shortly to the removal of an occupational disease of miners that has not received any really concentrated attention in years gone by. We may hope, with Dr. Llewellyn, that "in this twentieth year of the twentieth century the long-continued supremacy of the farthing dip will be finally ended."

The British Steel Corporation, Limited

The progress of the negotiations for a consolidation of a number of coal, iron and water transportation enterprises of Eastern Canada has now proceeded to a point where it is proper to make public comment on a proposal that has been adumbrated for about a year. It is understood the consolidation will include the Dominion Coal Company, the Dominion Iron and Steel Company, and the associated undertakings attached to these two main subsidiaries of the Dominion Steel Corporation, and the Nova Scotia Steel and Coal Company with its subsidiaries and controlled interests, that include the Acadia Coal Company and the Eastern Car Company.

By the inclusion of the Canada Steamships Lines, which company it is understood controls the Century Coal Company of Montreal, Toronto, Port Colborne, Sarnia and Sault Ste. Marie, there is added a network of water transportation and coal distributing facilities that will very much broaden the scope of the Dominion and Scotia Companies' operations, themselves almost as much transportation companies as they are coal miners and steel manufacturers.

It is also stated that the Halifax Shipyards, the Davis Shipbuilding Company of Levis, the Port Arthur Shipbuilding Company, the Collingwood Shipbuilding Company and other smaller interests are to join the consolidation.

The scheme is vast, comprehensive, but we believe quite logical, and is—although we think it quite possible that few will agree with our viewpoint—but a resumption of the natural evolution of industries having coal as their base that was interrupted when the consolidated operation of the coal seams of Nova Scotia by the General Mining Association was abandoned in 1857 for the experiment of independent operation.

We have always believed that whatever financial stability attaches to the coal companies of Nova Scotia is a testamentary benefit conferred by the General Mining Association, and we ventured about five years ago to suggest that the only hope of settled prosperity in the Nova Scotia coal trade lies "in the development "of strong corporations, with adequate financial re- "serves."

The base of the imposing fabric of the "British Steel Corporation, Limited," so far as Canada is concerned—and for that matter so far as any other plans its promoters may have overseas are concerned—is built upon coal. On that foundation has been reared the acquisition of ore bodies, the manufacture of iron and steel, and all that implies, the acquisitions of lumber areas, and the coastwise and inland water traffic of Eastern Canada and the St. Lawrence waterway, and the assembly of all these activities under one head is but the family reunion,—with the added vitality that union always gives,—of the children of coal.

It is as a coal-mining consolidation that the merger of these various enterprises holds most significance, and we believe further holds out most hope for financial success for its promoters and real impetus to the industry of Canada. The aggregate production of the Dominion Coal Company, the Nova Scotia Steel and Coal Company and the Acadia Coal Company comprises ninety per cent of the coal production of Nova Scotia and probably ninety-five per cent of the capacity of the collieries of Nova Scotia for production.

It is interesting to note that the coal areas which are controlled by the associated companies are precisely those chosen in 1857 by the representatives of the General Mining Association when that Company relinquished its monopoly of the minerals of Nova Scotia, namely the areas at Springhill Mines, at Stellarton, Sydney Mines and Glace Bay.

It is not within the province of the "Journal" to comment on the propriety or otherwise of the far embracing, but we would repeat, essentially logical consolidation of interests that has been sketched for the public information in the newspapers, but as to the desirability of a consolidation of the operations of the Dominion Steel Corporation and those of the Nova Scotia Steel & Coal Company, there is in the minds of those who are best qualified to judge not the slightest doubt. The only regret that such a consolidation could occasion was that it had not been undertaken many years ago.

The attitude of the "Journal" as to the necessity of an agreement between the Dominion and Scotia Companies for a re-allotment of the submarine areas has not been in doubt. We have always contended that the best interests of both companies were to be served by an amicable agreement, **based on consideration of technical operation,** a condition that, as we stated in our issue of December 31st last, "will speedily become ap- "parent if a scientific, impartial and complete survey "of the problem is undertaken by competent persons." Such a survey has apparently been made, with a result that was a foregone conclusion. There was no escape from the conviction of any competent and unprejudiced group of men who examined the undersea coal area problem that continued independent operation of the undersea coal areas, with continued failure to come to agreement, would in time have spelled disaster to both rival companies.

The consolidated operation of the undersea coal areas off Cape Breton will not by any means remove all the problems that have to be overcome in the future of this unique field, but it will simplify them as no other single occurrence could possibly do, and it will enable concentration of expenditure and technical direction on the problem, in lieu of duplicate expenditure and the raising of man-made difficulties in the operation of a coalfield that is essentially one con-

tinuous deposit, requiring for its most perfect exploitation one continuous management.

We would command to those who have the direction of the policies of the new Corporation the suggestion that coal is the base of every activity of the thousand and one departments that will require attention, and that it is at the collieries where intensive capital expenditure to improve the capacity of the mines for output is most urgently required.

CANADA RANKS SECOND AS MINERAL PRODUCER IN EMPIRE.

Commenting on the mineral production of Canada in 1919, the "Mining Journal" of London, Eng., states:

"In common with practically all other mining "communities, Canada experienced a general de- "cline in its mineral output last year. Allowing "for the great expansions which took place in "Canada during the war, and arising directly from "the war demand, the falling-off was relatively "less than in other parts of the Empire, and to- "day Canada undoubtedly stands second only to "the United Kingdom in the importance of its "mineral industry. Not only so, but the Canadian "industry is very diversified, and in many direc- "tions has prospects of expansion which promise "to increase her lead over the other Dominions "and Dependencies. The extent to which Can- "ada is supplanting Australia as the premier white "mining community overseas is very marked. South "Africa is, of course, unapproachable as a gold "producer, while India has a big lead in coal and "manganese, but Canada, while possessing certain "special features of her own, such as nickel and "asbestos, has an all round strength which is the "best guarantee of regular prosperity."

The day is coming when Canada will produce much more coal than Great Britain, and may be relied upon to overtake India in this regard. Great Britain's coal reserves was in 1913 estimated at 189,533 millions of tons, including Ireland. Canada's reserve is 1,234,269 millions of tons. India's reserve is only 79,000 million tons, and is mostly coal of poor grade. There is therefore little doubt that Canada will one day be the mineral producer of first rank in the Empire, as it is now constituted.

It was only in the quinquennial period between 1895 and 1900 that the United States passed Great Britain as a coal producer. It is difficult to realize that 25 years ago the annual coal production of the United States was only 177 million tons, and that it is now in the neighbourhood of 700 million tons. Canada's rise as a coal producer may be commensurately rapid. Why not? We have more coal in Canada than in the whole of Europe, and next to the United States, we have more coal than any other single country in the World.

There are those who argue that Canada should use United States coal, as such a practice will tend to conserve Canadian resources. If it is intended that Canada should wait until the reserves of the United States are exhausted, then the matter ceases to have any interest for this generation, seeing that the coal reserves of the United States are estimated at 3,838,657 million tons. In the meantime, if our own coal reserves remain undeveloped, Canada occupies tthe position of not having any resources of domestic coal supply, because non-utilization of natural resources is equivalent to their non-possession for every practical purpose. It will be possible to gauge Canada's material growth by watching the curve of coal production, and just now, most unfortunately, Canada is not progressing, but is slipping backwards steadily and without immediate hope of recovery in the rate and tonnage of coal production.

How much longer will we submit to be, as a contributor to the "Journal" on the availability of anthracite recently remarked, the "last applicant at the final source of fuel" in the United States; where, as our contributor further remarked, Canada "can only ask for consideration, has no voice in any proposals developing or conserving production for her future necessities, no control over efforts to expand, no means to compel any change in policy, and no authority to force her needs." Who can doubt the correctness of his further statement, namely, that "the future fuel supply of Canada is a subject large and important enough to justify the continued attention of the Goernment, and should not be taken up and sidetracked as crises from varying causes rise and disappear. It is a problem greater and more Dominion wide economic importance than much of the work now being undertaken by numerous Government departments."

NIPISSING MINES ANNUAL MEETING

Shareholders of the Nipissing Mines held their meeting in Toronto on Monday and listened to satisfactory reports concerning the years operation. During the meeting the question was raised as to why the dividend was not higher than 20 per cent. in view of the large surplus of the company, now standing at $4,372,952, an increase of nearly one million for the year. President E. P. Earle of New York, replied that a good deal of the surplus was in the form of investments in Victory and Liberty Bonds, amounting to $1,375,000 in the former and $340,000 in the latter, and that, having regard to the bond market, the company was inclined to pay heed to a feeling of the Government and hold the bonds for some time rather than throw them on the market and to that extent, furthed depress prices. Further dividend disbursements would be made as soon as possible. It was stated in regard to the company's oil lands that in the Texas field, drilling had reached 2,800 feet and the Ranger sands occur at about 3,400 feet. The former board of directors were re-elected.

SAFETY LAMP GAUZES

By JAMES ASHWORTH, Livingstone, Alberta

It is now more than one hundred years since Sir Humphrey Davy experimented and produced the well known safety lamp which still bears his name. Its construction has for all practical purposes never varied. The confidence of mining men in its safety and utility in mines has been unaltered through all these years, and even at the present day there are scores of miners who would enter the most dangerous gassy and dusty coal mines and use it with the utmost confidence.

It is, however, a fact that some of the warnings of its inventor were not heeled at first, and, moreover, the later warnings of observant mining men who detected some of its weaknesses, have not been heeded either; thus Sir H. Davy said, that the the gauze needed shielding from strong air currents, but some time elapsed before the lamps of this type were fitted with tin shields, for the whole height of the gauze but more generally for only part of the height. In time the tin shield was partially replaced by a cylindrical glass shield in this form and called the "Jack Lamp." Almost contemporaneously the Stephenson and Clanny types of lamp came into use, but they were never regarded with the same degree of confidence as the Davy, becaus the glass parts were looked upon as being dangerous; and not even the improved lighting value of the Clanny has been able to entirely displace the Davy.

Explosions, however, began to occur where Davy lamps were in use, and various committees and individual men commenced to make experiments, ALL of which showed that the Davy was not as safe a means of lighting a mine, as was popularly thought. Amongst the doubters was a Mr. Darlington (1852), and previously also Dr. Priara (1833) whose energies resulted in the Upton & Roberts safety lamp. The last named safety lamp was a thoroughly well shielded Davy Lamp, but it was very much heavier than the Davy and had not any better lighting value than the Stephenson (Geordie).

The North of England Institute of Mining and Mechanical Engineers appointed investigating committees and experiments were also made by some of its members from time to time, and still nothing definite resulted.

However about 1878-79 following the explosion at Haydock, near St. Helens, Mr. Smethurst of the Garswood Hall Colleries, Wigan, England, erected a testing gallery at one of the collieries where pure methane was piped up one of the shafts from the Six Feet mine, and being joined by the writer commenced experimenting on all safety lamps then in use. The results of these experiments were reported from time to time to the North of England Institute of Mining and Mechanical Engineers, the Secretary of which was Mr. Theo. Wood Bunning. This gentleman was deeply and practically interested, and he induced his Council to arrange to call a meeting of representatives from all the British coalfields to consider what ought to be done to improve the safe lighting of Colleries, and to ask the Government to take up the matter with a view to legislation. After this meeting had been arranged and just before it was to have been held, the Government took a very unexpected move and astonished the whole mining community by appointing the Royal Mines Accident Commission. This Commission commenced its investigations with the apparatus used by Messrs. Smethurst and Ashworth, and its report, which is known all over the world, was published in 1886, and so far as safety lamps were concerned, they selected four which seemed to them to have given the best results, viz., the Marsaut, (3 gauzes), the Gray, the Evan Thomas No. 7, and the bonneted Mueseler; all of which were bonneted lamps. But none of these lamps excepting the bonneted Mueseler are in use to-day.

Since then hundreds of patents have been taken out for new patterns of safety lamps, and for various small improvements in safety and lighting value, and yet here we are in 1920 still struggling with the question of a safe safety lamp. Just to show that the matter is considered of great importance it may be interesting to note that the British Government have an official Committee now engaged on a fresh investigation of miner's safety lamps.

It is a remarkable fact that although fine coal dust has often been suspected of reduciing the safety value of miners lamps, yet as a factor in experimental tests it has been neglected, and may be said to be so still.

The writer whilst conducting safety lamp tests for the North Staffordshire Institute of Mining and Mechanical Engineers safety lamp committee 1879, made an accidental discovery; thus, it was proposed by the committee to commence the tests with an explosive mixture of coal gas, (town lighting gas), and air, having a velocity of ten feet per second, but as the volume of gas was insufficient, it then seemed as if tests would have to be abandoned untill a larger connection could be made with the gas mains. On looking around a sack of fine Eight Feet Bambury coal-dust was noted, which had been specially collected from the roadway of a mine (where there had been at least two explosion disasters), for another committee which had been engaged in making tests with explosives and coal dust. A small handful of this dust was placed on the floor of the lamp testing gallery, on the windward side of the Davy lamp under test, whilst a low velocity of current of 370 feet per minute, consisting of air with 4½ per cent of gas, just licked up what is best described as a normal per centage of the dust. The result was startling, as the lamp quickly showed the effect by becoming red hot near the top of the gauze, and exploded the surrounding atmosphere in eleven seconds. This experiment was repeated many times and the flame passed at times in as little as ten seconds.

This experimental result was communicated to the North of England Institute of Mechanical Engineers, and of course to the North Staffordshire Institute of Mining and Mechanical Engineers, and the records are to be found in the transactions of both Institutes, in the 1879-80 of the former.

The writer does not know of any other experiments having been made in England with the same combination, and why it was not taken in hand by the Government when the Mines Accidents Commission commenced to test safety lamps it is now impossible to say. The next English Royal Commission which was appointed to investigate explosions from coal-dust, did not touch the subject of safety lamps at all, and thus we have now reached the year 1920, after a lapse

of forty years before the subject seems to have awakened mining men to its great importance.

Possibly a real awakening is now in prospect, something comparable to the early morning sun peeping up on the eastern horizon, ts there is actually a Miners' Lamp Committee, composed mainly of officials connected with the British Home Office Department, making an investigation.

In 1919, Mr. T. J. Thomas, of Porth, South Wales, contributed to the "Colliery Guardian," of London, a series of articles on safety lamp gauzes These articles were spread over many months, and whilst reporting the work of those who have in the past devoted their time and energies to the safe lighting of coal mines, show minute thought, and the sound reasoning on which he has based his conclusions.

He commences from the earliest period, beginning of course with Sir Humphrey Davy's work on wire and wire gauzes, and in this regard has deduced facts which demonstrate most clearly that the Davy wire gauze (composed of 28 iron wires of 0.0148 diameter (28 S.W.G.), with 784 apertures of 0.0209 diameter to the square inch), is in all respects superior to any of the Continental standard-gauze meshes. Sir H. Davy's rule was that if a wire gauze could be improved it would be by increasing the radiating or cooling area, and not as was the rule of the late M. Marsaut, by reducing the size of the aperture and using finer wire than that of Davy, and showiing that he attached less value to the radiating surface than to the area of the apertures.

The standard wire mesh of France, Belgium and Germany in 1912, had a diameter of wire of 0.3 m/m.; mesh 14; apertures per square cm. 196; diameter of the apertures 0.5 m/m. (0.01969); total surface of wire in one cm. 2.06 and the total open space in one cm. 0.4096.

In none of the gauzes tested by Sir H. Davy (1/40 to 1/60 of an inch), did the diameter of the aperture equal its depth. The nearest size was 28 B.W.G. (0.020 inch wire), with 24 mesh (578 aperture per square inch wire. It is curious that no one has experimented with a 25 mesh, made of wire of 0.020 diameter, which would give an aperture of 0.020 diameter. This is smaller than the aperture in our standard mesh, and practically equivalent to the aperture in the Continental standard mesh of 0.5 m/m or 0.01969 inch. A gauze made of 25 B.W.G. 0.020 inch diameter (1/50th), of 25 mesh would give 625 apertures per square inch, with the same open space as the standard gauze, of 784 apertures per square inch.

The Continental standard wire for gauzes is made of wire of No. 30 S.W.G., and is 0.0124 inch diameter, or 0.0024 less in diameter than the British.

Sir H. Davy to get as much useful effect out of his safety lamp as was possible, made it 8 to 10 inches high, and 2 to 2½ inches diameter, to give good lighting value, he further proposed a gauze cap on the top of the main gauze, and also a tin shield. This possibly was the origin of the Scotch gauze or Blantyre miners lamp 3 inch diameter by 10 inches high, but the Davy lamp as generally used was only 1½ inches diameter by say 4½ inches high.

In Sir H. Davy's day the air currents in coal mines were of low velocity, and the air impure in comparison with today, and hence both the Davy, the Stephenson and the Clanny proved to be safe and reliable under the then circumstances. But when ventilation became more efficient, and with higher velocities, the confidence in the lamps did not decrease, and they became like heirlooms handed down from father to son with all their traditions. As before noted, possibly Dr. Darlington was the first, or one of the first, to call attention to what he thought was a danger of the lamps from the presence of coal dust in the air. This was in 1852, at which time Dr. Darlington thought that the danger arose from coal dust in a state of incandesence flying off red hot gauzes.

Before mining men began to suspect that the Davy Stephenson and Clanny lamps, were unsafe in their early form of construction, suspicion fell on blasting because explosions were caused under certain conditions when coal dust alone was present, and when no detectable percentage of fire damp (methane was found in the ventilating current. Following this suspicion a great many private experiments were made to demonstrate without a shadow of a doubt, that coal dust was, when very fine and mixed with the ventilating current, an explosive which could wreck a mine much more effectually than a mixture of air and methane. And yet in spite of these demonstrations of the danger attached to the very fine coal-dust found in most coal mines, only a very few persons recognized that the arguments might at the same time be applied to all means of lighting collieries. In addition to this information re coal dust, various savants, Professor B. Phillips Bedson for instance, proved that coal dust was not merely very finely divided coal, but that when fresh it contained occluded gases which helped to make the very fine dust float in the air. Thus we always have a very finely divided solid carried along in its own balloon of gas.

Mr. T. J. Thomas, who has been referred to before and from whose work many quotations will be made, says in one of his articles, "what we are evidently try-to do in our mines today is to resist the passage of the flame from the inside to the outside of a gauze in a safety lamp, with a mesh which will not resist for longer than two minutes the passage of an inflammable mixture of methane and air in the proportion of about the lowest inflammable mixture, having a velocity of only 7 feet per second. It is obvious that if fine coal dust is coming into contact with a reated gauze there must be an evolution of coal gas from the dust. **This is the explosive mixture of unknown composition,** varying in composition, which increases the inflammability as the temperature of the gauze rises, and yet we are trying to resist it with this standard mesh. Our aperture of 0.0209 inch is greater than half the diameter of the mesh which passes flame when strongly heated, and in our standard mesh the absorbing and radiating surface is increased by 0.2 square inch,—these meshes were safe when cold, but will pass the flame when strongly heated, or when subjected to any motion.

Mr. T. J. Thomas again remarks, "It is remarkable that lamps with double gauzes should only have been submitted to test with 8 per cent of coal gas by the Royal Mines Accidents Commission at Woolwich Arsenal. (See the report of the experiments published in the 1886 report). What value these tests have in showing the resistance of the mesh to the flame of fire-damp and air in a Marsant lamp, Mr. Thomas finds it difficult to discover. It is known that if we throw a quantity of fine coal dust on to a metal plate at a dull red heat, we shall get an evolution of coal gas, and it is evident that we get a certain amount of

coal gas produced when coal dust comes in contact with a safety lamp gauze which is at a dull red heat. Enrique Hauser ("Researches on Firedamp" Transacs of the American Institute of Mining Engineers 1916). states that he obtained ignition of a mixture of coal gas with a limit of inflammability of 8.5 by using five parts mixed with 4.5 parts of firedamp, the illuminating gas forming therefore 54 per cent by volume of the two inflammable gasses. This ignition was obtained by the fusion of a ferro-nickel wire of 0.3 in diameter.

We are trying to prevent the flame passing, in possibly a mixture of this kind, with a mesh which will not resist the action of the lowest explosive mixtures of methane and air for any length of time.

A mesh of 900 apertures per square inch made of S.W.G. wire (0.0148 inch in diameter), 30 meshes per inch gives an aperture in diameter of 0.01853 with a wire surface of 2.788 square inches and a total open space in each square inch of 0.320 inch. Mr. Thomas thinks that with two superposed gauzes it could not be used in an ordinary safety lamp. The apertures of this mesh would be smaller than the mesh in use on the Continent.

Mr. T. J. Thomas expresses the opinion that we have long passed the limit when gauze can be relied upon for safety in fiery dusty mines. Thus when there is a continuous flame of burning firedamp in a miner's lamp in a coal mine, which has fine coal dust floating in the air the lamp ceases to be a safety lamp that can be carried about.

Probably the products of combustion when passing through a heated gauze may become decomposed and affect the result.

We are quite certain that the safety of a safety lamp is also affected by the air pressure in which it is being used, thus, take the case of the Viviers Reunis mine, at Charleroi, in France, with the barometer standing at 30 inches on the surface the pressure of the air is increased to 33.9 at a depth of 3500 feet, and thus would naturally increase the lighting power of a safety lamp, but of the effect of this extra pressure on the safety value of the lamp we practically know nothing.

Mr. T. J. Thomas calls attention to another point which would seem to require careful investigation, viz., as to what is the most suitable metal to use for miners' safety-lamp wire gauzes, thus, he gives reasons why steel wire ought NOT to be used, and why we should retain the iron wire as having been distinctly specified by Sir Hunmphrey Davy. He is also of opinion that a copper wire gauze is not as safe to use in a fiery mine as is iron wire. In this regard probably most mining people will agree with him, his argument being that copper occludes oxygen and therefore is one of the most dangerous substances to use in a gauze, and further that Sir H. Davy preferred brass wire.

Naturally, the force of an explosion within a safety lamp gauze or gauzes affects the safety of the lamp.

Mr. Thomas frequently uses the expression "internal detonation" and therefore assuming that detonation can take place under certain conditions, then we have another possible danger to provide against, seeing that the speed of such an explosion may be more than 3,000 feet per second.

Then again we know as a definite fact that the word firedamp covers many other gases besides methane, such as ethane, propane, and hydrogen, and therefore even a small percentage of any one of these gases will greately increase the danger of lighting a fiery mine. For instance, the failure of a perfectly sound double gauze Marsaut (Wolf gasolene pattern), caused an explosion at No. 3 mine Michel, B.C., as soon as the miner reaching his working place had hung his lamp. (See paper on "Firedamp" in the February, 1920, Canadian Mining Institute Bulletin).

Another suggestion which Mr. Thomas throws out is based on his reasoning that as one, two or three, superposed gauzes do not make a safety lamp safe in a fiery dusty coal mine, that some other construction should be adopted in which the gauze part is only exposed to the minimum of danger from the ignition of firedamp within the lamp. This does not seem feasible at first sight, but he quotes the Hailwood Combustion lamp, in which, as it is of the Mueseler type, there is only the disc gauze exposed to an explosive flame, in which case the flame is probably passing away from the gauze and therefore does not impinge on it and cannot dangerously heat it.

The Mueseler type of safety lamp is not, however, entirely immune from a certain amount of liability to fire the outside atmosphere, and therefore it is well to examine and find out if possible what are its weak points. Undoubtedly, the most likely part to show its weakness is through the open chimney, thus if the current of air and gas through the lamp becomes reversed, and does not extinguish the wick flame on ignition, or gas continues to burn under the disc gauze at the foot of the chimney, the explosion within the glass part of the lamp may be sufficient to carry the flame through the large gauze covering the top part of the lamp. The other risk is that the explosion of gas and dust within the glass part may carry the flame through the disc gauze at the foot of the chimney and into the top truncated or cylindrical gauze and thence into the mine atmosphere. Another danger arises from the fact that in a brisk ventilation if the gas continues to burn under the disc gauze after the first explosion at the wick flame it may continue to burn on the windward side and pass the products of combustion out through the same gauze on the lee side of the chimney, in which case the chimney may become a downcast and ultimately be the means of carrying the flame up and out through the main gauze. In the failures of this type of lamp it is very difficult to make sure how the failure occurs because as a general rule burning gas and the wick flame are both extinguished by the first explosion within the glass part. The writer has always considered the chimney to be the weakest part of the Mueseler, and therefore when making an improved Mueseler safety lamp he added a protection to the top part of the chimney to stop the possibility of a down-draught, and also a small circular truncated conical shield to cover the disc gauze, with of course a space between, to prevent any double current, that is, from the windward to the lee side, as referred to above,) (See paper on the Davy and Mueseler types, 1879-80, Transactions of the N. of E. I. of M. & M. E.)

The Mueseler type of safety lamp has been unfavourably received because of its almost certain extinguishment if thrown over or placed very much outside its perpendicular position, and hence the Clanny and the double gauze lamps have taken the lead. But even with this disadvantage the type is undoubtedly coming into favour again with the additions of what amount to small alterations in construction. One of the

best known of these is the Hailwood in which a high lighting value and, of course, a better combustion at the oil wick flame has been attained, by adding a small cylindrical glass to the base of the chimney and extending it down to the level of the wick flame, also with a cowl or protection to the top of the chimney to protect it from any down-draught current. Like many other modern designs, that of the Hailwood Combustion lamp is not entirely new, but presumably it is the combination and difference in the dimensions of the parts which constitute the patent; and, judging from the writer's practical and experimental experience he would expect to find that gas might be ignited and continue to burn under the disc gauze between the two glasses.

Another modification of the Mueseler type has also been patented by the Patterson firm of safety lamp makers, and is called the Patterson.—In this lamp the alterations are a combination of the Mueseler and Gray types.

There are also some other alterations in the details which do not materially affect its safety value. A higher lighting value is claimed for this lamp than for the Hailwood, and that there is only one glass for the light rays to pass through, and also that the glass part is less liable to become fouled by smoke from the wick flame. The gauze ring below the glass part of the Gray is replaced by a perforated brass ring one-eighth of an inch thick. In regard to this perforated ring it is to be noted that the Prussian Safety Lamp Commission, 1880-1887, decided that perforations through a metal plate were not as safe as standard wire gauze, but as the lamp has received the approval of the British Home Office it has evidently passed safely through the Eskmeals testing station. It may be observed, however, that the tests made at Eskmeals are made to pass the lamps through a fixed series of tests so that all safety lamp tests are made to one standard, and not to find out any particular weakness of design or construction.

There is, however, one notable claim for the lamps points of excellence which is extremely novel, viz., that of passing the inlet air twice through the *same* gauze, to double the resistance to the passage of flame, whereas the only practical effect is to increase the friction of the incoming current of air. A deflector plate is also fitted inside the shield touching the cylindrical gauze about half way up the height of the shield, which thus to some extent separates the ingoing and return air currents. Some value is claimed for the lamp as a gas detector, but the section shows that it does not permit the atmosphere to be tested to enter at any point nearer to the roof than any ordinary lamp, and in this regard is a long way behind the lamps of the true Gray type, neither is there any arrangement to save the wick flame from extinguishment from excess of gas, by admitting gas-free air at the lower end of the inlet air tubes, as in all Gray and Ashworth-Gray patterns.

Whether or not this pattern of safety lamp is immune from the possiblility of a down current in the chimney is a point which could be ascertained by experiment, but like the true Gray patterns it has a very limited space within which the ignition of an explosive mixture of air and firedamp can take place.

Having thus called attention to the main points of these two safety lamps, both of which have been specially designed to give an excellent light to the miner whilst at work, one being of the true Mueseler type and the other one mostly like the last pattern of Major Gray, the patentee of the original Gray, it remains to refer to the latter as well as to the Ashworth-Gray patterns.

All of these have a deflector plate around the wick flame to bring the incoming air for combustion into intimate contact with the wick flame, and thus improve the lighting value; some patterns have the chimney inside the gauze part as in the Patterson pattern, but lamps of the true Gray type have the gauze part inside the chimney—the difference in practice being that no coal dust can settle on the gauze when placed inside the chimney, and also it cannot become red hot. Therefore the lamps at this point are secure from the dangers which Mr. T. J. Thomas has called special attention to. The glasses of all patterns of Gray may be either cylindrical or conical—the original Gray having a cylindrical glass and most of the Ashworth-Grays, truncated conical glasses. The practical difference is that the latter form is stronger than the cylindrical, has smaller cubic contents and gives a superior roof light. All patterns of the Gray type have been specially designed for firemen and fire-bosses use, as the best detectors of firedamp and at the same time to give a superior illumination with less than an ordinary expenditure of oil or spirit or whatever illuminant is preferred by the firm using them. The outstanding features of the Gray type are (1), that it is impossible to make *any* gauze part red hot; (2) that the ventilating current within the lamp *cannot* be reversed when an ignition of firedamp occurs inside the lamp; (3) that if the lamp wick flame is not extinguished along with the gas the gas flame can only burn out of contact with the gauze ring, and thus it is impossible to overheat this gauze.

Another advantage of the Gray type of safety lamp is that the whole of the air entering the lamp is exposed to the wick flame and consequently the products of combustion become a really extinctive gas. A still further advantage is that it is the only type of safety lamp in which the air necessary for combustion, and the products of combustion, both pass through openings of standard size and therefore there is no danger of an excess volume of explosive current entering the lamp.

The patent rights of the Gray and the Ashworth-Gray constructions of safety lamps have long since expired, and therefore as there are no royalty charges these lamps ought to be supplied at very reasonable price, though at the time the patents were in effect, the sale of them was made almost impracticable in competition with bonnetted Clanny lamps selling at such prices as one dollar to a dollar and a half each.

Both the Hailwood and the Patterson are as expensive to manufacture as either the Gray or the Ashworth-Gray, and hence the prime cost does not seem to enter into the controversy, and consequently only the lighting values and safety points need to be taken into account. As regards safety in particular, it may be assumed without question that all the above named lamps are *safe*, as they have passed the British Home Office tests at Eskmeals.

It would make very little difference to the lighting value of any of the modern lamps named above if the new and more resistive gauze mesh suggested by Mr. T. J. Thomas were adopted and therefore the sooner it becomes the standard size the greater will be the margin of safety.

Since the partial introduction of electric lamps into dangerous mines, it has been impossible to carry out the rules of the Acts of Parliament in regard to the

testing for methane, and other gases, and therefore the safety lamp makers have been vigorously struggling to perfect oil safety lamps of higher lighting values than the electric, which can be used for testing for inflammable gases and also conform to the rules for keeping a mine safe. The makers claim that these high powered oil lamps give a better all-round light to the miner, are also better for his eyes, and therefore that they will enable a miner with nystagmus eyes to continue at work underground. What causes nystagmus has been debated for a score of years, and is still an unsettled question, but the majority of doctors and others incline to the insufficient light as the reason—others say it is "glass glare." Both these possible causes have now been provided for, thus, all the newest safety lamp designs provide for increased lighting power, and such lamps as the Hailwood Combustion lamp are shielded by the frame which carries the inner glass; all of the Gray type lamps may have one single flat air tube instead of two or four round ones, the same with the Patterson. The flat tube arrangement also permits it to act as a reflector, or white enamelled glasses (which the writer patented many years ago), might be applied to the Patterson or any other type. If the English Home Office Committee take up the question of gauze versus perforated metal, and decide in favour of the perforated metal, then we can have these safety lamps made entirely without gauze parts, and in this way replace Sir Humphrey Davy's gauze with George Stephenson's perforated metal plate. The writer thinks, however, that the majority would prefer the gauze and the higher powered oil lamp rather than the electric lamp, or at any rate until the electric lamp can be used for gas testing purposes.

In concluding these notes, the writer would impress on every one vitally interested, that no matter what our personal prejudices may be, we should *make* "Safety the First Consideration," and in this practical way do something towards minimising such fearful disasters as colliery explosions.

CONSOLIDATION OF INDUSTRIES BASED ON COAL A LOGICAL HAPPENING.

Abstracted from a Review of the Steel Industry since the Armistice by the Editor in the Christmas Number of the "Grain Growers' Guide".

It is in the logic of events to anticipate a consolidation of interests, including coal mines, iron-ore deposits, steel plants, and steel-ship building yards, along the lines that have been so successful in Britain, where it is often stated that the ore comes in at one gate and the steel ship goes out at another. It is possible by a consolidation of such allied interests, which are all founded upon coal and the heat that comes from coal when burned, to utilize that heat more completely and scientifically when all the surplus gasses, and the by-products of combustion are concentrated in a compact area, enabling process to follow process without loss of time or heat, and facilitating what is today known as straight line production. If such consolidations take place in the future, they should not be looked at askance, or regarded as undesirable, but should be recognized as the only way in which our basic industries of coal-mining, steel manufacture and shipbuilding can be developed to a point where they can stand on their own legs and enter the competitive markets of the world.

The weakness of the steel industry in Canada lies in its too great dependence on the United States for supplies of iron ore and coal. Only five per cent of iron ore reduced in Canadian furnaces is mined in Canada, although a large tonnage, at least 900,000 tons annually, comes from the Canadian owned mines at Wabana, Newfoundland. Canadian iron ores are plentiful, and well distributed, but they happen to be temporarily discounted in value by the more accessible, cheaper and more easily reducible iron ores on the United States' side of the Great Lakes. Some day, Canada's ores will prove a source of great wealth. In the matter of coal, Canada can, to a much greater extent than she has hitherto done, please herself whether she mines coal at home or goes to the United States and pays out good money for coal there. Canada has lots and lots of good coal, and is under no compelling necessity to spend some $50,000,000 annually in the purchase of United States coal.

An interesting subject at this time is the desire of British Columbia to have a steel industry in that province. The permanence of the ship-building industry there almost requires a steel industry on the Pacific coast, and the probability is that before long a beginning will be made in the manufacture of steel, and possibly in the reduction of iron ores to pig-iron, in British Columbia. Wherever coal is found of suitable quality, and in sufficient quantity, an iron and steel industry is bound to follow the development of the coal fields, even should it necessitate the transportation of iron ore and fluxes for some distance, because the metal industries, from the mining of the metalliferous ores to the final fabrication of the finished metal, are entirely dependent on coal for motive power and heat—with some notable exceptions where large quantities of electricity generated by water-powers are available. Coal is the most important and basic raw material of the modern world. It is a first necessity of national defence and national independence, and no country can achieve industrial importance without coal. Therefore, that country which is most generously supplied with coal is most likely to lead in industry. In Canada, that most favored district is Alberta, which has within its borders more coal than all the remainder of Canada, and more coal than any one state in the American union.

Book Reviews

MICROSCOPIC EXAMINATION OF THE ORE MINERALS. W. Myron Davy and C. Marson Farnham. First Edition. Mc. Graw-Hill Book Co., New York. 154 pages with Indices. 6 ins. by 9¼ ins. Cloth Boards.

This work deals with the technique of polishing and examining the specimen, and with the photomicrography of polished sections. The main feature of the volume is a series of determinative tables, to which a thumb index is given. The index is arranged as to order of reagents used in identification. A number of supplementary tests are detailed. The examination of polished specimens of ores is in the work referred to as "mineragraphy" following the analogy of the better known term of metallography. The work is intended for advanced students and for professional reference in the laboratory. The printing, indexing, and general arrangement of the work leaves nothing to be desired.

Miners' Nystagmus

(By SIR J. COURT, M.R.C.S.)

Miners' Nystagmus in the coal mines of Europe, its cause and cure, have been thoroughly investigated during the past thirty years. There is no doubt that the opinions, held by the majority of experts, that the deficient light of the safety lamp is the chief cause of the disease has led to great improvements in the illumination of collieries and in the construction of lamps. It may be said, therefore, that the greater the light the less the disease. It has been affirmed, with much truth, that miners suffering from myopia hypermatropia or astigmatism are more liable to develop the trouble than those men with normal vision. A high proportion of nystagmus cases have been found to have errors of refraction, a high proportion also of all adult working men have errors of refraction, and the same will be found in school children. Nevertheless, when these men work in naked light pits they seldom develop nystagmus. The condition of lighting in all mines should be made equal, or better than where naked lights are used. There is also a personal factor in some of the cases of nystagmus. It is remarkable that so many young men have tthe complaint. I have seen two brothers under 25 years of age suffering badly.

Many of the bad cases of nystagmus also suffer from photophobia and night blindness, and they cannot go out of darkness into bright light without shading their eyes and throwing back their heads.

Owing, however, to the great improvement in the lighting, especially by electricity, in all the collieries of Great Britain, these bad cases are nothing like as common as they were ten years ago.

Exhaustion and fatigue have a bad effect upon some cases, and they suffer much more at the end of the day than their fellow miners. Others are very depressed in mind, and when insanity is inherited the nystagmus might possibly be an exciting cause of it. Nystagmus should therefore be looked upon as a neurosis, because of the headaches, giddiness and tremors which so often are present in bad cases. These miners ought to have special attention, and any means to help them to avoid eye strain should be adopted. Many of them complain of the unshaded light of the safety lamps, and also the white light of the electric lamp. Although they can get more coal and with much greater ease with the electric lamp, the white light is irritating when looked at.

Probably some kind of glass could be used in an improved lamp which would overcome the glare caused by the ultra violet rays of the white flame. Amber coloured glass has been used with advantage by oculists for eyes which are sensitive to bright light. Either this or Sir A. Crooke's smoked glass should be tried, either by the whole bulb of the lamp or a shade made to cut off a quarter of the light so as to relieve the eyes from the glare without diminishing the light directly in front where the miner is at work. Another advantage of an amber coloured glass is that it gives a better definition of the object looked at.—Medical Times (Eng.) Mch. 1920.

Deep Boreholes

At a meeting of the Geophysics Committee of the British Association, held in London on February 6, a discussion took place upon the subject of deep boreholes. The debate was opened by the Hon. Sir Charles Parsons, who had previously put forward a suggestion that it might thus be possible to tap the heat of the earth's interior and utilize it as a source of energy at the surface. The project naturally strikes the imagination, and it does not at first sight appear to be beyond the realm of practical engineering, especially as something of the kind has already been accomplished at La Darello, in Italy, where volcanic heat, in the form of high-pressure steam, is already developing 10,000-horse-power, and other projects are on foot for turning to practical account the heat of Vesuvius.

We venture to call attention to this discussion for several reasons. In the first place, the possible, utilization of any natural sources of energy—more particularly in a country like Italy, where coal has always been an expansive luxury, and is now almost unobtainable—assumes a position of real economic importance. In the second place, our knowledge of the rate of increase of temperature in the earth's crust is still far from complete, and mining engineers cannot but take deep interest in any investigation which is likely to throw light upon it. In the third place, we are still lacking in precise information respecting the condition and behaviour of rocks at considerable depths below the surface. And finally, great importance must necessarily be attached to the views of practical engineers as to the limits of depth it would be possible to reach with the resources now at our disposal.

Upon all of these points the discussion referred to above afforded useful and highly interesting information. Let us take, in the first place, the rate of increase of temperature. It is a striking fact that, so far as actual experience in other countries has gone, the average rate of increase of temperature with depth, as measured in English collieries, seems to be altogether abnormal. The geothermic gradient estimated by this criterion is genarally assumed to be about 72 ft. per degree Fahr., but in Brazil, in the Morro Velho Mine, where a shaft has been carried down by successive steps to a depth of 6,426 feet the rate of increase of temperature is less than one-third of this amount. The same conclusion is reached in the Rand mines of South Africa, where a shaft at the Village Deep mine has reached 5,400 feet in vertical distance below the surface, and the geothermic gradient has been found to be about 250 ft. per deg. Fahr. The apparently exceptional and steep heat gradient found to exist in the British area at one suggests that some special local reason for it may exist, possibly of a chemical character, and there is no absolute certainty that the same rate of increase would be maintained in deeper workings. This, however, is pure conjecture, and can only be put to the test by actual experiment.

As to the practical limit of a deep borehole Mr. Hugh F. Marriott, whose experience in the deep mines of South Africa lends exceptional authority to his opinion, thinks that it would not be possible to carry a borehole down much deeper than the one recently sunk in West Virginia, which reached a depth of 7,579 feet, and can claim to be the deepest borehole yet made. Probably even this depth could not have been reached by any other method than cable drilling, which is a most unsatisfactory method from an exploratory standpoint. Core-drilling, as is knokn, suffers a great disadvantage owing to the difficulty of maintaining anything like a straight line. If the deviations are unchecked, the rod becomes defected more and more, and might eventually reappear at the surface. If this tendency to deflection is systematically checked, on the other hand, the rod ultimately assumes a corkscrew shape, and the resulting friction absorbs all the energy that can be put into it from the surface. Thus, a core drill seems to be strictly limited in vertical range, and may be dismissed from consideration for any borehole greatly exceeding one mile in depth.

There remains the shaft method, in regard to which experience gained at Morro Velho and in the Rand is highly instructive. The two most fundamental factors in deep shaft sinking are the ventilation of the working and the stability of the rock. With regard to ventilation, it is necessary to keep the air at the bottom of the shaft at a temperature at which men can work continuously for some hourse. An ordinary air current would appear to be unsuitable for this purpose in a very deep shaft, because as the depth increases the air becomes heated by adiabatic compression at a rate which is nearly equal to the temperature gradient in the earth's crust. Other methods of cooling are, of course, practicable; but they all involve an expense which would soon be prohibitive. As to the stablity of the rock at great depths, the little that is known of this factor is by no means encouraging. When an engineer makes a hole in the earth he is constantly in danger of disturbing the balance of forces, which, in the case of rocks under great compressive stress, may become highly dangerous to the stability of the shaft walls. Mr. Marriott gave some graphic illustrations of this effect. In Mysore, where the rocks are highly contorted, and are strained almost to the breaking point, miners are killed or injured by the sudden explosion of the rock, and even in the Rand, where the strata are dipping uniformly, the deep workings are groaning and cracking most unpleasantly. If these things are happening at depths of one mile only, the effect at greater depths maybe expected to be considerable, and Mr. Marriott expressed the opinion that a depth of three miles would be the maximum that could be expected to be reached in any shaft. The 10 or 12 miles contemplated by Sir Charles Parsons, therefore, appears to be quite beyond any possibility of achievement.

The moral of all this is obvious. The exploration of the earth's crust at such great depths being beyond the powers of engineering skill, we should be content for the present with less ambitions schemes. From the point of view of the mining engineer, as well as that of the geologist, it would be highly desirable to put down a number of boreholes of more modest dimensions, rather than to attempt what seems to be practically unattainable, and to undertake which, in any case, would involve a huge capital expenditure.

—"Colliery Guardian."

U. S. BUREAU OF MINES ISSUES BULLETIN OR FLAME-PROOF MOTORS FOR COAL CUTTERS

A proved Explosion-Proof Coal Cutting Equipment is the title of Bulletin 78, just issued by the Bureau of Mines, Department of the Interior. L. C. Ilsley and E. J. Gleim, the authors, say: "Electrical apparatus because of its flexibility and its adaptability to all classes of service has become essential to the mining industry. Hence the problem of providing electrical equipment that is safer for use in explosive mixtures of methane and air is of prime importance in coal mining. Investigators and experiment stations early resognized this fact and much work has been done in the investigation and the development of electrical apparatus for use in atmospheres containing fire damp. The term 'fire damp' as applied throughout this bulletin means an explosive mixture of methane and air.

"Direct current motors and alternating-current motors of the slipring type when running usually give off electric arcs or flashes that will ignite fire damp. Other motors that have no moving electric contacts may become dangerous through accident, deterioration, or neglect. Auxiliary apparatus such as fuses, switches, rheostats, and controllers may arc, flash, or become heated to such a degree that fire damp can be ignited. Such equipment is still more dangerous when worn or out of repair.

"In the United States the development of apparatus for use in gaseous mines has been associated largely with coal-mining equipment run by electricity. This is undoubtedly due to the use of such equipment at the face of the mine workings, where the chance of igniting fire damp is necessarily greatest. One American manufacturer built a coal-mining equipment of the totally inclosed type for use in fire damp atmospheres in 1903. Another built similar equipment with special protective devices in 1906 for export.

"During the years 1910 and 1911, the Bureau of Mines at its Pittsburgh experiment station conducted a preliminary investigation of the safety of such protection as was then in use or under consideration Five motors were submitted for this investigation, each having somewhat different methods of protection.

"Although none of the motors tested met all the conditions for safety, the investigation was of value in lying the foundation for future tests and development. Based on the experience gained a schedule of tests was published by the bureau that stated the fees and requirements for the test of motors designed for use in gaseous mines and also stated that the bureau would give its seal of approval to such motors as met the requirements.

"The first part of the bulletin just issued deals with the general theory of protection from fire damp, gives the bureau's schedule, and shows its application to the testing of commercial apparatus. The second part covers a detailed description of the apparatus that has been tested and, approved under this schdule, together with a résumé of the tests on which the approvals were based."

Copies of this bulletin may be obtained free of charge by addressing the Director of the Bureau of Mines, Washington, D.C.

WORLD PRODUCTION OF COAL IN 1919.

(Prepared by G. F. TRYON, and published by the United States Geological Survey.)

The world's production of coal in 1919 seems to have dropped back to the level of 1910. Preliminary estimates, necessarily, rough, place the total output of all kinds of coal in 1919 at 1,170,000,000 metric tons, or 1,290,000,000 net tons. This is 162,000,000 metric tons less than the production in 1918, the last year of the World War, and about 171,000,000 tons less than that of 1913, the year before the war begun.

This estimate is based by the Geological Survey upon reports to the Supreme Economic Council from countries which contribute about 85 per cent of the world's output. Obviously, returns from the other countries may materially alter this figure, if anything, they will probably reduce it still further.

The following table shows the estimated production of the world for each year from 1910 to 1919. Because of disturbances and interruptions in the compilations of Government statistics, particularly in Central and Eastern Europe, the figures since 1913 are not to be regarded as final. The metric tons of 2,205 pounds is used because it is the prevailing unit in non-English speaking countries. Americans will remember it most easily as being equivalent to the gross ton and the English ton.

The World's Production of Coal, 1910-1919.
(Metric tons of 2,205 pounds.)

Year	Production in part estimated	Per cent produced by United States
1910	1,160,000,000	39.2
1911	1,189,000,000	37.9
1912	1,249,000,000	38.8
1913	1,341,000,000	38.5
1914	1,208,000,000	38.5
1915	1,190,000,000	40.5
1916	1,270,000,000	42.1
1917	1,336,000,000	44.2
1918	1,332,000,000	46.2
1919	1,170,000,000	42.1

Comparative production in five of the belligerent countries before and after the war is shown in the following table:—

Production of Coal in Certain Countries, 1913 & 1919.
(In millions of metric tons.)

	1913	1919
United Kingdom	292	237
France (present boundaries)a	44	22
Belgium	23	18
Germany (present boundaries)b		
Bituminous	173	109
Lignite	87	94
United States	517	494

It is pointed out by the Supreme Economic Council that from 1913 to 1919 the output of bituminous coal in the four European countries shown in the table has failed from 532 millions to 386 millions, the decrease being about 20 per cent in the United Kingdom and Belgium, and nearly 40 per cent in Germany. In the Saar Valley, whose output appears to have fallen from 12 million tons in 1913 to about 8 millions in 1919, the percentage of decrease was over 30. The reduction of the mines in the Nord and Pas de Calais.

The output of lignite in Germany in 1919, though less than in 1918, was still greater than before the war, being 94 million tons, as compared with 87 millions in 1913.

In the break-up of Austria-Hungary the bulk of that country's coal and lignite, the production of which amounted before the war to about 55,000,000 tons, was inherited by the Republic of Czecho-Slovakia was about one-third less than the same territory produced in 1913.

(a) Includes Alsace-Lorraine.
(b) Excludes Alsace-Lorraine and the Saar.

CHANGE IN THE PRESIDENCY OF THE DOMINION STEEL CORPORATION

Roy M. Wolvin has been elected president of the Dominion Steel Corporation, Ltd., Sydney, N. S., to succeed Mark Workman, who resigned the position in order to devote his attention to personal affairs. Mr. Workman, however, has continued as chairman of the board of directors. He will become a member of the London advisory committee of the corporation at the instance of the British interests, who have become associated with it. After a rest at Atlantic City, he will sail for England.

Mr. Wolvin who has risen rapidly to a position of prominence in the industrial world, was born at St. Clair, Mich., Jan. 21, 1880. After a high school education in that city, he commenced his business career as clerk with the Western Transit Co., Duluth in 1896. remaining there about one year. He then became manager of the Great Lakes & St. Lawrence Transportation Co., and the Standard Steamship Co. and occupied these positions from 1901 until 1910. He next became president of the Standard Steamship Co., Winnepeg, Man., the Duluth Shipping Co., Duluth, and the Central Shipping Co., Chicago, in 1910. Later he became president of the Montreal Transportation Co., Ltd., Montreal, Que.; president of the Canada West Coast Navigation Co., Vancouver; vice-president and general managing director of the Halifax Shipyards, Ltd., Halifax, N. S.; president of the Canadian Towing & Wrecking Co., Fort William, Ont.;vice-president, Collingwood Shipping Co., Ltd.,; president, Reid Towing & Wrecking Co., Sarnia, Ont.; president of the Maritime Wrecking & Salvage Co., Halifax, and occupied other important and responsible positions. He was elected a director of the Dominion Steel Corporation in the middle of 1919.

Saward's Annual, 1920.

We are in receipt of the 1920 edition of Mr. F. W. Saward's well-known complication of data on the coal trade of the United States and Canada. Prefaced by a readable review of the coal trade of 1919, the volume contains figures on output, prices, freight rates, transportation, exports and trade conditions generally that are most useful to those who have to deal with the sale or transportation of coal. We would suggest that the value of this compilation might be increased if the coal production of the United States were to be given for each year since the beginnings of the industry. The growth of the industry has been so extraordinary that it is necessary to go back over the annual outputs for at least 25 years in order to get a proper perspective.

The Last Stand of the Reciprocating Steam Engine

By The EDITOR

Readers of a journal devoted to mining interests, particularly those connected with coal production, may, upon first impulse, view the spread of railroad electrification with hostility, or, at any rate, with but mild interest.

The "Canadian Mining Journal" would put forward the suggestion that the fuel problem in Canada is of such a specialized and such an urgent character that every possible means should be adopted to lessen our national handicap and to make Canada self-supplying in light, heat and power.

Canada has excellent waterpowers, but like the coal reserves, they are not evenly distributed. It may be stated (as a generalisation to aid our thinking) that in sedimentary-rock regions of Canada in which the coal reserves are found water-powers are not important, with the possible exception of Vancouver Island. For example, in Nova Scotia, while the waterpowers are not to be despised for local uses, no great outpower of hydro-electric power can be looked for. In the central plains, water-storage for irrigation and town-supply is important, but great waterpowers are absent. In the Archaen Shield, and in the Cordilleran region where coal is not found, waterpowers of great importance occur, and have already been partially utilized for the generation of electricity. It is stated that the undeveloped waterpower of the St. Lawrence River which could be harnessed by the construction of canals totals 4,200,000 h.p. By Combining the electrical power that could be raised from coal in Nova Scotia, with the hydro-electric power possibilities of Quebec and Ontario; and linking these up with the coalfields of the plains and the foothills of the Rockies and the waterpowers of the British Columbian Pacific slope, the possibility of transcontinental railways operated by electric power from Sydney to Vancouver is indicated, nor is the idea to be lightly dismissed in the light of what is being accomplished elsewhere.

The April issue of the "General Electric Review" is specially devoted to electric traction, and is a number that deserves the consideration of all who are interested in railways or the coal supply of railways. Under the striking title of "The Last Stand of the Reciprocating Steam Engine," Mr. A. H. Armstrong, contends that the steam locomotive is gradually disappearing from the railway field, as the reciprocating steam engine is disappearing from the industrial field and the propulsion of ships.

The table below given in Mr. Armstrong's paper subdivides the tonnage passed over the tracks of the United States railways in 1918.

The first four items, representing 85.56 per cent of the total ton-miles made during the year 1918 are common to both steam and electric operation.

By introducing the electric locomotive the last four items are reduced to extent of completely eliminating items 6 and 7, reducing item 5 by possibly 80 per cent and item 8 by one-half.

Of the total 14.44 per cent affected, it may be assumed that about 12 per cent of 146,000,000,000 ton-miles at present hauled by steam engines could be totally eliminated with electric locomotive haulage. This ton-mileage equals 20 per cent of items 1 and 2 representing the revenue-producing traffic on the United States railroads.

In other words, if the railways were electrified they could carry one-fifth more revenue-producing freight with no change in present operating expenses of track congestion.

The steam engine-tender would entirely disappear, while the haulage of coal on the railways would be largely curtailed by the use of hydro-electric power, and the establishment of steam power-houses at the coal mines.

Mr. Armstrong remarks that while water-power should be used to the fullest possible economical extent, the greater portion of the power must undoubtedly be supplied by coal, due to the unequal geographical distribution of water power available—so far as the United States is concerned.

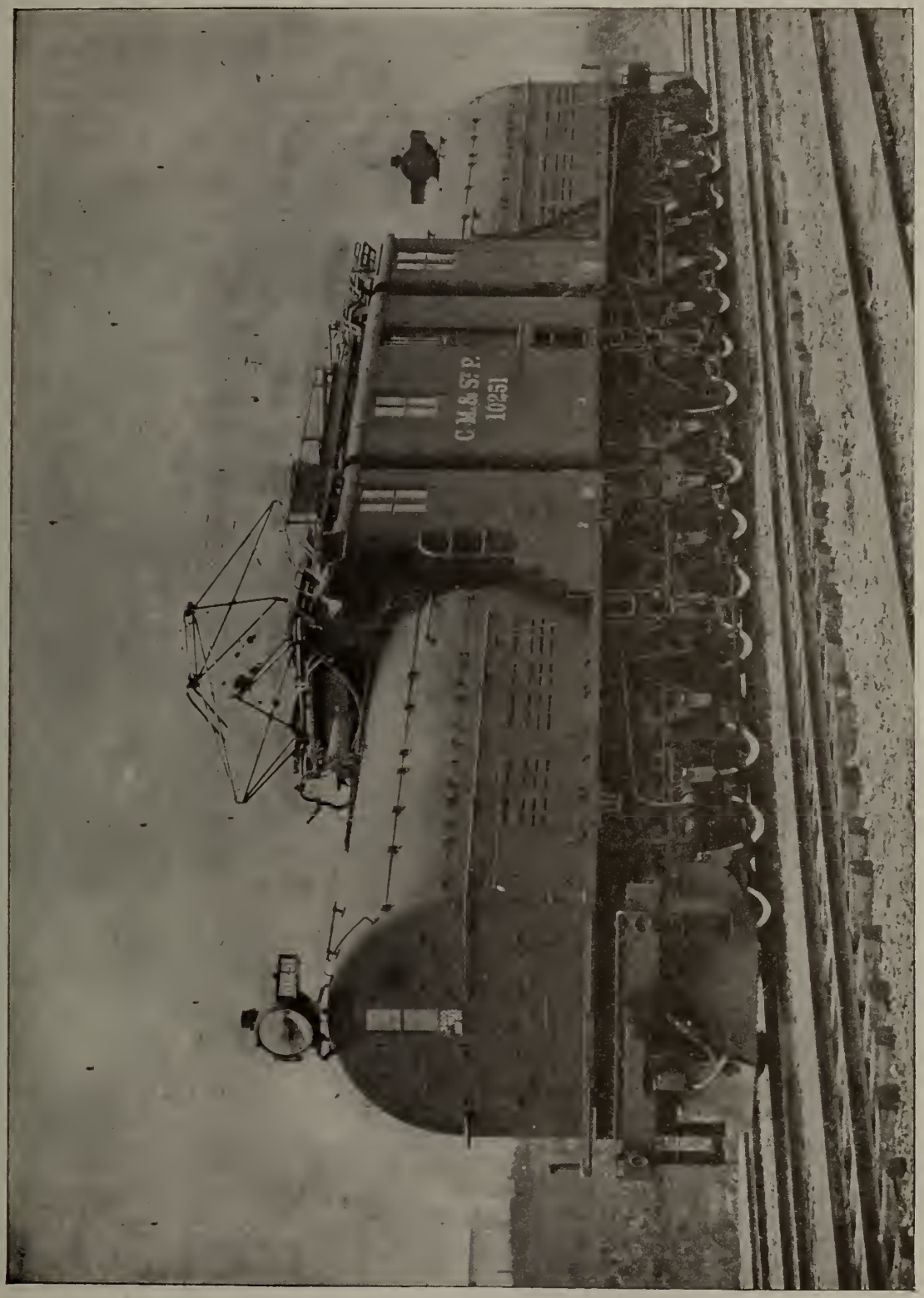
It is exactly this feature which should commend the use of electric locomotives in Canada. The economical distribution radius of coal is much increased when it is used to generate electricity for long-distance transmission, and, as previously suggested in the "Journal" (see issue of Nov. 5th, 1919) the electrification of the Canadian National Railways in the Maritime Province could be carried out from Sydney to Moncton, N.B. in such a manner as to avoid the necessity of hauling either water or coal for locomotive power purposes throughout the whole of that distance.

Similarly, the establishment of central power-stations with long-distance transmission in the prairie coalfields should enable the radius of western coal usefulness to be enlarged both eastwards and westward.

TOTAL TON-MILE MOVEMENT.

All Railways in United States—Year 1918

	Per Cent	Ton Miles
1—Miscellaneous freight cars and contents	42.3	515,000,000,000
2—Revenue coal cars and contents	16.23	197,000,000,000
3—Locomotive revenue, driver weight only	10.90	132,300,000,000
4—Passenger cars, all classes	16.13	196,000,000,000
Total revenue, freight and passenger	85.56	1,040,300,000,000
5—Railway coal	5.00	60,600,000,000
6—Tenders, all classes	6.50	78,800,000,000
7—Locomotive railway coal	0.39	4,700,000,000
8—Locomotive, non-driving weight	2.55	31,000,000,000
Total non-revenue	14.44	175,100,000,000
GRAND TOTAL (All classes)	100	1,215,400,000,000



The New 3,00-Volt Direct-Current Gearless Passenger Locomotive of the Chicago, Milwaukee & St. Paul Ry.

For mountainous districts the electric locomotive has exceptional advantages, particularly the feature of generation braking by means of which power is returned to the trolley circuit on a down-grade instead of being used up as is the case in the steam locomotive.

The coal operators of Canada are much interested in the cheap production of power from coal, because the greater the value the consumer of coal can get out of his purchase, the larger will be his future purchases. In other words, the cheapening of coal, or its complete utilization, will increase the uses to which it can be put. Just now, the high price of coal is a deterrent to its use, and consumers are scanning every possible substitute. Unfortunately, all indications point to still higher costs for coal production, making it still more necessary to examine every new development that promises more efficient utilization of the power-value of coal.

On the Chicago, Milwaukee & St. Paul Railway, 42 electric locomotives have replaced 112 steam engines, and are hauling a greater tonnage with reserve capacity for still more.

From the results obtained on this read, Mr. Armstrong estimates that had the railroads of the United States been electrified in 1918 approximately 122,500,000 tons of coal, or more than two-thirds the coal now burned in 63,000 locomotives could have been saved.

Northern Ontario Letter

THE SILVER MINES.

During the month of April the quotations for silver averaged approximately $1.20 an ounce. At the beginning of the month, it was quoted at $1.26½, and at the close of the month was quoted at $1.14½. During the month the lowest point reached was $1.12 an ounce. The April average, therefore, was well above the price for the whole of 1919 when an average of $1.11 1/8 was established, and compares with 96.77 cents in 1918 and a low average of 49.69 cents in 1915.

Metal authorities, as well as the silver producers of Cobalt in making a careful observation of the situation with the object in view of ascertaining the influences which have recently caused more or less violent fluctuations, seem still to have arrived at no uniform opinion. Among the advices received from abroad, and which would tend to throw some light on the situation, is the declaration that Great Britain is discouraging the mania for silver in India, and that the Chinese are less aggressive as bidders, not for the reason that they do not want the metal but due to the balance of trade operating against them. Also, that another large amount was not long ago released from the United States Treasury.

While influences such as the above may stem the tide of rising quotations, and, in fact, may cause violent fluctuations with a lowering tendency, yet those vitally concerned with the producing mines appear to cling unalterably to their opinion that the law of supply and demand must inevitable ultimately hold sway and that higher prices seem to lie in the future. As to this, time will contain the verdict.

The large surplus accumulated by the Nipissing Mining Company has been the subject of considerable comment and also criticism, according to the Toronto and London newspapers. The view is expressed that the shareholders are entitled to large dividend returns under the circumstances, and that the company is needlessly holding government war bonds. The matter has been received with deep concern in Northern Ontario where the policy of the Nipissing Mining Company is held up as an example of what all real mining companies should be. It is pointed out that during the past three years which is the period in which the increase in surplus occurred, the shareholders have been paid 30 per cent annually in dividends, and that the increase in the surplus has been placed largely in war bonds (chiefly Canadian). In the North, the policy of the company is admired; and, while the company could no doubt market its war bonds without any serious effect on the market, yet if all companies adopted a similar policy the result might become serious, and, therefore, leads to the belief that such would be quite wrong in principal. Another factor is that the Nipissing Mining Company is regarded as a leader in its fair dealings with its shareholders. Not only does the company issue an annual statement that would do credit to any company, but a financial statement is presented every three months, as well as a monthly report of production and developments exactly as reported by the manager to the president and directors.

At the 1,400-ft. level of the Beaver-Consolidated the four-inch vein opened up some time ago and which contains some high grade ore, is expected to be the forerunner of interesting developments on that part of the property. Also, in that the vein passes onto the adjoining Prince claim which the Beaver now has under lease on the basis of an even division of the net profits, the prospects of finding additional veins and ore on the Prince are favorable.

The McKinley-Darragh has again pressed its oil flotation equipment into service, after leaving the plant closed since January when cold weather interfered with pumping operations. Production will accordingly be increased to the extent of the silver recovery from the re-treatment of from 175 to 200 tons of sand and slimes daily.

In view of the intimation that the La Rose will curtail to some extent its exploration policy, particularly in fields other than Cobalt tends to indicate that with work centered largely upon the companies four Cobalt properties the total cost of operation will this year be reduced considerably. While the cost of labor and expense as that incurred by the company last year on material may continue high, yet the elimination of such prospect work will reduce the overhead, and should cause a corresponding increase in net profits.

Figuring ore reserves at over 23,000 tons and containing 22 ounces to the ton or more than 500,000 ounces of silver insight, and calculating costs at $8 a ton with silver at $1.25 an ounce. Mr. A. J. Young, president of the newly incorporated Bailey Silver Mines estimates a daily net profit of $768.75 from the operation of the old Bailey-Cobalt Mine. In addition to this, the Bailey Silver Mines owns the Northern Customs Concentrator on which the net profit from treating customs ore amounts to about $250 daily. This makes a total of $1.018.75 as indicated daily net profits, as against an authorized capital of $1,250,000, divided into 1,250,000 shares of the par value of $1 each. Following is an interesting extract from the report, and which shows the added possibilities of the future of the mine:—

"The engineers' report show that ore actually developed amounts to 23,126 tons, with an average assay

value of 22 ounces of silver per ton, containing 510,-294 ounces of silver. The report does not include any ore which may be stoped to a greater width than six feet, nor any values for the higher grade veins, several of which may be seen in the mine. It also does not include the ore on the dump, which amounts to several thousand tons, and which has considerable commercial value; neither does it include any probable ore which may be found by the development of the unprospected areas where there are a number of known veins."

Information has just been received that the interests now in control of the old Keeley mine in South Lorrain have acquired an option on the adjoining Beaver Lake property and have made the second payment on the option. The plan of operation on the Keeley includes the continuation of the shaft from its present depth of 230 feet to the contact which is estimated to lie at a depth of between 350 to 400 feet. At or near the contact the main veins will be explored, the largest of which passes from the Keeley onto the Beaver Lake property. Work is now proceeding at a satisfactory rate at the Keeley.

Senator Sharp, of Ottawa, paid a recent visit to the Leroy Lake section of the Gowganda district for the purpose of looking over the Silver Bullion and Dodds properties which were recently merged. Senator Sharp declared himself as being favorably impressed with the properties.

After having toured the United States with the purpose of gathering ideas in connection with ore testing laboratories with a view to erecting one in British Columbia, Charles Kamsell of the Geological Survey in B. C. and William Timm, head of the Ore Dressing Laboratory at Ottawa, paid a visit to the Haileybury Mining School. It is understood the modern plant in operation in the Haileybury School left a favorable impression.

During the week ended April 30th, six Cobalt companies shipped an aggregate of nine cars containing close to three quarters of a million pounds of ore, the output being the highest record for any previous month during the current year. The Mining Corporation with three cars containing close to a quarter of a million pounds was the heaviest shipper.

Following is a summary:—

Shipper	Cars	Pounds
Mining Corp.	3	240,277
McKinley-Darragh	2	189,188
Coniagas	1	88,000
O'Brien	1	77,673
Hudson Bay	1	61,522
Peterson Lake	1	60,000
Totals	9	716,660

During the corresponding period the Mining Corporation was the only bullion shipper, sending out 50 bars containing 50,783.50 ounces. The Nipissing, the leading producer, continues to store its output.

THE GOLD MINES.

Opinion is divided on the question of placing a tax on gold used in the arts and in return paying a bonus to the gold mines. The plan being advocated in the United States whereby the arts would be taxed $10 extra for each ounce of gold used, would presumably constitute a fund from which the producing mines could be paid a bounty on each ounce of gold produced. Some of the operators believe the scheme should be carried out, while others fear that it might only serve to create offices for another small army of men and with an overhead expense that might leave no very material amount available for bonus payment to the mines.

It is announced that the annual meeting of the shareholders of the Porcupine V.N.T. Mines will be held in Toronto on May 27th, at which time the usual routine of business will be done, as well as a discussion and consideration of suggestions which the shareholders have to make with regard to the affairs of the company. In view of the improved conditions in regard to the supply of labor, and that the Porcupine V.N.T. is equipped with a mill with a capacity of 100 tons daily, and with a large tonnage of ore immediately available, it is thought that some decision may be reached with regards to resuming work.

At the Dome Mines the indications are that full capacity may be shortly attained, and in which case the net profits may be expected to increase. There is considerable speculation as to the probable contents of the coming annual report covering the twelve months ended March 31st. It is thought that the report will be divided into two periods, that prior to the date of re-opening the mill and that covering the productive period. In this way it will be possible to arrive at a more accurate idea of the performance to be expected during the current year. More men are becoming available, and this is stated to be making it possible to prosecute with increasing vigor the work of exploring the Dome Extension property at the lower level. The question of exercising the opinion held on the property before October, next, will depend upon the result of this exploration work.

Results at the Hollinger, McIntyre and Porcupine Crown continue comparatively uniform, with a tendency toward improved production, and with a fairly satisfactory increase in the supply of labor.

The annual report of the Sovereign Porcupine Mines Company shows an expenditure of $16 872.43 during the year 1919 on exploration and development work. During the period approximately 4000 feet of diamond drilling was done. In doing surface work on the southern part of the property "an excellent vein, heavily mineralized, was uncovered". This vein was stripped for about 45 feet in length.

In the Kirkland Lake field the arrival of spring has been marked by further increase in activity. At a meeting of the shareholders of the Hunton-Kirkland, held in Haileybury on April 29th, it was decided to commence operations at once on the property, a satisfactory deal having been arranged with United States interests. Machinery for a mining plant is already being placed on order. Details will appear in next week's issue of the Journal.

Since resuming work very recently, the Wright-Hargreaves Company has added about fifty men to its pay-roll. The underground workings have been dewatered and machines are now in operation. The construction of the mill is also to be carried forward as fast as the supply of labor will permit, and the mine is expected to join the list of important gold producers before the end of this summer.

At the Kirkland Lake mine of the Beaver Company, it has been decided to continue the main shaft from its present depth of 700 feet to a depth of 900 feet, work toward this end having already commenced. It is also stated that an excellent shoot of high grade ore has been opened up in a stope from the 300-foot level.

The plan of development includes the driving of a log development drift at the 500 foot level to the west boundary of the property.

On the Lake Shore, production continues normal at approximately $1,500 daily and with mill heads ranging from $23 to $25 a ton. The mill is treating a little over 50 tons of ore daily.

The main shaft on the Ontario-Kirkland has reached the 450-ft. level and the work of cutting a station will be carried out. It is proposed to cross-cut both north and south so as to intersect and drift along the veins which were developed at the 300-ft. level so as to determine the extent of the downward continuation of the ore shoots. Plans have been made with R. C. Coffey to design and supervise the construction of a mill, but actual work will be held in abeyance pending the result of work at the 450-ft. level.

Boston Creek and Skead township interests have combined toward providing a road to Skead by way of Boston Creek, instead of following the present road from Englehart. The distance from Englehart is about 24 miles, while from Boston Creek it ranges from eight to twelve miles. The appeal for government assistance having failed, the prospectors and claimholders have joined together and already have cleared and fairly satisfactory trail, and have built a foot bridge over the Blanche River. It is stated that if the government will build a bridge suitable for vehicle traffic, the prospectors and mining men will provide a right of way for wagon traffic from the railway to the center of activiey. The present band of amateur road-builders have been self-named the "Boston Creek and Skead Township Overalls' Brigade." At any rate, they have exhibited a degree of enthusiasm that bids fair to have some effect on the government.

One the Miller Independence Mines at Boston Creek, although the crosscut at the 500-ft. level has not yet reached the point where the downward continuation of the main ore body is expected to be encountered, yet a narrow vein has been found in which gold tellurides occur. This is pointed to as an excellent indication that the crosscut may intersect the main vein at a mineralized horizon.

In the Sesekinika Lake district, in the township of Maisonville, the Golden Summit Mining Company has completed the purchase of the Jensen Farm, the price paid being $10,000 in cash and small block of stock. Two veins occur on the property, both of which are very narrow at surface, but one of which widens out to about two feet in width at a depth of eighteen feet. The formation is andesite, with intrusions of porphyry. A limited amount of surface exploration is being carried on, and a special car with visitors from Detroit will arrive on the ground about May 13th.

A meeting of the shareholders of the Thompson-Krist Mining Company will be held in Toronto on May 10th for the purpose of considering and if approved ratifying the deal which is to merge the company's property with that of the Porcupine Crown. A new company is being incorporated, to be known as the Northcrown Mining Company, with an authorized capital of $3,000,000, divided into 3,000,000 shares of par value of $1 each. The Porcupine Crown will pay into the treasury $20,000 and receive in return 1,999,997 shares; while the Thompson-Krist will pay $10,000 into the treasury and receive 999,997 shares.

Contracts were left on April 30th for the sinking of a shaft on the Fidelity property in Teck township from 150 to 300 feet, and for 2,000 feet of lateral work at the 300-ft. level. The work is already underway. This company is also planning to let a contract for a large amount of drilling on its properties in Skead township on which large sulphide dykes occur.

British Columbia Letter

Victoria, V. C.

Stewart, B. C.: The Benson Brothers, of Victoria, B. C. who staked in the Salmon River District, Portland Canal, before the war from which they have just returned, have sold a two-third interest in their properties to a Vancouver syndicate of business men for a substantial amount. There are two groups of claims involved, one known as the white Mouse being situated on the Canadian side of the line and the other group, which has been given no special collective designation, consisting of fifteen claims located on the American side. The Bensons assert that while no considerable development has been done they uncovered a lead containing native silver and that assays gave first class returns.

George Clothier, government mining engineer, discussing conditions in northern British Columbia recently made it clear that, although there is much excitement over mining prospects in this section and notwithstanding that this sentiment appears to be justified to a large extent, there are as yet only three proven mines of note. These were the Dolly Varden, at Alice Arm, the Engineer, in the Atlin District, and the Premier of Salmon Arm. But these were great properties. He continued: "The Engineer, at Carcross, is a proven gold mine and will operate this year if the will of the late Capt. Alexander, who was the owner, is executed. Shipments from this mine would be made by water to the White Pass Railroad where ore would be taken by rail to Skagway and thence south to the smelters. This Mine will have the same effect in making Atlin an active town as the Premier and the Dolly Varden have on Stewart and Alice Arm. In the Stewart and Alice Arm Districts there are many properties under development and many of them show great promise. Nothing more however, can be said of these until they are proven. A mining country cannot be made in a single year and we will know more about the country a year from now. Vancouver and Victoria are full of companies, many of which are formed over properties on which no development work has been done. Some such companies no doubt will fall through because of lack of funds to carry out development work. In every mining country there are a flock of these. It is hard for good companies to get properties on account of the prices asked for by prospectors. Big companies are always willing to put their money in the ground but they do not like to have to pay and spend it on the chance of proving up a good thing."

Stewart and Hyder, situated at the head of Portland Canal and the Canadian and American portals to the Salmon River mining district, are very busy little towns according to advices from the north. Miners, prospectors, speculators and many others whose business it is not easy to define are being taken into the camps in boat-loads, every north-bound vessel from

either Vancouver or Seattle being crowded. Real- estate values in both communities are said to have soared, having practically doubled in the course of the last six months. It is reported that the Provincial Government intends placing some of the lots of the Stewart townsite, which reverted to the Crown, on the market. Mining machinery is being taken in over the trail to both the Premier and properties of the Angelican (Belgian) Mines, as well as to some prospects on which development is underway, and the whole trend of travel, at least on the part of those who are entering the country for earnest work this season, is up the Salmon or the Bear Rivers. In Hyder there is a building boom. The tide flat area is being improved, foundations being laid over it for buildings which are in course of construction or which are planned. A sidewalk 1,900 feet long is being laid to connect up these structures.

With reference to development work on the Spider Group, under bond to the Algunican Development Co., of Belgium, and which is situated on the Salmon River District, it is interesting to note that camp supplies, as well as mining machinery including a compressor, have been freighted over the snow. To accomplish this horses were fitted with snow-shoes of a special design which are reported to have served admirably.

There is much talk over the prospects of the Marmot River Section of the Bear River zone, Portland Canal. Mr. George Clothier, government mining engineer, reported on a number of prospects in this locality last year and on the whole his observations were favorable. It is said that there are a number of properties with showing of ore high in silver. This season there is no doubt that much prospecting will take place here as well as throughout the Bear River Valley, while development is planned on a number of claims. C. B. Bush and associates and the Sterling Mining Company are among those interested in the development of properties in this zone.

..The Silver Group, Salmon River, consisting of three claims and situated about 21 miles from Hyder, has been bonded by R. H. Stewart, mining engineer of Vancouver, B. C., and associates in the sum, it is unofficially reported, of $77,500 and $5,000 has been advanced as an earnest of the intention of the bondees to proceed with development this year.

Alice Arm, B. C.: The Dolly Varden Mine will continue at least for the present under the ownership of the Taylor Mining Co., subsidiary to the Taylor Engineering Co. This property and its affairs occupied the limelight to a considerable extent during the closing days of the Provincial Legislature. R. T. Elliott, solicitor for the original holders of the property, the Dolly Varden Mines Co., telegraphed Premier Oliver accusing him of all evil doing in this connection. The opening paragraph of Mr. Elliott's first telegram, for there were two, is a good specimen. "The influence brought to bear" he said" upon the Oliver Government in attempts to secure further legislation affecting property rights in Dolly Varden mines constitute direct lobbying for fraudulent purposes, being wilful attempts to substitute forces of secret illicit lobbying for open public administration." The premier read this to the House, defended the course that the Legislature had taken with reference to the property and introduced a Bill confirming the Taylor Engineering Company in its title to the mine, the mine plant, the railway, etc., in short of all the holdings embraced in the property commonly termed the Dolloy Varden Mine. This passed the legislature without division and now is a part of the British Columbia Statutes. This legislation is expected to strengthen the position of the Taylor Engineering Company with the question of ownership comes before the Court, where it is being taken by Mr. Elliott on behalf of the original Dolly Varden Company.

Development on the La Rose Claims, Alice Arm, is reported to have opened up a strong lead of high grade ore. That some mine machinery is to be installed to facilitate work, that a 450 foot crosscut is to be driven and that some diamond drilling is propsed is the effect of an announcement from the company's headquarters, Vancouver, B. C.

A twol-drill compressor and power plant is to be installed on the North Star Property states P. Oleson, who is in charge of development work. The machinery is being obtained from San Francisco.

Anyox, B. C.: One of the diamond drilling outfits which has been in use by the Granby Consolidated Mining & Smelting Co., on Ecstall River properties is to be sent into the Salmon River section for work to be undertaken this summer.

O. B. Smith, connected with the Granby Consolidated Mining & Smelting Co., for the past twenty-one years, has resigned. At the time of his retirement, which was forced because of ill-health, he was assistant to the managing director and head of the exploration department of the Company. Mr. Smith graduated from the Messachutts Institute of Technology in 1897. From 1899 to 1904 he was engineer for the Granby properties at Phoenix, B.C. and from 1904 to 1908 he was superintendent at the same place, following which date he was general superintendent of mines for the company in all the districts in which it operated.

Douglas Channel, northern B. C. Coast.

The Drum Lummon Mine is reported by C. L. Copp, Superintendent, to be showing up satisfactorily on development. Mr. Copp, who is about to take north some special parts for the Mill, which is to be ready for an early start this season, states that the tunnel is in high grade milling ore and that a large tonnage has been taken out during the winter and is ready for treatment.

Barkerville, B. C.

Pickeringite, a hydrous sulphate of magnesium and aluminum, which has not been observed previously in British Columbia, has been found in the Cariboo Country. Samples have been brought out by W. H. Brock and analysed by Dr. V. Dolmage, of the Geological Survey. The mineral, which is of a creamy color, with a silky lustre, was found in considerable quantities but it is not thought that the deposit goes far beneath the surface. The mineral has been observed in Chili, Argentine, Colorado, and Nova Scotia.

Sheep Creek, B. C.

Harold Lakes, Superintendent of the Nugget Gold Mines Ltd., reports that the old Motherlode Mill is ready to commence the season's work as soon as a shipment of cyanide, now on order, arrives. Recently efforts at the mine have been concentrated on the laying of track, the construction of chutes, and otherwise preparing for production. Mr. Lakes reports that the drift on the main vein at a depth of 625 feet has developed the ore for a total distance of nearly 200 feet. Drifts driven both to east and west still are in ore, the vein widening and narrowing with the advance but, it is said, the values are maintained. At the recent annual meeting of the Company an encouraging report was submitted by R. H. Stewart, consulting engineer. Officers were elected as follows: President, A. C. Burdick; secretary, G. S. Bothwell; directors, Captain W. H. Logan, E. H. Beasley, R. S. Lennie, K. C., and Professor J. M. Turnbull.

Nelson, B. C.

A full crew of men is employed on the Texas-Yankee Girl Mine, near Ymir B. C., getting it in shape for production. The power plant is being repaired and soon will be ready for operation and it is the intention of the new owners to proceed with a systematic plan of development.

Riondell, B. C.

Water conditions in most sections of the Kootenays having improved many of the Mills, which were closed down for some weeks, either have resumed operations or are preparing to do so. The Blue Bell Mine at Riondel is one of those planning to again become an active producer. As soon as a crew of men can be obtained the development work underway will be continued and the Mill will be re-opened.

Ainsworth, B. C.

The property of the Florence Silver Mining Company, Princess Creek, is being re-opened. The Mill again is active after a period of some weeks idleness caused by lack of water.

The Utica Mines Ltd. will operate its property, Paddy's Peak, after the 1st of June. It will be recalled that A. J. Poyntz and associates obtained a lease of a portion of the workings where they developed some high grade ore. Their interest lapses on the date named.

Greenwood, B. C.

The Waterloo Property, Lightning Peak, is reported to be showing up well on development, a good sized body of high grade silver bearing ore having been struck on the second level. On the Kootenay property a tunnel is being driven which now is in 36 feet.

Slocan, B. C.

A serious tie-up of mining operations in the Slocan District, B. C., is threatened, officials of the One Big Union, which is said to be at least well enough organizer among the metalliferous mine workers of the section to be able to cause trouble, having given the Mine Operators notice that on and after the 1st of May the miners must have a substantial increase of wages. The present scale is $5.50 for miners and $5 for muckers with 50 cents extra in each case of wet mines. The demand, generally speaking, is for an extra $1 a day and, it is asserted, the men also want the employers to supply them with blankets and white sheets.

As the Mine Operators are understood to have refused to consider acquiescence it is likely that the O. B.U. will be permitted to carry out the threat behind the ultimatum. The issue, however, still is in doubt as arrangements are being made for a meeting of the representatives of both sides to take place on the 30th of April.

If there is a strike quite a number of active silver-lead producers would be closed down. Among the properties of the Slocan Mining Division that have shipped 1,000 tons of ore or more this year, and whose operations would be interfered with, are the Bosun, Galena, Rambler-Cariboo, Silversmith, Standard, and six of the Clarence Cunningham mines, viz., Ivanhoe, Sovereign, Hewitt, Queen Bess, Van Roi, and Wonderful. From this Division, and from the Slocan City Division, there have been shipped this year upwards of 140,000 tons of good grade ore and there are employed below ground 417 men and above 206 men.

As is it likely that the Ainsworth Mining Division, which is adjacent and no doubt is included in the scope of the O. B. U. demands, it is interesting to note that the Florence and the Cork-Province Mines would be affected and that throughout that section, according to late returns, there are employed 127 men below ground and 95 men above.

Trail, B. C.

Receipts at the Trail Smelter of the Consolidated Mining and Smelting Co. for the week ending April 14th totalled 4,408 tons, of which 48 tons were concentrates. This brings the aggregate for the year up to 82,232 tons, of which 78,874 tons was ore and 3,358 tons concentrates. There are two new shippers, namely, the Last Chance, of Sandon, and the old St. Eugene, of Moyie.

On the 15th of April 1920 the Consolidated Mining and Smelting Co. of Canada, operating the Trail Smelting and Refining Plant as well as a number of large and small producing mines in British Columbia, took out a blanket insurance policy covering the lives of its employees and protecting their families or dependents against their permanent disability. Roughly the Company employs 2,000 men. The amount of insurance is based on length of service. One who has been employed for five years and six months and over has a policy in his favor of $1,500 while one working for six months and less than one year has been insured for $500. Those ranking between the maximum and the minimum have policies the amount of which are based on a graduated scale which, of course, mounts as length of service increases.

In announcing this innovation the Company, among other statements, makes the following: "On leaving the service of the company the insurance ceases"; "In the event of re-employment a man is classed as a new employee". In the case of permanent or total disability before the age of sixty years the amount of the insurance will be paid in one sum or over a period of years; "There is no cost to you and no medical examination is required; "It does not in any manner take the place of or interfere with the benefits provided by the Workmen's Compensation Act or any other insurance the employee may have; and "This

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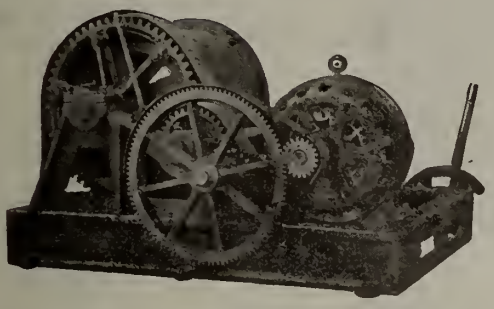

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Greenwood, B. C.

The Silver Cloud and Skylark properties in the Greenwood Mining Division are being developed with promise of good results. On the former a nine foot lead is receiving attention the ore giving good results in gold and silver. The operators are considering the installation of a small concentrator. Some years ago the Skylark was a considerable producer and it is claimed that the old lead has been discovered.

Comox, B. C.

The Providential Mining Co. is reported to be developing a copper property in the Buttles Lake District, Vancouver Island, having been working all winter and now being engaged in taking in a diamond drill and other machinery to continue development on a more comprehensive scale. It is said that about $10,000 already has been invested.

Victoria, B. C.

Among the mining companies to be incorporated in British Columbia recently are the Northwest Silver Mining and Development Co. Ltd., with a capitalization of $1,000,000 with headquarters at Vancouver B. C. and the McLennan Silver Mines Ltd., with a capitalization of $1,500,000, headquarters Vancouver B. C.

Nova Scotia Notes

The Mabou Areas

The Montreal "Star" seems to attach much importance to the Mabou areas, which a recent dispatch described "as the last large independent mining area in Cape Breton." This despatch says the mine "has not been worked for several years since American interests were forced to let go their holdings through a Wall Street Panic." The Mabou Colliery was flooded by an inbreak from the sea in 1909, and it has usually been presumed that this was the reason for its abondonment. Residents in Inverness County will be best able to appreciate the accuracy of the "Star's" frequent news items regarding Mabou, and will also be able to form conclusions as to the disinterestedness of an announcement which intimates that Scotia and Dominion Steel are dickering for the Mabou area with a view to bettering their positions in prospect of the expected amalgamation of interests. The Mabou area is actually one of quite limited extent, and in its operation some difficult questions of extraction and transportation will have to be faced, and its acquisition would not materially strengthen either Dominion or Scotia, both of which companies possess areas much more adapted to their requirements.

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One 8 in. x 16 in. simple twin reversing link motion horizontal engine connected by gears to a single drum hoist, endless cable type, with the necessary gears, shieves and idler shieves and cable tightening device for taking up slack by means of idlers. Brake band in drum.

These hoists are in A-1 condition, and as part of a plant in liquidation, must be sold.

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50	Bullock	1200	11 x 12	Skinner
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59	Western Elec.	276	9 x 14	Robb Armstrong
60	Fairbanks Morse	1200	—	Fairbanks Morse
75	General Elec.	—	—	Ideal
100	General Elec.	257	14 x 14	Lycoming
100	Crocker Wheeler	277	14 x 14	Harrisburg-Fleming
100	General Elec.	257	14 x 14	Lycoming
110	Warren	720	13 x 18	Erie City
117.5KVA	—	257	3 Cylinder	Can Producer & Gas Engine Co.
120	General Elec.	225	16 x 18	Erie Ball
150	General Elec.	600	—	Chandler Taylor
			20 x 18	Fleming Harrisburg
165KVA	Westinghouse	225		
175KVA	Western Elec.	225	21¼ x 22"	Sheffield
185KVA	General Elec.	225	17 x 21	Erie City
200	Westinghouse	600	20 x 42	Corliss
240	General Elec.	200	14 x 30	Harrisburg-Fleming
250	General Elec.	200	15 x 29 x 22	Harrisburg
325	Can. Gen. Elec.	150	18 x 36 x 24	—
360	General Elec.	150	15 x 28 x 30	Harris
400	General Elec.	120	20 x 40 x 42	MacIntorh & Seymour
400	Westinghouse	107	18 x 32 x 42	Rice & Sargeant
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The Mining Society of Nova Scotia.

Twenty-Eighth Annual Meeting

Glace Bay
May 4 and 5
1920

A Well Attended, Worth-While Meeting, with Conservation as its Key Note.

THE 28th Annual General Meeting of the Mining Society of Nova Scotia was, for the first time, held in Glace Bay, the centre of a mining district that has during its productive life added more wealth to Canada that any other mining district in the Dominion. In actual monetary value, according to current market prices, the Sydney coalfield has yielded a greater revenue, over a longer period of time, than any other mining operation in Canada, but the intrinsic value of the coal produced, regarded as a source of national energy, so far exceeds that of all other products of the mine as to make it proper and fitting that the Mining Society of Nova Scotia should meet in what its citizens are pleased to call "The Biggest Town," but unfortunately only known throughout the rest of Canada in inverse ratio to its real importance.

Not only has Glace Bay and its environs produced the major portion of the coal production of Canada, up to this date, but, until Alberta comes into its own as the greatest storehouse of Canadian coal, Glace Bay will continue to be the centre of the most important coal mining industry of our country. As the central point of access to the undersea coal areas, Glace Bay can never be lessened in importance until that day, far distant, and recessive in the ratio that human knowledge grows, when the extraction of the undersea coal will have grown too expensive to be profitable.

In the transactions of mining societies the name of Glace Bay will frequently recur in years that are to come, as the fascinating problem of profitably mining undersea coal seams develops new inventions, and as necessity compels novel methods of which the mining fraternity will be eager to learn. Some premonition of this enkindled the Glace Bay meeting, and the dominant note in the papers and in the discussions was not that of things actually accomplished—although this note was not lacking—but dwelt upon things yet to come. There was a definite feeling that the coal mining practice of Nova Scotia was entering a new stage, that new difficulties would compel the adoption of new methods.

The keynote of the meeting was "Conservation," and, as will be seen from the papers that were read, in part reproduced in this issue, economies were suggested in regard to the supporting pillars in coal extraction, in connection with mine timber, waste heat and power economy, and in regard to labour turnover.

Thanks to the courtesy of the Dominion Coal Company, the new club-rooms of the company, recently provided for the staff, were put at the disposal of the Mining Society, thereby, in large part, making possible the unqualified success of the meeting.

About seventy members took part in the meeting, the interest of which was sustained from the opening. The President, Col. Thos. Cantley, who has had much experience of society meetings, remarked that he did not remember to have seen a larger attendance at the opening session.

The excellence of the attendance was matched by the quality of the papers, and the keenness of the discussions was a natural result of a gathering of men daily occupied and immersed in the problems dealt with by the papers. One eminent member of the profession deplored the sustained excellence of the papers as depriving him of all excuse for criticism.

Visitors from outside the immediate district of Glace Bay and the Sydneys included Mr. Hiram Donkin, the Deputy Commissioner of Mines, and Messrs. H. M. Wylde and H. C. Wright from Halifax, a re-

presentative deputation from Pictou County and Cumberland, and Mr. H. Y. Russel and the Editor from the Montreal Branch of the Institute.

The new President of the Mining Society is Mr. A. J. Tonge, the General Superintendent of the Dominion Coal Company at Glace Bay. Mr. Tonge was President of the Manchester Geological Society in 1910, succeeding Sir W. E. Garforth, and is a Councillor of the Canadian Mining Institute.* He is a mining engineer of large experience and of acknowledged eminence in his profession. The retiring President, Col. Thos. Cantley, is sufficiently well known throughout Canada to make recapitulation of his offices unnecessary. As President of the Mining Society of Nova Scotia he succeeded Mr. D. H. McDougall, the immediate past-President of the Institute. This is a presidential record of which the Mining Society of Nova Scotia may be justly proud. The Canadian Mining Institute was much strengthened when the older society decided to join forces, and, we think, it may be fairly stated from observation of the recent meeting, that added prestige and virilty has resulted to the Mining Society of Nova Scotia from the union.

As a member, and as the Editor of the Mining Society, the writer is diffident in praising in these columns the doing of the "mother lodge," but in fairness to this eastern representative of the Canadian Mining Institute, it is necessary to say that at no metropolitan gathering at headquarters has the general excellence of papers and discussion been surpassed, and that a larger representation from headquarters would not only have been welcomed, but would have received good value as compensation for the long journey.—F. W. G.

PROCEEDINGS OF THE MEETING.

Business was opened at 10 a.m. May 4th, in the Club Rooms of the Dominion Coal Company at Glace Bay. The President, Col. Thos. Cantley, was in the Chair. After an address of welcome by the Mayor of Glace Bay, Mr. E. McKay Forbes, the members present, numbering about fifty, proceeded with routine business. The Secretary-Treasurer reported a balance on hand of $1,265.

Mr. Hiram Donkin, the Deputy Commissioner of Mines, expressed the regret of the Hon. E. H. Armstrong, Minister of Mines, that he could not attend the meeting owing to his duties at Halifax, the Houses of Assembly being in session.

The Report of the Council, among other matters, referred to a Resolution which had been forwarded to Ottawa deploring the numerous resignations from the Geological Survey . (See issue of 16th April, 1920, page 305, and March 5th, page 184.) The President briefly emphasised the gravity of the situation, and said he was unable to say whether remedial action was proposed by the Government or not.

* See Journal, Nov. 26, 1919.

Change of Date of Meeting.

A resolution, of which notice of motion had been given, was unanimously adopted to change the date of the meeting to "a date chosen by the Council between the 1st of January and the 1st of July."

Change of Name of Society.

Notice of motion had been given to change the name of the Society to the "Nova Scotia Mining & Metallurgical Society." This proposal did not meet with unanimous favor, and after discussion, it was moved that the recommendation of the Council to change the name of the Society be adopted, and that a letter ballot should be prepared by the Council, and submitted to the vote of the members, and that upon this vote action should be taken by the next Annual General Meeting.

Presidential Address.

Col. Cantley gave the Presidential Address on "The Importance of Cheap Power to the Industrial Life of Nova Scotia. A vote of thanks was moved by Mr. C. M. Odell and seconded by Mr. Hiram Donkin, who said it was reassuring to those who had given thought to power problems to note that men who filled important positions on the Canadian National Railways Board, as did Col. Cantley, were abreast of the latest developments in sources of motive power.

In replying, Col. Cantley said there was no doubt but that the Diesel engine was the most economical prime mover of today, but the draw back was that not sufficient oil is being produced to supply current demand, and that in comparatively few years it was unlikely that oil would be available in anything like the quantity in which it is being produced today.

The Application of Hydraulic Stowing to Undersea Coal Workings with Special Reference to the Sydney Coal Fields.

Mr. Walter Herd, the Mining Engineer of the Dominion Coal Company, read a paper on the possible application of hydraulic stowing to the undersea conditions of the Sydney Field.*

A vote of thanks to Mr. Herd was moved by F. W. Gray and seconded by Mr. T. J. Brown, both congratulating the author. Mr. Brown said that the paper had been written with especial reference to the application of hydraulic stowing to undersea areas, and had not laid much stress on its usefulness in the extraction of pillars on land, particularly under towns.

Mr. Alexander McEachern (Asst. Supt. Dominion Coal Company) said that Mr. Herd's paper was an intimation that new methods were becoming necessary to meet new conditions.

Mr. J. J. McDougall (Mining Engineer, Acadia Coal Co.) suggested the application of the system to the conditions of Pictou County.

Mr. Hiram Donkin said that the subject of hydraulic stowing was one to which he had not given the detailed thought that was necessary to enable comment, but he thought the deciding factor in its use would be that of cost, as there was no physical impossibility involved in its application. He suggested that the un-

* See also issue of Jan. 23rd, 1920, page 56, "Primary Considerations in Hydraulic Stowing," by C. A. J. Hendry.

dersea mining problem would be largely one of transportation, and that perhaps not enough attention had been paid to the civil engineering side of mining. He humorously applied the story of a Chinaman upon first seeing a trolley-car, who, after some study, expressed himself by saying: "No pushee, no pullee, go like hellee allee samee! He congratulated Colonel Cantley upon the successful solving of the transportation problem in the Wabana Slopes, where great speed had been obtained by spending thought on the special nature of the haulage required to meet the special conditions. In this connection, readers of the "Journal" are referred to the article on the Wabana Slopes, in our issue of March 26th last (see page 241), in which Mr. R. E. Chambers remarked that this type of haulage was significant "inasmuch as it points to a solution of the haulage problems arising from the moving of submarine deposits of coal at increasing distances as the working faces recede from the shore."

Mr. Tonge, in congratulating the author, said the paper would be one that all could look back upon when the day came, as he believed it would, when the practical problems of hydraulic stowing would be a matter of everyday routine in the Sydney field. He mentioned that he was looking into the practice of water flushing as practised in Belgium when the war broke out, and that conditions had since prevented further consideration of such matters. Mr. Tonge referred to the practice in the Scranton field, and to the excellent Bulletin on this which was published by the U.S. Bureau of Mines. Mr. Herd has prepared his paper with special reference to coal lying between the 200 and the 800 foot cover line. There are no other means by which the coal can be all extracted in this area except by some such system as water flushing with solid materials. Speaking generally, about 50 per cent of the coal had been taken out, which means that if some such method of supporting the roof so as to enable the pillars to be extracted is not adopted, fifty per cent of the coal will be entirely lost. The application of the method to pillar areas under towns promised well. Mr. Tonge referred to the troubled conditions occasioned by the war which had prevented mining engineers from developing the scientific side of mining practice as they would have liked.

Mr. Neil Nicholson (Inspector of Mines) expressed his belief in a panel system of retreating longwall combined with hydraulic stowing.

In presenting the vote of thanks, the Chairman referred to the use of crushed slag in hydraulic stowing in the Ruhr District of Westfalia. He also suggested that the problem of getting workmen to face, more particularly in the iron-ore mines at Wabana, would in time become so great that consideration might be paid to providing temporary underground residences for workmen.

Mr. Herd replied at length to the questions raised in the discussion. With regard to the super-imposed undersea seams down to 800 ft. of cover he would advise stowing one seam solid, and then it would be a question for deliberation as to what percentage of the other seams should be stowed. It might not be necessary to stow the whole area; perhaps half-stowing of the goaf might suffice, which would represent the percentage of pillar support now left.

MR. ALFRED J. TONGE,
President, Mining Society of Nova Scotia

In the matter of cost the additional cost of hydraulic stowing over and above the present practice was not so important—relatively—as it had been in the past.

In reply to a remark by the President that the Germans, in using hydraulic stowing, had developed an idea which they did not originate, a characteristic national trait, Mr. Herd said that the system of hydraulic flushing pursued at Scranton had been originally conceived by an English engineer, who could not get his own countrymen to consider his plans, and had been listened to in the United States, but that it was really in Germany that the system had been perfected.

Mr. Herd's paper will be published in a following issue of the "Journal."

As the whole of the afternoon had been taken up, other papers purposed to be read on the first day were deferred until the following morning.

MR WALTER HERD,
Dominion Coal Company, who read a Paper on "Hydraulic Stowing."

THE SMOKER

During the evening a smoker took place, which was —well, it was a "Smoker," and fully up to the Penhale standard, with—oh yes, just a dash of Holland.

SESSION OF WEDNESDAY, MAY 5th.

Mr. E. G. Mackay, Superintendent of the Open Hearth and Blast Furnace Departments of the Nova Scotia Steel and Coal Company, read a paper on "Generating Steam by Use of Open-Hearth Furnace Waste Gas." The paper was a description of a waste-heat boiler attached to one of the open-hearth furnaces at Sydney Mines, and, as was pointed out by the President, showed a saving of 91 cents per ton on steel manufacture by the interception of the heat of the waste gases. On the production of pig-iron in Cape Breton, such provision, if applied to the existing open-hearths, would amount to a possible saving of $400,000 per annum.

Mr. H. C. Wright (Canadian General Electric Co.) pointed out that Cape Breton was much interested in saving of waste coal-heat, because the Island had no water powers, and coal was the only source of power. The Province of Nova Scotia was definitely committed to a policy of developing its hydro-electric powers.

Mr. J. S. Whyte (Acadia Coal Company) said many possibilities were yet untouched in the salvage of waste heat, which Mr. Mackay's paper barely opened up.

Mr. Tonge recommended the extended use of recording apparatus in steam plants. Mr. Mackay, replying to questions, said the boiler he described gave between 50 to 75 per cent efficiency, and he emphasised that it was merely an intercepter of waste heat, and did not use gas as fuel, the gases utilised being exhausted and non-combustible waste products of the open-hearth furnace

"Conservation, and Drawing Mine Timbers."

Mr P. T. Prendergast Manager of Dominion No. 2 Colliery, read a paper, published in this issue, with the foregoing title.

Mr Herd, who was an officer in the Canadian Forestry Corps during the war, referred to the great destruction of growing timber in the woods, and the tremendous depletion of the forests by pulp mills. As to quality, pine was best, followed by spruce, and the much inferior balsam fir. Nothing was growing today in Cape Breton suitable for pit timber, but second-growth balsam fir. It had not the lasting qualities of spruce, and as Mr. Prendergast rightly pointed out, it should be treated for preservation. He referred to the necessity of barking timber used for mine support. Elaborate treatmnet, such as creosoting was not advisable for such poor timber. Boiling in a saturated solution of common salt with the admixture of a little alum was a simple and successful practice. He suggester sorting timber into separate piles, so that the timber best suited for certain underground purposes could be readily selected. Props are sometimes tapered so that they will not break readily in the middle, and used timbers can thus be made of further service by cutting into shorter lengths for thinner seams.

Mr. D. H. MacLean (Manager, Princess Colliery, N. S. S. & Coal Co.) said in the deeper mines the weight played havoc with the timber, and it lasted so short a while that treating would be wasted expenditure. Mr. MacLean's description of the effect of roof-weight in deep mining suggests that possibly utilisation of the roof-pressure to break down the coal by use of the longwall method would be preferable to endeavoring to hold up the roof at great depths of cover.

Pit-Timber Supply of Eastern Canada has Life of Ten Years.

Mr. J. W. Revere (Purchasing Agent of the Dominion Coal Company), whose knowledge of the pit-timber situation in Nova Scotia is more complete than that of any other person, expressed himself as satisfied that the present growth of timber in Nova Scotia was not making up for what was being used, and that in ten years the pit timber supply of Eastern Canada would be exhausted. The pulp mills in Cape Breton were offering $12.00 a cord for pulpwood.

Mr. J. J. McDougall commended the practice recommended by Mr. Prendergast of chucking the high side and thus shortening the length of the timber required, which was the practice in Pictou County. In regard to preserving timber, creosoting could not be used in the Pictou collieries because it had been found that the odor of the creosote underground was indistinguishable from the "fire-stink" which the miners relied upon to give warning of underground fires.

Mr. Neil Nicholson pointed out that the system of mining largely decided the amount of timber that was required, and he advocated retreating longwall wherever possible to obviate the use of timber for support.

Some discussion took place on barking timber. It was stated the use of the "barker" of the pulp-mill men would not suit for pit-timber as it also took off about twenty per cent of the wood. Mr. Herd mentioned that in South Wales men would not accept barked timber. They liked wet timber, timber that would "talk" when the weight came on, and give warning to the miner. Timber in South Wales was sold by weight, the wetter it was the better in the miner's opinion. He referred also to the effect of heavy roof pressure in South Welsh collieries, where in the course of two years, in one instance, the intake road, originally driven in the coal on the same level as the return, was raised to a level thirteen feet above the return.

Mr. Revere said a machine existed by which timbers were rotated in a cylinder with an admixture of water and gravel, which removed the bark satisfactorily.

The President, in presenting the vote of thanks to Mr. Prendergast, said that timber was becoming so scarce that the use of reinforced concrete in large quantities for underground support was likely in the near future.

In the unavoidable absence of Mr. W. H. Graham (Superintendent of Construction, Dominion Iron & Steel Co.) a paper on the Plate Mill of the Dominion Iron & Steel Company, bearing particularly on the construction work, and prepared for the Toronto Meeting of the C. M. Institute was taken as read.

The "Turn-Over of Labor."

Mr. Angus W. MacDonald (Employment Agent, and Welfare Superintendent, Dominion Steel Corporation) read a paper on "Labor Turnover in Industrial Plants and what can be done to minimize it." Mr. George D. Macdougall (General Superintendent, N. S. S. & Coal Co.), in moving a vote of thanks, said that the available supply of labor did not promise improvement, and that time and thought devoted to conservation of labor would be well repaid. Mr. F. W. Gray seconded, remarking that labor—reduced to its lowest denominator—was a marketable commodity, but was also *the* commodity of greatest value dealt in by corporate organizations. It was therefore worthy of at least as much study as the duties of the purchasing agent who dealt only in materials. Prof. Sexton warned against the regarding of the laborer as a commodity, and he deplored the system which had developed the motion-study and stop-watch man, and had speeded-up production without proper regard to the physical and mental needs of the worker. Mr. Tonge said the author had touched upon the question of safety, and that conservation of life was not to be regarded as the least of the subjects drawn to the attention of the meeting.

The President said he would place the cost of educating new men at a figure greater than Mr. MacDonald had mentioned. He would put it at $150 per man. With regard to the effect on safety, accidents occurred at two distinct periods, namely, the first week of employment, when men were becoming accustomed to their surroundings, and later, when familiarity had bred contempt. In the middle period there was comparative immunity. The first stage of employment was, however, the one that yielded most accidents.

MR. HIRAM DONKIN,
Deputy Commissioner of Mines, who urged greater attention to the "Civil Engineering" side of Coal Mining

Longwall Mining and Conservation.

Mr. J. H. Cunningham (recently Superintendent of Mines, N. S. S. & Coal Co.) read a paper on the theory and practice of longwall mining which was one of the clearest expositions of a difficult subject for description we remember to have heard. Mr. Cunningham's paper will be published in a following issue of the "Journal."

Mr. Herd congratulated the writer upon his interesting and able account of longwall mining. He referred to the mining of the Torbane Hill mineral, (sometimes known as "Torbanite") in Scotland, which was originally two feet thick and was extracted by the longwall method, and thinning out, had been followed down to a thickness of four inches, this being possible because of the valuable character of the mineral. There wes really no limit to the thickness of the seam that could be worked longwall, as it is common practice to work thick coal by longwall faces in layers. He did not think there was any necessity to blast coal after it had fallen from a longwall face. It could be broken up with wedges, unless the area was too confined.

Mr. Angus MacKay (Acadia Coal Company) said longwall mining had been practised in Pictou County. The height of seam was 3 ft. 11 ins. It was difficult to break coal with wedges under conditions existing in this mine, because the height was too small to allow proper use of hammer and wedge, and the coal came down in pieces weighing three to four tons. Mr. Neil Nicholson said the smaller amount of travel involved in the examination of a longwall mine as compared with pillar and room was a consideration. The longwall face at the Jubilee Mine Sydney Mines, was a successful operation.

Mr. Tonge said that the longwall system had been in successful and extensive use at the Emery Mine of the Dominion Coal Company, but had been abandoned in favor of pillar and room because of the loss of longwall miners, chiefly Belgians, during the war. He thought longwall had not been successful because it had been tackled in a half-hearted fashion, or in a partial manner. Sufficient space had not been allowed ed for full play of the bending action of the roof, and too many pillars had been left. He had himself worked longwall faces a mile long and in all heights from 1 ft. 6 ins. to 7 feet thick, and had never thought of working coal any other way. Once longwall had been decided upon, it did not matter whether it was used under sea or under land. Mr. Tonge said he did not know when he had heard a clearer description of longwall practice than had been given by Mr. Cunningham.

One speaker mentioned what is probably the true explanation of the non-success of longwall mining namely, that the local miners do not favor it.

Mr. F. W. Gray mentioned that there was in the Joggins Field, at the collieries of the Maritime Coal & Iron & Railway Company, a unique longwall operation. inasmuch as a thin seam was being completely extracted from under the sea by the longwall method. In view of the number of thin seams which exist in the Sydney field, and proceed under the sea, none of which have as yet been touched, the Joggins Mines operation was of some significance. He suggested that if it were possible to obtain a description for the next meeting of the Society, this should be done.

Fighting Mine Fires in Pictou Field.

A paper was read by Mr. Angus MacKay—in the absence of the author, Mr. F. E. Notebaert, Acting General Manager of the Acadia Coal Company—on "The Theory and Practice of Fighting Mine Fires from Practical Experience gained in Pictou County." Mr. Notebaert's valuable and historical paper is published in this issue of the "Journal."

Mr. F. W. Gray stated that he was glad to note Mr. Notebaert stated his belief in the existence of the McCulloch fault, and his opinion "that the Westville seams are only the regular continuation of the series of Stellarton seams, thus adding an enormous tonnage of coal to that already known to exist in the Stellarton district." He had himself come to the conclusion four or five years ago, after studying maps loaned by Mr. Notebaert, that the "existence and size of the McCulloch fault seems to have been presumed from surface indications and from a belief that the "Main" or Ford seam of the Albion area was identical with the "Main" or Acadia seam of the Westville area, worked at the Drummond and Acadia Collieries." No proof of the identity of the two seams had however been furnished.

HON. E. H. ARMSTRONG.
Commissioner of P. W. and Mines, Nova Scotia.

The reading of Mr. Notebaert's paper concluded the morning session, and there was not time to hear Mr. H. Y. Russel's talk on the manufacture of explosives, or to deal with the papers on "Transportation of Coal" by Mr. M. A. McInnis, and that on "Canada's Coal Supply" by Mr. F. W. Gray, read at the Toronto Meeting of the Institute, and placed on the programme of the Glace Bay Meeting for discussion.

At noon-hour the Society was the guest of the Dominion Coal Company at luncheon.

In the afternoon, a meeting was held in the Savoy Theatre, to which the public were invited, at which there was displayed a series of moving pictures, lent by the U. S. Bureau of Mines, showing the manufactuer of coke and by-products, and modern colliery power

plants. Prof. F. H. Sexton spoke on "Vocational re-training of Workers in Industry" and illustrated his remarks with lantern slides. Prof. Sexton's enthusiasm and successful work in this connection are well known and much appreicated. Mr. W. S. Wilson, of the Economy Engineer's Department of the Dominion Steel Corporation, read a paper on "Conservation in Colliery Power Plants."

The newly elected officers of the Society were announced these being as follows:—President, Mr. A. J. Tonge; Vice-President, Mr. Geo. D. MacDougall; 2nd Vice-President, Mr. C. M. Odell; Secretary-Treasurer, Mr. E. C. Hanrahan.

The new President was suitably installed by the retiring President, and this closed the proceedings.

PROF. F. H. SEXTON,
who spoke on "Vocational Re-Training of Workers in Industry."

MR. F. E. LUCAS,
Economy Engineer, Dominion Steel Corporation, whose work on the Committe was largely responsible for the successful meeting.

The Conservation and Drawing of Mine Timber

A paper read before the Mining Society of Nova Scotia, Glace Bay, April 5th 1920.

By P. T. PRENDERGAST.

When asked to read at this meeting a paper on the conservation and drawing of mine timber, it was with a full realization of the fact that this subject had already been discussed before you on different occasions, that I reluctantly consented.

This matter has heretofore been discussed from the theoretical point of view; and while, no doubt, much valuable knowledge is obtained from a discussion of this nature, it is proposed in a few remarks to deal with the subject from the view point of practical experience; by which is intended my own personal experience, as acquired during years of connection with mines and mining in Cape Breton.

Conservation of raw materials has so taken hold of the public mind, and is regarded of such vital importance by those of us who realize our responsibility to those who are to come after us, that it behooves all to use every available means to prevent wastage of timber in and around the mines. In recent years the item of mine timber has entered so largely into the cost of coal production, that any measures which we can take towards the economical use of our available timber supply will prove a great investment in the years to come.

When the Dominion Coal Company was organized in the year 1893, the cost of the regulation 9 ft. prop was from 54 to 50 cents per dozen laid down at the pit mouth, and the specifications followed at that time required that they were all to be of black spruce and six inches in diameter at the small end. This was in the days when the mines were working under comparatively shallow covers. Today the only avail-

able supply of timber is of balsam fir, with a small proportion of spruce, and the cost has reached four and a half times as much.

Mining under greater depths with an inferior wood to support the roof means that more timber will be required, and the manner of use of our present supply will have to be dealt with more energetically in the future. The drawing of mine timber and the use of preservatives are two ways of assisting towards this end.

We are each successive year going deeper and deeper into the earth in order to obtain the coal to keep our industrial plants in operation, and furnish our homes with warmth. This means that each successive year much greater weight of strata has to be contended with. It will be found where mining operations are carried on at any great depth, that even an increase

MR. GEO. D. MACDOUGALL,
Vice-President of the Mining Society of Nova Scotia.

in the size of pillars will not prevent the breakage of timber.

Where great weight of strata has to be reckoned with and where lateral pressures are troublesome, we find that on our roadways the roof is forced down on the timber causing them to lag and finally break. To overcome this breakage is one way of assisting in the great cause of conservation, as all broken timber must be replaced by new ones, and the writer submits that a great deal of over-head timber destroyed in this way might be saved by shortening the span between the supports. It may not be good policy to recommend the placing of props too close to the haulage roads, but the shortening of the span of overhead booms could be done in a great many cases with increased safety to employees, and at a saving in expensive timber, if certain methods are adopted, with the idea of conserving timber supply.

Take the case of landings and turnouts where long booms are required, and where, on account of the length of the span and the area to be supported, extra heavy timbers are required, it will be found that even these timber very often break, and it becomes necessary to replace them. Also, the thin end of the pillar here is continually breaking away, necessitating more timber and labor, adding greatly to the cost of production. This, you will all agree, is an unpardonable wastage, as it not only means an unnecessary use of new timber, but also very often results in a decreased output of coal, both of which could have been avoided had the work been properly done in the first instance.

The building of neat packs in the "V" of the road, on which would rest one end of the overhead timber, thus shortening the span, would result in a great saving of timber. This would not only be a safer method, which is in itself sufficient to justify its use, but would result in a great saving in cost, as much shorter and cheaper timber could be used. It would also serve the purpose of preserving the ends of the pillars which are continually splitting off. These packs could be built of broken and discarded timber of which every mine has a fairly good supply. The only cost would be that of labor.

Not only would such packs tend to conserve our timber supply, by lessening the amount of broken timber and protecting the weak end of pillars, but it would be a satisfaction to the mine official to have this work done properly along roadways and landings. To have long booms carrying a heavy load is by no means a nerve-soothing condition.

I might give here a few figures showing the cost and quantity of timber used today as compared with, say eight years ago, in some of the coal mines. In one mine there were 64,000 more pit props used in the year 1919 than were used in 1911, and the cost of props increased in that period 100 per cent. In 1911 there were four tons produced per prop, and in 1919 only 2.4 tons. This difference may be attributed partly to different conditions, but principally to the deeper workings, and the maintaining of longer roadways and airways. The replacing of broken props along roadways is a heavy drain on our timber supply.

In the deeper local mines, where the edges of pillars can not be depended upon as a safe support for booms, and where all booms must be supported by props or packs, such props are very often subjected to more stress by the heaving of the bottom than by the weight of the roof. Props are thus forced up until they cut through the overhead roof, thus weakening the roof support, and new timber must be put in. This heaving of the bottom is generally from one of two causes, (a) Where pillars are not left sufficiently large, (b) Where the strata below the coal is of a weak and broken nature. The first of these causes suggests its own remedy, while the second presents a problem which is somewhat more difficult to grapple with.

Since heaving of the bottom results in a great wastage of timber through breaking, one might suggest that the most easily applied remedy to overcome

this wastage would be to use a better quality of timber. With this statement no doubt you will all agree provided it did not materially increase the cost of coal per ton. However, looking at this question from the view point of conservation of valuable timber resources, and bearing in mind the fact that future mining developments must be carried on at a much greater depth than that of the present day, it might be the proper thing to conserve for future generations the more valuable woods, while the cheaper and faster growing woods might be drawn on in quantities to meet present requirements.

While still dealing with the question of conservation of mine timber, there is another phase of it which is worthy of attention. At present the wood that is to be used as timber in our mines is cut and handled in large quantities during the winter months, and while the hauling is good, it is hustled out of the woods and piled along the railway and highway. Some of this will not be used in the mines for a year and in many cases for a much longer time. During all this time it is laying in close piles and deteriorating from disease and decay, and when it is finally placed in the hands of the miner, its strength and life in many cases, is reduced at least fifty per cent. In timber that is closely piled, thus preventing a free circulation of air, and on which the bark is continually moist, we have the most favorable conditions for fungoid growth.

A great deal has been done and said by mining men with regard to curing timber before putting it into the mine, and much good has been accomplished in this way to lengthen the life of mine timber, but to apply remedies to wood that is already well advanced in decay is so much energy wasted. The proper time to apply the remedy, if wood curing is to be done with a sufficient degree of satisfaction, is when the timber is green from the woods, and before the parasites have had an opportunity to get in their work, and not after they have had many months start.

The drawing of mine timber from finished places is a question that has been given a great deal of thought by those interested in coal mining. It has been contended on many occasions that timber cannot be drawn profitably in our Cape Breton mines, as such work cannot be done by common labor. I agree with this statement in so far as it applies to inexperienced labor. Experienced men must be employed at such work, and labor of this kind must be paid a fairly high rate. The timber must then be carried to the roadways, from whence it can be again hauled to the working places.

In this country, where mine timber is principally of balsam fir, a large percentage after being drawn is not worth resetting. I have had this work done myself with a fair degree of profit by having men take only such timber as could be drawn without too much labor and make good timber for resetting.

I do not know to what extent these ideas will meet with your approval, but I believe that, having in mind only the cost of coal per ton without regard to the conservation of timber, the drawing of timber in this way will be found most profitable. In places where the bottom is fairly strong, and does not heave sufficiently to break the timber, and where the roof is not too heavy, it will be found that a great many timbers can be drawn which will be fit for resetting. Probably from 50 to 75 per cent. particularly where such timber is of spruce.

I have also used broken timber in the making of road ties in the mine, and find that these can be made at about the same cost as new ties, but it requires a man who has had some experience at this kind of work to make it come out even. It might be suggested that this work could be done better on the surface, if the wood was brought there; but the extra handling would increase the cost, and probably result in the lessening of the output, by interfering with the free handling of the coal.

Where booms have of necessity to be removed, because of their being broken, either through deterioration of the wood, or through some other cause, and where either end of such boom is of sufficient length to make a prop, they may well be used for that purpose; and even when the fibre becomes brittle through deterioration, and the stick is of no further use as a boom, it can be used as a prop with fairly good results.

MR. H. M. WYLDE, Halifax,
A Charter Member of the Society.

Rafted timber, or in other words, timber that has been soaked in water for some time until it sheds the bark, will stand underground conditions much better than wood sent into the mine with the bark on. I might also say that timber which is cut from areas that have been swept by forest fires, and are cut after they dry on the stump, have much better lasting qualities than wood cut in the sap. It follows then, that it might be better to have timber peeled when cut, and piled so as to give it a chance to dry out. This would of course add materially to the cost.

It might be argued that the additional cost would not be justified from the fact that the life of much of the timber used in the mine is of short duration owing to conditions already mentioned. However, it might be recommended that a certain percentage of the timber be prepared in this way, so that the mine official could use them in travelling ways and airways, and such other places as are to be maintained for a longer period.

In the timbering of mine roads, where it was necessary to maintain such roadways for a number of years, and where such timbering must of necessity be of a more or less permanent nature, imported timber of a quality superior to our native wood is sometimes used. This is generally yellow hard pine. This wood, if it is in good condition when put into the mine, and has not too much resin extracted from it, does not seem to be affected by underground conditions.

Steel girders are sometimes used where support of a permanent nature is required. The initial expenditure is fairly large, but allowing for the cost, and having due regard to the permanency desired, any reasonable expenditure is justifiable, as it will ultimately prove much cheaper than if ordinary timber had been used.

It has been proven conclusively that main roads can be supported as cheaply, particularly where double tracks are repaired by using steel rails that have been condemned for ordinary railway use, as with round spruce timber. This is for the reason that many more spruce booms would have to be set for a given distance; and as for durability, the life of the steel boom, as compared with the spruce, might well be placed at 20 to 1, and the difference may be much greater than this. This refers to the ordinary 80 lb. steel rail.

Portions of haulage road boomed with these rails, say six feet apart, supported on cured spruce props, and having sufficient overhead lagging, would require, if spruce booms were used instead, three spruce booms to every rail so used, and would entail three times the labor in getting.

It is generally supposed that when steel is used instead of wood for timbering, that the first cost is much greater, but in the cases referred to it does not work out that way. For instance, we take a case where roof conditions will require a steel boom every three feet, then at least two spruce booms must be placed in the same space. The average cost of a steel boom 14 feet long is $5.00. Supported on two special spruce timber at 30 cents each, the cost of putting up would be about $2.40, making a total cost per boom of $8.00. The cost of two spruce booms 14 feet long is $2.00, with four props for supports $1.20, and $4.80 for setting, makes also a total of $8.00. Where it becomes necessary to set steel booms a distance less than three feet apart owing to the weight of the roof, I would not take any chance with spruce even if set skin to skin, unless propped in the centre, and centre props on haulage ways are always a source of annoyance and delays.

ALEXANDER S. McNEIL,
Supt. of Mines, Nova Scotia Steel and Coal Company,
Sydney Mines.

CANADIAN COAL MEN.

Alexander S. McNeil.

Alexander S. McNeil, the Superintendent of Mines of the Nova Scotia Steel & Coal Company at Sydney Mines is another of the native sons of Scotch Highland descent that are the moving spirits in the coal mining activities of Cape Breton Island. Mr. McNeil was appointed Overman at Dominion No. 1 Colliery in 1899, and after holding various official positions was appointed manager of No. 8 Colliery in 1908. He filled successively the position of manager at No. 9 and No. 2 Collieries, and was in 1916 appointed District Superintendent, having charge of Collieries Nos. 2, 7 and 9, and later of Nos. 1, 5 and 10 in addition. In 1919, Mr. McNeil joined the staff of the Nova Scotia Steel Company as Superintendent of Mines.

Like so many other men in official positions in Nova Scotia, whom it has been our privilege to know, Mr. McNeil has risen from a junior positon underground by dint and personal merit, and studious nights, to the superintendency of a group of collieries producing 600,000 tons annually. His long experience in connection with the submarine collieries of the Dominion Coal Company, namely, Nos. 1, 2 and 9, and 7, and his charge of the Princess Colliery at Sydney Mines, has given him a unique knowledge of undersea coal-mining at long distances from shore, and with heavy cover.—F.W.G.

The Theory and Practice of Fighting Mine Fires from Practical Experience Gained in Pictou County

Paper Read Before the Mining Society of Nova Scotia April 5th 1920, Glace Bay.

By F. E. NOTEBAERT.*

A large portion of the Pictou County Coal Field is composed of very thick seams. Amongst these are seams that have been known for years past, namely:

The Foord Seam—40 feet thick;

The Cage Pit Seam—18 feet thick;

The Third Seam—14 to 17 feet thick;

The McGregor—The thickness of which at certain places reaches over 22 feet.

These four seams are the old seams known as the seams of the Stellarton district, and have been worked, some of them for over a century.

To these seams a series of thirteen new seams underlying the four first ones mentioned, were added—when in the winter of 1915 a borehole drilled by the Acadia Coal Company, made this discovery.

As in the upper seams, the heavy thickness of these new seams seems to have prevailed, and we have to record:

One—21 foot seam;

One—28½ foot seam;

One—20'4" seam;

One—24'2" seam;

One—23'0" seam.

These seams were found intermingled with thinner seams, such as: 3 ft. 6 in.; 5 ft.; 6 ft. 2 in.; 4ft. 11 in.

McCulloch Fault Considered Non-Existent.

Undoubtedly had the borehole been extended further down, other seams would have been discovered, and eventually the borehole extended still further down, would have entered the Westville coal measures. These very often have been considered as being the same seams as those of the Stellarton district, but thrown in a south-westerly direction by a fault of great amplitude known as the "McCulloch Fault," the existence of which has never been proved. Without certainty, although without much doubt, we are fairly safe to abandon the old conception of the so much talked of "McCulloch Fault" and to accept that the Westville seams are only the regular continuation of the series of Stellarton seams, thus adding an enormous tonnage of coal to that already known to exist in the Stellarton district.

Having so outlined what may be properly now called the main coal field of Pictou County, we will enumerate the main features of this field.

The angle of dip may be called steep in comparison with the great majority of the Cape Breton fields. At the southern end of the field, the seams outcrop with an angle of 21° to 23°, dipping northerly until they reach a basin line, then they rise up in a northerly direction at various incilnations, varying from the true level up to 90° and in certain disturbed sections of the northern portion of this field, the seams are completely reversed, the foot wall resting on top and the hanging wall lying underneath.

The angle of the dip, the thickness of the seam, the fact that the space left open by the working out of the seam is not flushed nor filled, implies almost necessarily a method of working by "Bord and Pillars," retreating from the limit of the field towards the main slope, leaving only a crush behind the working faces.

The Cause of "Gob" Fires in Pictou County.

The immediate consequence of such a system is the unavoidable abandonment of a more or less important tonnage of coal in the gob. This coal being subjected to the heavy pressure of the roof, is crushed, and provided that the oxygen of the air is allowed to get in contact long enough with this "loose coal" great heat is bound to be generated, which ultimately will provoke a "gob fire."

These gob fires are naturally frequent in the seams of the Stellarton district, or more correctly, would be quite frequent if special precautions were not taken. These precautions are of three different natures, namely:

1. Reduce the quantity of combustible matter left crushed in the gob, the presence of which is the original cause of the fire.
2. Reduce the prolonged contact of air (oxygen) and crushed coal in the gob.
3. Emergency measures, consisting of heavy stoppings which allow us to isolate and to seal off any sections or part of section whenever this section is threatened or affected by fire.

These emergency measures are naturally very expensive, but our experience has proven to us that they may be, after all, the cheapest and safest method to prevent gob fires, or to fight them.

Hydraulic Filling Advocated as Gob Fire Preventative.

The amount of combustible matter left in the gob, when attempting to work out such thick seams, can only be reduced to an unimportant quantity by the adoption of the "flushing system," also called "hydraulic filling," but at this date of the coal industry in Nova Scotia, it is very questionable if in long slopes with an abnormally high cost of labour as compared with the selling price of the coal the time has yet come when "hydraulic gob-flushing" can be introduced in Nova Scotia mines with financial profit. Although, as we have just stated in the case of the Pictou County mines, the "flushing system" is and will be the only system by which all the coal being recovered, the gob fires may be completely suppressed. Let us also incidentally mention that with the hydraulic flushing, dust explosion will be a thing of the past.

Gob Areas Should Be Air Tight as Possible.

To reduce the prolonged contact of air (oxygen) with the crushed coal left behind in the gob, the most efficient disposition is to advance the working faces as rapidly as possible, so as to bring the roof down; also to avoid any filtration of air through the gob. This can best be done by retreating towards the slope, also by ascensional ventilation, the air being allowed in at the bottom of the pillar section and being exhausted at the upper end of the section in a direction opposite to the gob.

To reduce a prolonged contact of the air with the gob, implies also that the gob resulting from the work-

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ing out of a pillar section be properly and completely sealed off, so as to avoid as much as possible filtration of air through the gob and oxidation of the crushed coal left therein.

These are roughly speaking, the general points that should always be kept in mind in the extraction of pillars in a thick seam dipping at a steep angle, without having recourse to the "flushing system," if an earnest attempt to avoid gob fire is made.

We have mentioned the nature of the seams and of their dispositions, and we believe it might be interesting to point out that although commonly qualified as "very apt to spontaneous combustion" the coal seams of Pictou County and especially of the Stellarton district are the least subject to spontaneous combustion; this being due to their very low percentage of sulphur, which in most cases does not exceed 1 per cent.

The Progress of a Gob Fire.

But even when all precautions are taken, gob fires are apt to take place. Usually the first indication of fire is only a very slight odor of distillation of coal. According to the nature of the seam, and to the general dispositions which are causing the fire, the odor will persist for hours or for days, and we know of cases where it has persisted for weeks without showing any increase of temperature, or any sign of smoke, which are the next indications of a gob fire.

At this stage when smoke appears, conditions are always very serious, because even if the seam does not liberate explosive gases, the distillation of coal with a restricted amount of air will generate carbon monoxide, which is highly explosive. It is at this stage that good judgment must be used and a quick decision arrived at.

When smoke has made its appearance, the tendency is usually to continue carrying out the dispositions which had been adopted in the earlier stages when the only indication of the gob fire was the odor of distillation.

In many cases this may have resulted in apparent success, but very often the fire has already been allowed to smoulder too long, heat has increased and flames have made their appearance. Conditions then may be termed as highly dangerous, and alarming, since all the elements required to provoke an explosion are present. If conditions have unfortunately been allowed to develop this far, there remain very few remedies to be depended upon, and any one of these remedies is entirely affected by a very great factor of "chance." The natural remedy against flames is water, applied by sprinkling or by flooding. The flooding of the section will usually take a great time, during which the fire will continue to progress, kept alive by the suction of the fan. Besides, flooding against fire can only be adopted as a very extreme measure. As a matter of fact, it is almost always worse than the complete and forced abandonment, except if the flooding may be restricted to a small area, because without controlling the fire quickly, you add to the damage and risk of the fire the destruction from the flood.

As regards the sprinkling, it will generally not be very efficient and will almost in every case amount to failure, since the water will only reach the outside manifestation of the gob fire (the flames(without reaching the real seat of the fire, which is away inside in the gob. We have known of flaming fire being successfully extinguished by sprinkling of water, and the officials who were supervising the fight are today still wondering why it was that the water put the fire out. A closer study might have shown that the steam generated by the water on a very hot fire and carbon dioxide were the decisive factors. The fire will in most cases, continue to gain in violence and make its appearance at other places in the district, until conditions are so alarming that the mine has to be abandoned. This abandonment means the stopping of the fan. The natural ventilation, which will likely be reinforced by the heat of the fire zone, will carry a current of air through the mine and in the vicinity of the fire. The next available step is to seal off the mine at the main intake and main return, and to wait developments. The moment is naturally a very serious and anxious one, since the conditions and the elements are all present to cause a very serious and destructive explosion, which even on the surface may cause loss of life.

It is an order to avoid this alarming situation that we recommend never to wait to face these desperate conditions, and instead of being guided by "luck and chance" to control the conditions whenever the first smoke has made its appearance. Even then conditions are dangerous, but in our opinion, it is at this stage, that radical decision should be taken without waiting and without hesitation, and that the mine should be sealed off as tight as possible at the main intake and return. The purpose is total suppression of oxygen, not only in the fire district, but in the whole mine, and its replacement by a high percentage of other gases, explosive or not, the mixture of which will after a short time be inexplosive, due to its lack of oxygen.

As an illustration, are given some analyses of mine gases taken at a slope mouth of one of our mines, after it had been closed for only a few days, as follows:—

	Per cent
Carbon dioxdide	7.2
Carbon monoxide	0.0
Oxygen	3.1
C. H. 4	31.4
Nitrogen	58.4

and a few days later, the percentage of oxygen had fallen to .86 and .42.

The mine referred to here, is the Albion Mine of the Acadia Coal Company. This mine, ever since its opening away back in 1881, has been affected by numerous very serious fires, almost always due to one of the causes mentioned hereabove. In this particular case, (the fire which took place in 1917-1918) an old abandoned section in the Third Seam, had been entirely isolated by a line of very substantial concrete stoppings, which unfortunately, due to a special disposition of the ventilation circuit, were subjected to a heavy water gauge, that except for the stoppings themselves, would have allowed a short circuit of the ventilation through the old section.

Workings in an underlying seam, having disturbed the stoppings in the Third Seam, odor of distillation of coal, was first perceived at almost every stopping, showing conclusively that most of the section was affected by heat: This heat was generated by the oxidation of the coal, occasioned by the filtration of the air through some defective stoppings and also through the coal itself, as we show later on.

The first step taken was naturally a general reinforcement of every concrete stopping, followed by further reinforcements of weaker stoppings. The odor of distillation would disappear for a few days or even

weeks, to suddenly reappear at some other place; until finally after about eight weeks of special watch, a slight vapor of smoke made its appearance in one of the bottom stoppings which was being reinforced.

The section which was affected had an area of 1,410,000 sq. ft. in which a considerable body of crushed coal had been left. Following the policy herein advocated we decided without any hesitation, at the very moment smoke was seen, to suspend any further reinforcements of the stoppings isolating this section, and to surround this body of smouldering heat slowly but undoubtedly developing into a flaming fire, with an atmosphere entirely deprived of oxygen.

We have given above, the analysis of the mine atmosphere, and will only recall that after a very short time, the percentage of oxygen in the mine was less than 1 per cent. that the percentage of CH4 was about 36 per cent and the percentage of carbon dioxide between 7 per cent and 8 per cent. Such a mixture made the extension or even the existence of any fire impossible.

But this mixture, efficient as it was to suspend the fire and prevent its expansion, could not kill the heat which had been generated by the first stage of the coal oxydation, in the time estimated. The extent and importance of this heat we did not know and could not have known, since at the first appearance of light smoke we had decided to seal off the mine for the reasons already explained.

We had considered that the fire zone was of small extent, in that after the previous reinforcement of the other stoppings, the warm points could be located only very near the stopping where we had noticed the first smoke. Therefore, basing our decision on similar experience in the past, we had decided that the mine being closed for over thirty-six days, the temperature of any heated point should have been equalized by the natural and much lower temperature of the strata and of the whole atmosphere of the mine. But apparently the area of the zone which had been affected by heat was far more important than we had estimated as will be seen from a brief relation of the stages of the method of re-entering a mine, abandoned on account of a gob fire and subsequently entirely filled up with mine gases that we recommend.

During the last six years, underground conditions in the Pictou County coal field have faced us five times with reopening of mines, abandoned either on account of fires getting beyond control, or because of explosions creating fires compelling the temporary abandonment of the mine.

Natural Ventilation Currents from Fire Areas.

In all our re-entering of mine workings, under similar conditions, we have never made use of the fan. The mine having several outlets all sealed up as tight as possible, with the exception of one, (the one intended to be used to re-enter the mine) a current of air or of gas is bound to be set up, notwithstanding the fact that there is only one opening. The slightest leakage in the stoppings of the return airways, if the intake is open, or of the intake if the return is open, will cause the heavy cold fresh air to drive out the light warm gas included in the mine.

Supposing that all the openings could be kept theoretically absolutely tight, with the exception of the one through which the re-entering of the mine is going to be made, a current will be set-up. The cold air will travel down on the pavement of the slope chasing the warmer gas which will escape by following the roof of the slope.

As a matter of fact, during the reopening of the mine which we are going to describe, we made an experiment We reinforced all the surface stoppings, covering them with sand and clay, even covering certain portions of the surface with sand and clay, and then opened the main return-air slope, lying alongside the main air-shaft.

The first effect was a large quantity of gas coming out of the full section of the slope and after a very short while a regular current was noticed, going in at the foot wall of the slope and coming out at the roof.

After several hours of this experiment, the cold air gradually found its way down the mine, the whole section of the slope becoming an intake. In order to counteract this motion, a wooden stopping was built below the connection which existed between the slope and the air shaft in the main return slope. This had the effect of reducing the amount of fresh air going down, but did not stop the current.

In order to still further counteract this tendency, an opening of 16 square feet was made in the fan shaft, in the expectation that the air, instead of keeping down towards the mine, would return up the fan shaft. Of a total quantity of 8400 cubic feet of air the greatest part was going straight in the mine, and barefaced men could reach the stopping which we had built in the main return slope.

Finally, as a last effort to prevent the air from going down, the steam fan was started at 14 R.P.M. in order to draw the air up the fan shaft. Of a total quantity of 5148 cubic feet of air at the slope mouth, 4500 cubic feet was rushing in the mine at a point 25 feet below the crossent between the main slope and the main air-shaft.

This experiment ought to show the effect of natural ventilation, especially on pitching seams. At first sight it should be evident that a state of equilibrium does not exist when placing in contact light warm gases, and cold heavy air. The quantities involved being very large, with considerable difference in temperature and density, heavy exchange setting up currents or natural ventilation are bound to take place and to persist for a very long time.

Therefore, in every reopening of mines, the question of natural ventilation will have to be taken very seriously into consideration, especially in cases where it is important that fresh air does not get away ahead at places where fire may exist, because under these circumstances fires may be apt to start again suddenly. In such cases, it will be most important to direct the natural current by short circuit or new circuit away from any point where the oxygen of the air could and would cause damage.

As an illustration, at the time of re-entering the Albion Mine on January 1918 the first inrush of air, entirely due to natural ventilation, was 50,000 cubic ft. of air per minute, both fans being standing, every opening being closed, with the exception of the main slope (through which the re-entering of the mine was made) and a few boards taken off the fan shaft.

In order to prevent this flow passing anywhere near the seat of the heated section, this amount of air must be deflected before it gets near the fire zone by short circuiting the main intake and the main return. In our case, this had been done when closing down the slope at the time of the temporary abandonment of the mine. The short circuit of the air current was established at a distance of 1,300 feet from the seat of the fire. Only a short distance below this point we

had a blanket of gas through which no living person could pass without the use of breathing apparatus.

The mine was then allowed during three or four hours to clear, the great bulk of the gas lying on the circuit which had been established at a point 1,300 feet above the fire zone. The ventilation being then considerably reduced, due to the cooling effect of the circuit, and also due to dilusion of the gas in the return, the short circuit at this point was suppressed and established further down, closer to the fire zone at a distance of only 460 feet from the fire.

Our men following the air circuit reached the point where the light smoke had been seen at the time of the closing of the mine. At this point, a strong odor of distillation was detected and soon after was followed by a smell of coal smoke. This discovery was most disappointing because it did not leave us any doubt that the smouldering gob fire which had been surrounded by an atmosphere less than 1 per cent of oxygen during thirty-six days, had not been extinguished.

A few hours after, smoke again made its appearance, and for the same reasons as before, we decided to close down the mine and to let it fill again with gas.

The mine had been opened for only 18 hours and all the different phases of the re-entering had been carried out as scheduled. As stated, this attempt was somewhat disappointing, coming after four other successful reopenings carried on exactly under the same theory. In each of these cases, one month had been considered as being fully sufficient, not only to extinguish the fire, but also to cool down the surrounding coal and strata. In some cases less than one month had been the waiting period.

This apparent failure caused hesitation in the mind of many an official, and every supposition was considered; namely, the possibility of the section being connected with some workings of upper seams which were on fire, or connections through subsidence which might have taken place between this seam and the underlying seam and so on.

Finally, after new consideration and study of the situation, it was decided to proceed according to the same method as that adopted previously, but to keep a closer control of the natural ventilation. Since our first attempt had shown us that thirty-six days had not been sufficient to cool down the fire zone, the new attempt was made almost three months after the first one, and contrary to what had been done in this case, the new attempt was going to be made in different stages.

The first one included the establishment of a ventilation circuit to No. 4 level 1,900 feet, and from there upwards towards the surface in a separate ventilation slope, the idea being to keep the ventilation as far away as possible from the fire zone. Instead of starting with as heavy a quantity of air as during the first attempt, the air current given by the natural ventilation at the start was only 10,000 cubic feet of air per minute, which ultimately was increased to 21,000. The composition of the mine atmosphere at the time of this start was:

	Per cent
Carbon dioxide	9.98
Carbon monoxide	0.89
Oxygen	1.00
Methane	42.6
Nitrogen	45.9

in other words, highly favorable.

The rest of the program of this first day included the opening of a door on No. 5 level at 260 feet away from the seat of the fire. This door having been previously left closed by mistake, meant that any ventilation passing below No 4 level would pass on the fire zone. This part of our programme meant that in order to avoid sending the ventilation past No. 4 level, as this part of the mine had to be kept under gas, the door had to be opened first by a Draeger team. The distance down the slope from the air station to the door was 940 ft. Our men went down to the door but found that a fall which had taken place, prevented its opening. At this stage, a sample of gas taken on the slope at No. 5 level, 2,800 feet, was analysed, and showed 17 per cent of oxygen. The mine having been opened for almost 10 hours, dilution of the gas in the air current was taking place. It was decided to end there this first stage of the operations and to let the mine fill up again with gas for a few days. This was done, and after a very short while, a gas sample taken through the pipe at the slope mouth gave us:

	Per cent
Carbon dioxide	10.9
Carbon monoxide	0.42
Oxygen	0.62
Methane	30.00
Nitrogen	59.00

A few days later we proceeded with the second part of the programme, which consisted in levelling off the fall which prevented the opening of the door at No. 5, also the closing by a temporary wood partition of a small ventilation head next to the fire stopping. 20,000 cubic feet of fresh air forced in the mine through natural ventilation was admitted in the slope, but only down to No. 4 level. From this point the work which we had planned to do was done by our Draegermen, in an atmosphere including only a small per cent of oxygen, and working at 940 feet from No. 4 level which was our air station. This was practically all that was done that day. At the end of the day, our Draegarmen had levelled off the fall, opened the door referred to and closed up the ventilation head. They also took a sample of gas almost against the fire stopping; this sample was most reassuring since it included carbon dioxide, 5.5 per cent—oxygen 10 per cent, methane 24.5 per cent, after the mine had been opened up for almost almost twelve hours.

A Proper Use of the Breathing Apparatus

The value of this information alone would fully justify the use that can be made of a well-trained and well organized corps of Draegermen. This valuable information meant that all our previous work had been successful in keeping away from the fire zone an explosive mixture; also that it was possible to work with a restricted ventilation in the close vicinity of the fire stopping for about 12 hours, without allowing the diffusion of the air and of the methane to constitute an explosive mixture.

Men Wearing Breathing Apparatus as "Scouts."

Further valuable information brought back by our Draegermen was that nowhere close to the fire section could they feel any indication of heat. We had therefore every reason to believe that the period of three months of rest which we had given to the mine, during which the percentage of oxygen had been less than one per cent, had been sufficient to equalize the temperature of the smouldering fire to the surrounding temperature of the mine. In other words, not only had the combustion been suspended, but the surrounding temperature was low enough to avoid excessive avidity of hot combustible matter for oxygen.

At this stage, it would have been quite possible to complete our programme, which included the building of a temporary stopping outside the one where on two different occasions we had noticed smoke; but before proceeding to this last stage, the whole mine was once more allowed to fill up with gas.

Mr. Notebaert's Method Justified.

Finally the last day came. Through the same proceeding, the air was allowed in the mine, and this time allowed to pass No. 4 Level, travelling down towards No. 5. Barefaced men started, followed the air and built the temporary stopping mentioned above. The old stopping and all its surroundings were found to be perfectly cool, giving no indication of heat and no odor of distillation. The building of the temporary stopping was rapidly completed, and right after the permanent concrete stopping was started. We had been successful, and once more our mine officials felt that their confidence in this system of fighting fire was well justified.

In order to remedy the real cause of the fire, namely filtration of air through the coal surrounding the stoppings sealing off the lower part of the section, a system of pipes connected to a natural supply keeps a head of a few feet of water all over the bottom part of the section. The overflow taking place through the coal itself is the best proof that the air cannot again enter to feed the gob with oxygen.

All this took place late in the year 1917 and early in 1918.

This time as before, we had found out that it was not only possible to suspend a gob fire by curtailing its oxygen supply, but also that it was possible, if time were liberally granted, to equalize the temperature of the smouldering fire with the rest of the temperature of the mine by means of a restricted natural ventilation.

Our faith in this logical, safe and efficient system of stopping an underground fire, passing rapidly beyond control, had once more been fully rapid, adding another mining experience to many other anxious ones of the Pictou County Coal Field.

COL. THOS. CANTLEY,
Retiring President, Mining Society of Nova Scotia.

COAL CONSERVATION CAMPAIGN.

Engineers' and Firemen's Year Book.

We have received a copy of the "Engineers' and Firemen's Year Book", issued under the patronage and with the co-operation of the Fuel Administrations of Canada and the Provinces, the Railway Association of Canada, Mr. J. K. L. Ross and Mr. R. M. Wolvin, supported by the large railways of Canada and a number of leading banks and manufacturers.

The volume contains some striking reproductions of crayon sketches by Hal. Ross Perrigard, showing the part played by coal in our national life.

The text of the volume is an extract from the Final Report of the Fuel Controller of Canada. We congratulate those who conceived the idea of giving this Report such an attractive dress, and a wider opportunity for perusal by Canadians. Mr. Magrath's studied conclusions on the Canadian fuel problem deserve the widest publicity, much wider publicity than they have obtained. The Canadian public is extraordinarily apathetic about the fuel problem, and we are coming to the conclusion that the men who really know are afraid to face it. It is the skeleton in the Canadian closet, and too many people prefer to forget it. It is therefore encouraging to come across a volume that is deliberately designed to haul this skeleton into the daylight for public inspection.

The foreword to the volume, is as follows, and in quoting it, we would remark that it is an epitome of the view that the "Canadian Mining Journal" has preached regarding our domestic coal supply since it commenced publication in 1907.

> "The most immediate, if not the greatest, experience of Canada from the war has been the absolute necessity for our country to produce more Coal and to conserve it more than we have done in the past.
>
> "We are starving for coal today as we have done in the worst days of the war and whether the blame should rest upon industrial unrest here or in the United States, or upon any other cause, we are confronted with the fact that we have very little coal to burn and that a few days could see us reduced to the straits in which Germany and Austria find themselves today.
>
> "Every body is agreed upon the necessity for an increased production of coal in Canada; this takes time however and two to four years will be required as a minimum before our coal production is increased to such a level as would relieve us from the coal shortage from which we are suffering today and would also enable us to secure that most desirable of results: the establishment of a foreign market for our surplus coal production. Meanwhile we must save coal and save it more than we have done during the last two years if we want to live, to prosper and to develop.
>
> "We have preached and spread the doctrine of Coal Conservation in and out of season; our reception has been in directly inverse ratio to the weather: warm in winter, cold in summer. Who worries about coal in July and August?
>
> "This is precisely the point we wish to emphasize; coal is just as vital in the hottest day of summer as in the bleakest day of winter: we must keep in mind that the year is short and that the seasons revolve quickly. Uppermost before us at all times should remain the fact that we must work untiringly: 1.—TO SAVE MORE COAL. 2.—TO PRODUCE MORE COAL."

A NATURAL QUESTION.

?

Racey, in Montreal "Star."

"Canada (disgusted and worried at the constantly increasing size of its coal bill). "Why in thunder should I be at his mercy and be forced to pay these millions annually when I have sixteen per cent of the world's supply right under my feet?' ".

Note:—Canada has greater coal reserves than any other nation, with the lone exception of the United States.—Ed.

SAWARD'S ANNUAL—1920. A CORRECTION.

We regret that, through a printer's error in the "Journal" of last week, we were made to refer to Mr. Saward's publication as a "well-known 'complication' of data." The unfortunate wording might in some instances contain sufficient truth to prove embarrasing, but it can hardly affect the reputation of Mr. Saward's handbook, which is unexcelled in the fullness and accuracy of its information regarding all phases of the coal trade in North America.

Mr. F. A. Combe who was, until recently, Chief Engineer for Canada for Babcock and Wilcox Limited has opened an office at 603 Southam Building, Montreal to practice as a consulting combustion and steam engineer. Mr. Combe will specialize in power plant design and operation and the utilization of waste head and steam.

Northern Ontario Letter

The Silver Mines.

Quotations for silver during the first week in May continued to decline. Big silver producers in Cobalt which have been hoarding their output since the price began to fall below $1.25 an ounce, now find their vaults fairly bulging with bullion and with quotations having dropped to $1.05 an ounce at the time of writing. It is obvious that the recession in the price of the metal was quite unexpected, and was due to influence which may not be altogether visible even to the most astute metal authorities. While the decline has caused some disappointment, yet the current quotations are still higher than the fixed price which ruled during the closing years of the late war, when the mines were exceedingly prosperous.

An outstanding feature in connection with the silver situation is that while a decline of a further 25 per cent in price would cause curtailment of work in many of the silver mines throughout the world, it would still leave a big margin of profit for the leading producers in the Cobalt field. It is a noteworthy fact that the entire silver production of Cobalt is maintained at an average cost of under 60 cents an ounce. The Nipissing has the lowest cost, each ounce being produced at about 35 cents an ounce. Such mines as the Coniagas and Kerr Lake produce their silver at less than 45 cents an ounce.

The Beaver Consolidated Company having succeeded in leasing the adjoining Prince claim, is now making arrangements to also get control of the Badger property which corners the Beaver on the north west and lies adjacent to the Prince claim. Lateral work is being carried from the Beaver onto the Prince on a vein opened up on the Beaver at the 1,400-ft. level and which has been found to run over the boundary to the Prince. It is proposed work through the latter claim to the Badger.

It is stated that the Dominion Reduction Company has agreed to treat the old tailings pile of the Peterson Lake Company for one-third of the proceeds. The slimes are estimated at over 300,000 tons and while the exact average silver content is still undetermined, yet it is known to be such as to leave room for a substantial margin of net profit.

The appeal in the previous decision on the dispute between the O'Brien Mine and the La Rose is scheduled for an early date. It has to do with the determination of the exact location for the boundary between the Violet property of the La Rose and the O'Brien Mine of the M. J. O'Brien, Limited.

Official announcement is made this week that the Canadian Light Railways Construction Company has already engaged one engineer and a small force of men to scout out the most suitable location for a roadbed, and that actual work of construction is held in abeyance only pending the bill for the charter receiving the Lieutenant-Governor's assent. It is also announced that not only will work commence on the Gowganda line, but it is also planned to proceed with the line from Swastika to Kirkland Lake. Following is the official statement in part as submitted to the correspondent of the Journal:

"We intend to overcome every obstacle and to make a great success of our transportation scheme and hope to have all our lines constructed and in operation before the end of the year. Our bill has passed the committee and received its second reading in the House. We now have an engineer and force of men on the job at Elk Lake and as soon the as our Bill receives the Lieutenant-Governor's assent, we will go ahead with a large force not only on the Elk Lake-Gowganda line, but also in the Kirkland Lake district.

"As soon as we have reached Gowganda, it is our intention to continue right into Shiningtree and Fort Matachewan."

It is stated at Elk Lake that the Coniagas Company of Cobalt has secured a working option on the Gamble-Thompson properties in the Gowganda district, and that the terms governing the deal are moderate. The vendors are stated to have demonstrated their faith in their property by granting fairly easy terms, with an ultimate large price provided the property makes good.

According to official advice to the "Journal", the Aladdin-Cobalt and the Tough-Oakes Company's have completed all details in connection with consolidation, and that arrangements have been made to commence work on the Tough-Oakes about May 20th. It is also stated that following a meeting to be held this week, the Burnside will also be included in the merger. Concerning the outlook for the consolidated properties, the physical condition of the Tough-Oakes and the Burnside is dealt with under "Gold Mines."

Ex-Governor Smith of Vermont, holder of an option on the Kells Silver Property in the township of Corkhill in the Gowganda Mining Division has made application for an extension of time to make the large cash payments which shortly fell due. In the meantime, an order has been issued to close down this week. The attitude the vendors will take is problematical, but the belief of local men is that they may consider the application favorably. This opinion is based on the fact that it is quite difficult to interest capital in such outlying properties, a condition with which the vendors are fully familiar.

It is expected that a shipment of ore fay be made early in June by the Bailey Silver Mines, the company in control of the old Bailey-Cobalt Mine. In the meantime, preparations are being made to commence making regular shipments of medium grade ore to the Bailey Mill, formerly known as the Northern Customs Concentrator.

According to a despatch from New York, the Nipissing Mining Company has brought in three or four small oil wells on its oil lease in Kansas, with indications of the venture being a profitable one. At the same time deeper drilling is being carried on in Texas on the 1000-acre lease held by the company there. This new speculative aspect attracts added interests to the Nipissing. As regards the mine itself, the first four months of the year have been marked by a production of around $375,000 monthly, the highest record so far in its history.

Ore and Bullion Shipments.

During the week ended May 7th, six Cobalt companies shipped an aggregate of eight cars containing approximately 576,364 pounds of ore. The Mining Corporation with three cars was the heaviest shipper, as shown in the following summary:—

Shippers	Cars	Pounds
Mining Corporation	3	196,873
Northern Customs	1	88,000
La Rose	1	87,211
McKinley-Darragh	1	84,280

Coniagas	1	60,000
Dominion Reduction	1	60,000
Totals	8	576,364

During the corresponding period, the Mining Corporation was the only bullion shipper, sending out 99 bars on May 4th, containing 99,987.25 fine ounces.

The Gold Mines.

Net profits being realized by the leading gold producing mines of Northern Ontario continue satisfactory, with indications of continuance. Present conditions justify a fairly general belief that the Hollinger may decide not to increase its present rate of one per cent every eight weeks, that the McIntyre will continue to disburse 5 per cent at intervals of about every four weeks, and that the Dome and the Lake Shore will each probably pay 2½ per cent quarterly. A departure from these rates would be brought about only by a change in the labor situation. With more men available, it would be possible to increase net earnings but, as at present, with no assurance of more than about 75 per cent of the required number of men, the mines are strengthening their position as much as possible .Shareholders in close touch with the situation express confidence in the sound policy generally adopted which carries with it promise of greater longevity and increased dividends in due course.

Considerable importance attaches to the meeting of the shareholders of the Porcupine V. N. T. called for May 27th in Toronto. Obligations incurred by Sir Henry Pellatt in connection with stock underwritten some years ago by him are believed as likely to be dealt with. The meeting is also expected to reveal some idea of the cause of the friction between the English and the American directors. It is believed that all differences may be disposed of, and a decision may be reached to resume work.

Unofficial reports that the Schumacher would resume work at an early date have been current in Porcupine. Among other things, it is reported that provided work should be resumed this summer, the main shaft will be carried from its present depth of 700 ft. to the 1000-ft. level. The treasury of the company is in fair shape, there also being upwards of 100,000 treasury shares as yet unissued, and which the directors have authorized the sale of at 45 cents each. The location of the Schumacher and the nature of its gold ore deposits lends a high degree of importance to the property. It corners in between the Hollinger and the McIntyre, and is located on the contact of the porphyry and the greenstone formations under similar conditions.

To the visitor the Kirkland Lake district now present a busier appearance than ever before. To those in touch with all phases of the industry, the field promises to experience further rapid growth, and within a year or so to see as many miners engaged in work there as the total employed in Cobalt. By this, the importance of the area may be gauged.

At the 300-ft. level of the Kirkland Lake mine of the Beaver Company, some remarkably rich ore has recently been opened up. Stoping operations are being carried on at that depth. It is also learned that in addition to the usual developments, the main shaft will be continued from the present depth of 700 ft. to a depth of 900 ft.

With reference to the Tough-Oakes and the Burnside properties, the merging of which is being completed this week, and the operation of which will commence May 20th, an official of the company stated to the "Journal" that ore actually in sight amounts to between 17,000 and 18,000 tons, and that the average gold content is from about $12 to $15 to the ton, or in all amounting to close to a quarter of a million dollars. The reason for the comparatively small amount of ore in sight is said to be on account of the development work having fallen far behind production during the few months prior to closing down. With work again under way at full blast, it is believed the reserve can be greatly increased in about six weeks by which time the mill will be set in operation.

A deal has been closed in connection with the Hunton-Kirkland, whereby M. Porteous and his associates have agreed to place funds in the treasury of the company so as to finance the installation of a mining plant and an extensive plan of development work. In return for this necessary money, treasury shares are to be issued. It is learned, however, that the control of the company will not be changed. Work has already commenced, and orders for machinery have been placed. It is proposed to contract for electric power from the Northern Ontario Light and Power Company and to at once build a transmission line to the property

It is announced that the Fidelity Mining Company has let a big contract for work on its property in Teck township. The work of sinking the main shaft to the 300-ft. level has already commenced and the contract calls for an additional two thousand feet of lateral work at a depth of 300 feet.

According to official advice, the Bidgood Company, operating property at Mud Lake in the township of Lebel has raised adequate finances to assure the completion of preliminary work, which consists of 300 feet of sinking now under way, as well as over one-third of a mile of drifting and cross-cutting at the latter depth.

At the Argonaut Gold Mines at Beaverhouse Lake, about twelve miles east from Kirkland Lake, a shoot of ore 190 feet long has been passed through at the 200-ft. level. Official figures show the average gold content of the ore to be high. It is stated that 100 feet in length and seven feet wide contains average values of $11 to the ton, while an additional 90 feet in length and five feet in width shows average gold values of $17 to the ton. The information is entirely reliable, coming from John W. Morrison, who is charge of the operation. Mr. Morrison obtained a good reputation as the result of the work in opening up the Lake Shore Mine and bringing it to a producing basis.

It is unofficially reported that the Boston Creek Gold Mines may be re-opened within the next few weeks, and that the interest of John K. Pappassimakes has been purchased. Among those interested in the property are Messrs. Bickell, Symmes, Richardson and Albright.

W. H. Seaman has been appointed manager of the Fort Matachewan Gold Mines, to succeed T. J. Flynn who has managed the work since the company was formed.

British Columbia Letter

Stewart, B.C.

That recent development on the L. L. and H. group of Mineral Claims, situated on Bitter Creek, Bear River Valley, has exposed an ore bearing body twenty-seven feet in width is the statement of C. N. Tubman, of Victoria, B.C., who, with E. M. Molander, of Everett, Wn., one of the original stakers of Mount Sicker, Vancouver Island properties, bonded this group last February from J. S. Hartley, one of the first stakers. The ore carries values in copper, silver, lead and gold. When Messrs. Tubman and Molander went to work on the 14th of last March they found two tunnels had been driven one for forty feet on the upper or galena ledge and the other for two hundred feet on the lower or arsenical ledge. The former crosscut the ledge and the latter had struck the vein and had been carried forward in ore for a distance of seventeen feet. Mr. Tubman and his partner continued the latter work and, the former states, have gone forward another ten feet in ore. They, therefore, now have exposed a body 27 feet in width which, assays have demonstrated, gives encouraging returns in the minerals named. The L. L. H. is about sixteen miles from Stewart and it is the intention to carry on development throughout the season now opening.

Alice Arm

Miners employed by the Taylor Mining Co., at the Dolly Varden Mine left their work on the 22na of April and, as far as could be learned on the date of writing (3rd May), still are on strike. Negotiations, however, then were reported to be underway which, it was hoped would result in the resumption of operations. As matters stand both the actual mining and the railroad, which furnishes transportation between tidewater and the mine, are tied up. The men's demands for a raise in wages from a minimum of $5 a day to $6, single cot bunks, scrubbing of camps, and free blankets and sheets. The Company's rate of board was to remain at $1.25 a day. This ultimatum was presented to the management on Monday, it being specified that three days, or until the next Wednesday night, would be allowed for the announcement of a decision. The decision was that under no circumstances could what was asked for be allowed and that rather than submit the whole work would be permitted to cease. This is what happened and as stated no word has has yet been received indicating a settlement.

Anyox, B.C.

The Granby Co. Two and Three, consisting of sixteen mineral claims situated in the Hidden Creek District and adjacent to the property of the Granby Consolidated Mining & Smelting Co., are reported to have been bonded by P. Oleson. The owners are William Hanna, Charles Flood and associates. Mr. Oleson also has bonded the Ptarmigan, Rex, and Monty Groups in the same section. Development work is to start on the first mentioned claims next June, it being the intention to use three diamond drill outfits.

Nelson, B.C.

Samples of mineral taken from the upper workings of the Utica Mine are being shown in Nelson District which because of their exceptional quality have attracted special attention. They are from a showing between five and six feet wide and represent a rich stringer in the showing two feet wide, the latter being of grey copper with ruby and native silver, running it is estimated from $100 to $1,000 a ton. The average of the whole showing of five and a half feet of ore will be 500 to 600 ounces of silver per ton.

Cranbrook, B.C.

A. J. Palmquist, manager of the Wild Horse Creek Mining Company, who has been spending the winter in Texas, has returned to British Columbia and is making preparations for the resumption of placer mining operations on Perry Creek. The company did a lot of work last season in the shape of repairs to flumes and other plant. Washing operations, therefore, should be started in the course of a month.

Vancouver, B.C.

Dr. E. T. Hodge, for several years professor of mining in the University of British Columbia and in that time prominently active in outside mining circles, has resigned to accept a professorship in the Department of Mining, Geology, and Petroleum in the University of Oregon at Portland. Dr. Hodges states that, while he is leaving the university of this Province, he will not entirely cut off his associaton with the mining industry and the mining fraternity of Western Canada. As his new duties will not necessitate the spending of his entire time at Portland he has agreed to become the executive head of a group of engineers organized with the object of assisting in the development of the natural resources of the Pacific Northwest.

Revelstoke, B.C.

Recent development on the Lanark Mine, an old and well-known British Columbia property situated near the City of Revelstoke, appears to confirm the faith and judgment of the present owners, Fred. C. Elliott and William Dornberg. At a depth of 1,000 feet on their vein they have opened up a body of ore containing a high grade streak from two to four feet in width, with about six feet of milling ore. The high grade averages 90 oz. silver and 65 per cent lead. The vein has been drifted on for 30 feet and holds its width and values. In addition it is asserted that a vein of high grade copper has been exposed on which little work has been done. During the winter considerable work has been done in blocking out ore and the Lanark now is pratically ready to commence production. Since Messrs Elliott and Dornberg have acquired control they have installed a modern hydro-electric plant and a concentrator.

Victoria, B.C.

A total reduction of 318,101 tons of ore and concentrate by the properties of the Consolidated Mining & Smelting Co. for the 15 months ending December 31st, 1919, is shown in the report of W. M. Archibald, manager of the British Columbia mines of that corporation.

J. Warren, the president reported in part as follows:—

"The ore reserves have been largely increased, the developments in the Sullivan Mine being most satisfactory.

"Owing to the strike the prosecution of the power Company's line to Copper Mountain was seriously interrupted. It should be completed early in the coming summer. As usual your Company was the large consumer of the power company's output.

"For many years your directors have been ambitious to make your company a large producer of copper. Originally the Rossland Mines promised to contribute considerable quantities of this metal, but latterly the copper content is almost negligible, the gold values being the important ones.

"With the acquisition of the controlling interest in the Coast Copper Company (Quatsino) and the Sunlock Mines (Jordan River) both properties being situated on Vancouver Island the ambition referred to seems about to be realized.

Outside of the remarkable advancements in the Sullivan Mine, the outstanding occurrence of the period was the demonstration of a satisfactory process of treating the lower grade ores of the Rossland Camp—a problem that it has taken over 20 years to solve. This followed months of operating a large sized experimental mill. As a result many years have been added to the life of the Rossland Mines.

Another important incident of the period was the improved practice brought about in the concentrating mill at the Flourspar property, in consequence of which a product of the highest grade can be turned out, and also the lower grades can be produced more uniformly and economically.

The copper refinery is being enlarged to a capacity of 50 tons per day. A rod mill of the same capacity is being installed.

These extensions are necessary to take care of the concontrates of the Canada Copper Corporation, shipments of which will begin in the coming summer. Three Dwight & Lloyd sintering machines are being provided to treat these concentrates prior to the main smelting operations.

S. G. Blaylock, general manager, in a more detailed report makes the following statement:

Copper Plant: The main source of supply for this plant is the company's Rossland property. Owing to the very high cost of operation and the small available tonnage of ore sufficiently high in grade to offset this cost, it was not considered advisable to mine a large tonnage at Rossland. Mining operations, therefore, were conducted on a very small scale and only one copper furnace, was operated at the smelter. While the tonnage was so small that both mining and smelting costs were high, the metallurgical recoveries were the best that have ever been obtained in the smelter, and tonnage considered the costs were very low.

Lead Plant: Most of the ore treated came from the Sullivan Mine and consisted of crude ore or zinc plant tailings, but there was an insufficient supply of ore, a condition that will be remedied when the new Sullivan concentrators have reached the point where they can provide the required lead tonnage. There has been much improvement in the class of customs ore received, shippers taking more care to eliminate the zinc from their lead concentrates. The metallurgical work of the lead plant has been much improved, this year's work, considering the analyses of the ore treated, being better metallurgically than that of any of the last 10 years.

Zinc Plant: Owing to the delayed completion of the magnetic concentrator through non-delivery of machinery, the cost of production in this plant did not decline as had been expected. The cost was increased too through the raw ore dropping in grade owing mainly to the shortage of labor at the mine. The magnetic concentrator is now completed, so that much lower costs and higher production should prevail.

Copper Refinery: Improved methods have been introduced and better practice prevails. The product is now admitted to be thoroughly high grade and most suitable to the trade. The present capacity (20 tons of refined copper per day) is being increased 50 tons of refined copper per day, to take care of the production of the Canada Copper Corporation under a contract with that company.

Lead Refinery: This plant has continued to turn out its uniformly high grade product, and has shown marked improvement in costs, which are now well below the costs of a Parkes' Process Plant operating on the same tonnage.

Gold and Silver Refinery: The gold and silver refinery has been practically rebuilt, and is now thoroughly up-to-date.

Zinc Lead Ores: A floatation mill of 200 tons daily capacity was run for several months on the low grade Rossland ore. This mill proved beyond a doubt that the Rossland ores can be concentrated at reasonable cost and with good recoveries. Plans are well underway for a concentrator to handle 1,500 tons of Rossland ore daily.

Research Department: This department is a very important factor in the development of new processes and improving old methods, and has done much good work during the period under review.

Mining costs have been affected by the low tonnage produced in the same manner as the reduction plants. While the developments in the Coast Copper and Sunloch properties have been very satisfactory, probably the most gratifying thing has been the actual opening up of the ore bodies on the lower tunnel level of the Sullivan Mine. The ore opened up here while slightly different in charactr, is richer and larger than anyone expected, and assures even greater tonnage in this tremndous ore deposit. The tonnage developed at this mine easily justifies the building of a concentrator of from 2 000 to 3,000 tons of ore per day. The erection of such a plant at the mine will make great savings in freight, besides which the operation on such a large scale will greatly lower the cost of production. Another advantage derived from a mill of this size will be that it will insure a sufficient supply of lead concentrates to make a very substantial lead production.

Flourspar: The opening of the Rock Candy Mine and the building of a concentrator at that mine has added a new industry to the list. The company are now able to supply practically any grade of flourspar required in the trades.

THE COLLIERIES

The production of British Columbia collieries for the month of March follows:

CROWS NEST PASS

	Tons
Crow' Nest Pass Coal Co., Coal Creek	27,090
Crow's Nest Pass Coal Coal Creek	
Crow's Nest Pass Coal Co., Michel	21,529
Corbin Coal & Coke Co., Corbin	10,116
Total	58,735

NICOLA-PRINCETON

Fleming Coal Co., Merritt	3,344
Coalmont Collieries, Coalmont	81
Princeton Coal Co., Princeton	993
Total	4,418

VANCOUVER ISLAND.

Canadian Western Fuel Co., Nanaimo	55,769
Canadian Collieries (D) Ltd., Comox	32,587
Canadian Collieries (D Ltd., Extension	19,277
Canadian Collieries (D) Ltd., South Wellington	7,219
Pacific Coast Coal Mines Ltd., Wellington	10,338
Nanoose Collieries, Nanoose Bay	1,849
Granby Consolidated Mining & Smelting Co., Cassidy	17,566
Total	144,595

NORTHERN BRITISH COLUMBIA

Telkwa Collieries, near Prince Rupert	200

Coal deposits situated on the North Thompson River near Kamloops City are being developed. Drilling is to be undertaken and those interested state that the necessary capital is avilable to open up a mine and put it on a producing basis. This is to be done as soon as the preliminary work now underway is complete. Chu Chua Coal, as it is termed has been tested out for efficiency as against the product of the Province of Alberta and the terms given indicate that it is of first class quality. A good market is looked for in Kamloops and among the different metal mines of the district.

The Settlers' Rights Act of 1920, passed at the last session of the Provincial Legislature, is not likely to receive the sanction of the Lieut. Governor, who has re-

fused his signature to the measure. This, it is presumed, he has done on advice of the Dominion Government authorities. The result is that settlers within the E. and N. Railway Belt, Vancouver Island, will not be permitted further time in which to make application and receive provincial title to the coal under their lands on proving the validity if their claims This is the third time that the federal administration has refused to assent to like legislation passed by the Legislative Assembly of British Columbia.

GEOLOGICAL SURVEY PLANS EXTENSIVE FIELD WORK IN BRITISH COLUMBIA DURING SUMMER.

Despite the reduced condition of the personnel of the staff of the Canadian Geological Survey Branch, Dominion Department of Mines, there will be more parties in the field in British Columbia this summer than for years past. Charles Camsell, in charge of the Geological Station of this Province, who returend from Ottawa a few days ago, has made this announcement. While the proposed distribution of the work planned has not yet been formally approved, it is confidentially expected that parties will be sent out as indicated below:

Portland Canal District, with particular reference to the Salmon River section, of which so much has been heard of late.

Eutsuk Lake Country.

Taseko (Whitewater) region. Here discoveries have been made of Hematite and Limonite ore on which W. M. Brewer, provincial mining engineer, has reported favorably. If. Mr. Brewer's findings are confirmed it is figured that the deposits will have an important bearing on the question of the establishment of an Iron and Steel Industry in British Columbia.

West Coast of Vancouver Island.

Coquitalla Valley, from Hope to the Summit.

Lardeau and Windermere Districts. This examination, it is stated, has not been definitely decided upon but is under consideration.

Fraser River Delta Country.

In addition to these two parties are going into the field which do not come under the jurisdiction of the British Columbia Geological Station, one into the Peace River District from Hudson's Hope to Mount Selywn and the other into the Elk Region, the latter's object being the investigation of coal deposits.

Topographic parties are slated for the districts of Alice Arm, Eutsuk Lake, Cariboo and Barkerville, Teseko District, and Vancouver and Fraser Delta.

It is assumed that the attention this Province is to receive is the result of the keen interest taken in the work of exploration in the Canadian West by Mr. Camsell as well as the fact that Hon. Wm. Sloan, Minister of Mines, at the last session of the Provincial Legislature made a fervid plea for the maintenance of the high standard of service set by the Canadian Geological Survey.

PORT ARTHUR NOTES.

J. J. O'Connor.

A party of men left May 6th for Silver Islet, in charge of R. C. Jamison of Duluth, Minn. and J. D. Lamont, of Virginia, Minn. with mining supplies and equipment, including a large smokestack, and material for the erection on the Islet of a bunkhouse for the men.

Such of the old buildings as are still available will be put in repair for use in the new operations. One structure, built of logs in 1870, is still intact, with walls in good condition. Very little will have to be done to the shaft house to put it in condition for use.

The work of unwatering the mine, will begin soon as the necessary surface preparations can be completed.

The Silver Islet Syndicate have under option, and are now carrying on operations on the following old properties in the Port Arthur district; East End Silver Mountain (Shuniah Weachu), West End Silver Mountain, Badger, Porcupine, Porcupine Jr. and Rabbit Mountain mines. The option requires the expenditure of a fixed sum per month, on this group of mines. The expenditure so far, has met the option requirements, up to June 15th next.

The Prince Location Syndicate, composed of Montreal and Boston gentlemen, are about to undertake a careful exploration of the "Prince Location", comprising 6400 acres situated in the township of Blake, on the shore of Thunder Bay. This was the first mining location staked and patented on the Canadian shore of Lake Superior. A Crown patent was issued to the late Colonel Prince, for this location in 1846. It was located for copper, and was operated during a part of 1845, and the whole of 1846. Men and supplies were brought from Montreal by batteaux, up the Ottawa and French Rivers, the Sault River and Lake Superior. Three men left in charge of the property during the winter of 1846-47 were never afterwards heard of. In the spring of 1847, a body was found on what is now known as Deadman's Island, and was supposed to be the remains of one of the party. From this incident the Island was named.

MANITOBA LETTER

Experiments are being made between Winnipeg and Selkirk with wireless telephony. These are being carried out under the supervision of Prof. R. C. Wallace, and with a view to installation of necessary equipments chiefly between Winnipeg and the Rice Lake District, and between Le Pas and the Northern Manitoba mine areas which at present have no method of quick intercourse, and, at this season of the year, are absolutely cut off from all means of rapid communication. Just now, and for a few weeks to come the lakes will be frozen and the trails fit for neither winter or summer travel.

Prof. Wallace is conducting these experiments with the object also of having any installations controlled and operated by the Government. In the abstract, this is all right—but from a matter of fact point of view, it has this objection, i.e., the Provincial Government does not own its natural resources, and therefore has little incentive to go in for much expenditure even though the enterprise would be largely commercial. So we cannot look for rapid action along this line, and it is understood that no assistance would be given to corporations to install privately controlled commercial plants.

The Rice Lake district has been added to the territory over which Prof. R. C. Wallace acts as Government Commissioner. This is good news as the Professor is not only conversant with his new territory, but entertains a kindly interest for it as a prospectively rich part of the new mining areas which have recently attracted so much attention in and to Manitoba as being other than a strictly agricultural Province.

Comparatively little news is available of activities at the various mines East of Lake Winnipeg. Travel in or out is at a standstill. Navigation on Lake Winnipeg itself will not be earlier than the first week in June, as the ice is extraordinaryily thick this year—being from 5 to 6 ft. in most places. The late spring, with the steady northerly winds of the last month has resulted in keeping the ice very firm.

While the summer trip to Rice Lake will, this year and from now on, be comparatively easy, those contemplating the journey this summer will be well advised to arrange for canoes before reaching Hole River. It is almost impossible, at the present time, to secure the proper kind of canoe in Winnipeg, and all canoe manufacturers seem to be well sold out of freight canoes far in advance. In all probability the Gabrielle Mines, Ltd., will arrange this summer to have a small launch on the upper Hole River which will be available for a limited freighting service. With the new Government wagon road complete it will not be a difficult matter to take in two or three tons of supplies on one trip, as the matter of portaging will very soon be eliminated.

An effort is being made in Winnipeg to offset any further attempts at "brokers" mining booms and the wildcatting of mining stocks. Just recently the management of the Winnipeg Stock Exchange decided to allow the members of the exchange to trade in several of the Rice Lake and Le Pas mining companies' stocks. These will be quoted in the unlisted section. To date development stock of the following Manitoba mining companies can be quoted:—Gabrielle, Northern Manitoba Mining & Development, Bruce Consolidated, Northern Copper and Nickel, Boulder, Pan Extension, Gold Pan (8 p.c. pref.), Marigold and Golden Vein. No activities as yet have been evident as far as exchange trading is concerned, as most of the companies still have development stock available from treasury sales, but it is expected that, in the near future mining stocks will be quite active as progress reports are forthcoming from the camps, and the Winnipeg Stock Exchange taking hold of the situation in time may prove a most desirable feature in mining speculations and invesments.

FIFTEEN RESIGNATIONS FROM GEOLOGICAL SURVEY.

The staff of the Geological Survey Branch of the Canadian Mines Department faces the season of 1920 very much thinned, and no doubt to a large extent disorganized, because of the failure of the Dominion Government to provide in the year's estimates for increases necessary to bring the salaries of these technically qualified civil servants to an acceptable standard. Many did not wait to learn what the authorities intended to do during the Season now in progress but took advantage of offers from private companies for service in various parts of the world. Those who did hold their positions expecting consideration are reported to be far from satisfied and some have since given clear evidence of their feeling by submitting their resignations. A list of those who have left the Canadian Geological Survey recently follows:

Name and place of Geological Work	Approximate length of Service Years
S. J. Schofied, British Columbia	15
L. Reinecke, B. C. and Quebec	13
J. J. O'Neill, B. C. and Arctic	12
H. C. Cooke, Quebec	16
M. Y. Williams, Ontario	14
B. Rose, B. C. and Arctic	12
O. A. Hayes, Eastern Canada	12
E. L. Bruce, Manitoba and B. C.	12
B. R. McKay, B. C. and Ontario	12
W. Wright, Eastern Canada	13
F. Alcock, Manitoba	10
V. Dolmage, B. C.	8
J. Stewart	10
W. E. Cockfield, Yukon	8
M. F. Bancroft, B. C.	10

GOVERNMENT ASSISTANCE REQUIRED FOR ONTARIO IRON-ORE MINING

By J. J. O'CONNOR

To prevent the iron ore situation becoming as acute as the fuel problem is today, Canada should take immediate steps to provide against such a contingency. A leaf should be taken from the book of experience now being written on the richest iron ore range in the world, the Mesabi range in Minnesota. On this range, and on the contiguous ranges of Vermilion and Cuyuna, there are many millions of tons of the highest grades of iron ore, ready at hand, susceptible of being mined by the cheap steam shovel method, yet millions of dollars are being expended in the erection and equipment of beneficiating plants, for the treatment of their low grade ores.

The experienced operators of the Minnesota ranges are quite well awere, that with an annual consumption of sixty million tons, the high grade ores must necessarily be exhausted within a comparatively short time, and, therefore, are preparing for the time when their low grade ores must be drawn upon for the nation's supply.

The percentage of treated ore being shipped from the United States Lake Superior mines, is increasing annually. Washing plants, crushing plants, and concentrating plants are being installed at many of the mines, for the conservation of ores, that a few years ago were not considered mechantable.

The huge plant now being erected at Babbitt, (formerly Argo) Minnesota, by the Mesabi Iron Co., is the most outstanding example of what is being done in this direction. This company have expended $750,000 in the operation of a testing plant at Duluth, and in the acquiring of iron lands on the eastern Mesabi. The operation of their pilot plant at Duluth, has amply demonstrated to them, the commercial feasibility of the undertaking, and has cleared away all doubts of the success of the enterprise. They are now erecting at Babbitt, a concentrating and sintering plant, the first unit of which, is to cost $3,000,000. This plant, will have a capacity for handling from 3,000 to 4,000 tons per day. The operations of the Mesabi Iron Co., are under the immediate direction of Mr. Dwight E. Woodbridge, M.E., of Duluth, Minn., a gentleman of long experience in the mining, handling and treatment of iron ore, on the Minnesota ranges. This company is not rushing into this vast expenditure, without having proved their theory of beneficiating the low grade magnetites of the eastern Mesabi.

The knowledge gained by these experienced operators, in the treatment of low grade ores, should be an object lesson, as to what may be done with our own

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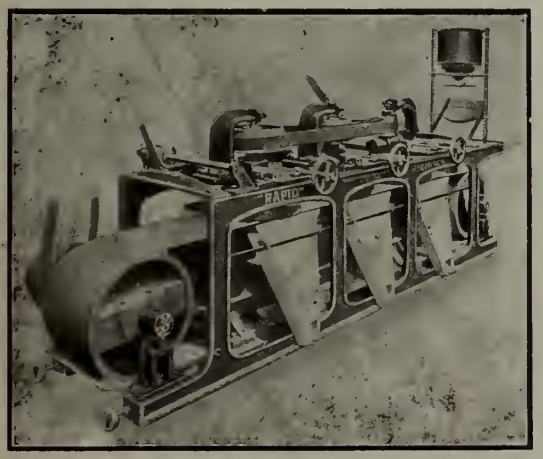

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ores. It shows that it only needs capital and enterprise to make of our iron deposits, real nation builders.

The chief disadvantage our own ores are under is the easy accessibility of United States Lake Superior ores, so long as these ores can be imported free of duty, and at low freight rates, just so long will our own ores be neglected. Added to this ease of import, is the fact that practically all Ontario ores must go through some form of treatment. If the cost of this latter handicap were overcome, it would be plain sailing for Canadian ores. Capital would be induced to invest in the development of our iron deposits, and make Canada independent of imported ore.

Already retaliatory legislation has been asked for at Washington, in the matter of news print. If the retaliation should take the form of an embargo on the export of United States iron ore, where would Canada be? This matter is so serious, that it invites the immediate attention of the Federal Cabinet, Members of Parliament, and all public bodies, to the end that the present situation may be remedied, and Canada made independent of foreign ore.

The remedy may be found in governmental aid to iron ore operators, to the extent of the cost of treatment necessary to place our low grade ores on a parity with United States ores. There can be no division of interests in this form of assistance, the benefits would be widespread and beneficient to the whole people. The iron industry is just as basic as agriculture, just as necessary in the building up of a great country, as the latter. No word of criticism has ever been heard, in or out of parliament, against the government aid given to agriculture. No class in the community would benefit more largely, through government aid to the iron ore industry, than the agriculturists, through increased markets, better prices, and cheapened implements.

The shipbuilding industry, so necessary to an exporting country, would be very largely benefitted, and enabled to compete successfully with foreign yards. Canada is, and must be, an exporting country, therefore, to reap the full benefits of our exports, we must have ships, whether privately or government owned. We are as much a maritime country as Great Britain, and relatively, just as much interested in shipping, anything that will encourage ship-building, to the extent that government aid to iron ore would do, should have the support of every Canadian, whether he be a resident of the prairies, the metallic fields of northern Ontario, or any of our commercial centres.

THE CANADIAN EXCHANGE PROBLEM.

By GEORGE E. ROBERTS, Vice-President National City Bank.

(From an address before the Merchants' Club of Boston.)

The exchange problem is usually more or less obscure to any one who is not intimate with it, but the principles are very simple. I might illustrate them by the situation between this country and Canada. If the payments both ways were equal, the drafts drawn in each country on the other would meet in the clearing houses and offset and cancel each other. But this country sold to Canada last year nearly $300,000,000 worth of products in excess of Canada's sales to us. Canada must pay this balance. There is a balance in favor of Canada in her trade with Great Britain, and ordinarily Canadian bankers would draw on London and sell the drafts in New York to setttle the account with the United States, but part of Canadian exports to England were for credit and did not provide a cash balance.

In normal times, when the balance is first one way and then the other, bankers might ship gold from their reserves to make the settlements, but the total gold reserves of Canada are less than $200,000,000, and under present conditions they might be all drained away, taking the foundation from under the whole banking credit situation. And so the Canadian government has placed an embargo upon exports of gold.

Under these conditions, the demand in Canada for means of remittance to the United States is greater than the supply, and this results in competition which has sent credits in the United States to a premium. From this side of the situation, we say that Canadian exchange is at a discount; in Canada they say that exchange on the United States is at a premium.

In the fall of 1918 the premium on American drafts in Canadian cities was about 2 per cent. In the spring of 1919 it was about 3 per cent; by November, 6 per cent, and now it is about 15 per cent. That premium amounts to an open public offer for any one to come forward and provide funds in the United States. It is an inducement to those who have the means of creating credits here to do so. A resident of Canada who owns American securities, or any securities that have a market in this country, may sell them on this side of the line and realize a premium of 15 per cent above the selling price by selling his New York draft in the Canadian market, and the same is true of the Canadian producer of any kind of goods which are saleable in the United States. The exporters of pulp and paper from Canada to this country are making handsome additions to their profits by means of the premium on exchange.

It is not a situation created by bankers or that can be cured by bankers. It is due to the one-sided state of trade. It is not a reflection upon the credit of Canada or upon the money of Canada. I read the other day of an interview with a prominent public man in Canada, a parliamentary leader, who spoke rather bitterly about the discount on Canadian exchange. He said that he would not buy anything from a country which did not accept Canadian money at its face value. That was a rather ill-considered remark. We recognize and continue to accept the Canadian gold dollar as an own brother to our dollar, but the Canadian paper money was never intended to circulate in this country. We cannot use it here. We cannot pay wages with it. We cannot pay taxes with it, and that is one of the principal uses of money nowadays. We cannot pay debts with it. The banks cannot use it in their reserves or pay it out, and merchants cannot have it. We have to ask them to settle with something we can use, and it is the competition among themselves for means of payment which makes the premium upon exchange. Moreover, it would not be desirable to have paper money issued in Canada enter into free circulation here. It would not be sound from the Canadian standpoint, for it might lead to undue inflation of the currency.

The situation is not pleasing or advantageous to us, for it is a barrier to our trade. It makes American goods cost more in Canada. We hear daily from our customers who are having trouble in holding their Canadian trade. Some of them say they cannot hold it; some of them are dividing the cost of exchange with their Canadian customers; some of them have

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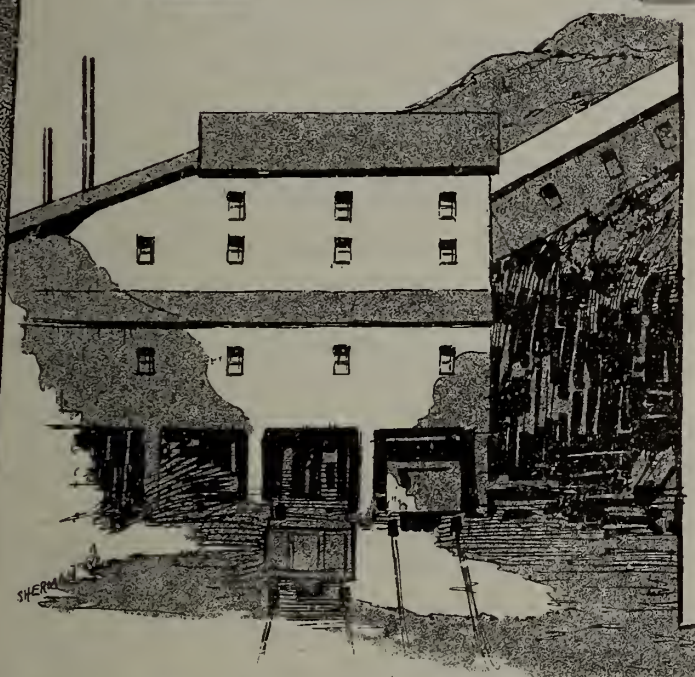

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been taking their pay in Canadian funds; that is, checks on Canadian banks, and some have been converting their funds into Canadian investments, which is all right if they are able to spare the capital from their business. I had a talk a couple of months ago with the treasurer of an important corporation, who said that he had $2,000,000 in Canadian banks. He said: "We did not want to bring it home last spring when the discount was 3 per cent, we did not want to bring it home when it was 6 per cent, and we do not want to bring it home when the discount is 10 per cent." I suspect it does not feel any better with the discount at 15 per cent. He wanted to borrow against his Canadian balances. He said: "I am getting my working capital tied up in Canada." And I said: "Yes, and now you want to get our working capital tied up in Canada." That is something which has been going on to an extent which we can only estimate, but undoubtedly our exporters, not only to Canada, but to Europe, have been taking pay in foreign funds which are not realizable at present, and borrowing of their bankers to replenish their working capital. That is one factor in the rise of bank loans in the last year.

There are always people at such a time coming forward with remedies and so all sorts of arrangements are proposed now. An international currency, an international clearing house, an internatioal gold pool and a foreign exchange bank all have been suggested, but all these people overlook the fact that in the long run trade must be brought into balance, and these high exchanges are a powerful influence to bring it into balance. The influence is to reduce exports from the United States to Canada, and to increase exports from Canada to the United States, and that is the only real remedy for the situation.

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EDITORIAL

Canada's Coal Supply

Commenting on the paper prepared by the Editor for the recent meeting of the Canadian Mining Institute in connection with the coal supply, the "Colliery Guardian" of London remarks: "A thriving "country such as Canada cannot face the future with "any serenity if it is unable to provide for a growing "consumption of fuel. . . . . Happily, relations be- "tween the peoples of Canada and the United States "are very cordial, but the latter country has often in "recent months found great difficulty in supplying "the demands of its own population, and, at the same "time, is stirred by the compunction that it has obliga- "tions to assist by large contributions of coal in the "industrial rehabilitation of Europe. Under these "circumstances, we can conceive that the feelings of "the patriotic Canadian are not very dissimilar from "those of our French Allies at the prasent time."

We are afraid that the bulk of the Canadian population has never bothered to think out the fuel problem of Canada, except insofar as attention is forcibly drawn to it by the constantly increasing price of fuel. Neither do we think it will entail any great strain on the coal resources of the United States to supply both this country and Europe with coal. The difficulty of coal supply in North America is at least seventy-five per cent a difficulty of transportation, complicated and exaggerated by seasonal demand. There is no shortage of coal in the ground, neither in Canada or in the United States. Our neighbors come first, and we come second in possession of the coal reserves of the world. These remarks apply to bituminous coal but they require much qualification. In the case of anthracite there is a decided shortage, as was clearly pointed out by the article on the anthracite supply available to Canada that appeared in our issue of 2nd April. There is every likelihood of decreased supply and increased price of anthracite to Canadian consumers. It will shortly be a luxury for the rich alone, and we should indeed be facing calamity were anthracite so indispensable as it is popularly supposed to be.

Under these circumstances, and in face of the greatest demand for Nova Scotia coal that has been known in the Maritime Provinces, Quebec and a portion of Ontario, it is surprising to know that no attempt is to be made during the present season to bring Nova Scotia coal into the St. Lawrence market. There are certain passing reasons that justify this condition, the chief being that the Nova Scotian collieries are producing so little coal that they cannot do more than overtake the local manufacturing and domestic demand, and the bunker and export trade that is at the present time so brisk. The present attractiveness of the export market to coal operators on the Atlantic Coats, or having access thereto, is not to be gainsaid, but it upsetting to all pre-conceived ideas regarding the Canadian coal trade to read in the "Financial Times" a statement attributed to a gentleman who is associated with the promoters of British Empire Steel Corporation, as follows: "We—the Nova Scotia coal operators—have been for some time convinced that the markets in the central and western provinces are practically lost to Nova Scotia coal and steel..... the years of the war have given almost complete control of the St. Lawrence market to dealers in American coal." This expresses a complete reversal of the policy of those who directed the affairs of the Dominion Coal Company until it became as important a transportation agency as it was a coal-mining enterprise, and until it possessed loading plants at the mines and discharging plants in the St. Lawrence River that exceeded in speed and efficiency, and in low cost of handling, any coal transportation system in the British Empire. To imply that because through Admiralty requisitioning of coal freighters during the war period and because of shortage of miners occasioned by enlistments and the stoppage of immigration, United States' coal controls the St. Lawrence market and that this market cannot be regained, is a counsel of despair which the circumstances do not warrant. There is an immediate and pressing home market at St. Lawrence ports for not less than three million tons per annum of Nova Scotia bituminous coal. Any reversal of policy which implies that Nova Scotia coal is henceforward going to look to Europe and South America for its markets, and that the provincial operators are prepared to consider the Montreal market as the exclusive possession of United States' coal operators, will have the most dangerous consequences.

The coal reserves of Great Britain are estimated at 189,533 million tons. Those of Nova Scotia are estimated at 9,718 million tons. The total reserves of Europe are 784,190 million tons or over eighty times greater than the reserves of Nova Scotia. If it were

possible to extract every pound of coal represented by the ten billion tons which is approximately Nova Scotia's reserve, it would serve the coal requirement of the British Isles about thirty years. Compare the map of Britain and that of Canada, and consider the extent of the coal reserve of Eastern Canada in relation to its extent and expected population with that of Great Britain, and it will be speedily apparent that, unless Canada wishes to become a satrapy of the United States, it must look to Nova Scotia to provide the coal that is an indispensable requisite of national independence. Nova Scotia, so far as its coal resources are now known, contains 0.7 per cent of the coal reserves of Canada, and it is the only supply that Canada can call her very own in a territory that contains eighty per cent of the population of our country.

The dependence of Europe on America for coal is at this time very impressive, but it is only a passing phase. Europe contains great stores of coal, iron, potash, sulphur, lime, salt and timber, the essential raw materials of modern industry, and, though its present political position is a precarious one, the trained technical workers and scientists of Europe still exceed in numbers and are not less intelligent than their contemporaries on this side of the Atlantic. It is only a matter of time until Europe will recover. Recovery may take years, but it will come, and those who should exchange the policy of developing a home market for Nova Scotian coal for an export market will find that they have exchanged substance for shadow.

If coal is a first necessity of nationhood, and after 1914-1920 there can be little question about it, then the coal of Nova Scotia, and in particular the coal of Cape Breton Island, is a national asset of far greater importance than all our gold and silver mines, because it is a guarantee of national independence, and it should be so used and regarded at all times.

MINING CORPORATION OF CANADA TO PAY GREATER ATTENTION TO CANADIAN DEPOSITS.

The annual report of the Mining Corporation of Canada strikes a cheering note when it states its general policy to be "to lessen its field activities at great distances from headquarters, and pay more attention to possibilities nearer home." It is not the desire, or purpose, of the "Journal" to criticise the extension of the activities of Canadian mining companies to distant and foreign fields, but the number of such far away actvities, and their tendency to increase, causes doubt regarding the future of such districts as Cobalt and Porcupine, as it is very well known that the large mining companies whose original activities have centred in these fields have the very best knowledge of the prospects that are as yet undeveloped. When they therefore choose to re-invest in other fields it suggests that these prospects have been found uninviting. The publicly announced policy of the Mining Corporation, in pleasant contrast, suggests the opposite, and to that extent is encouraging. It is a little too soon yet to regard Canada as holding out no further attractions to development companies.

HYDRAULIC STOWING.

In this issue will be found a paper read before the Glace Bay Meeting of the Mining Society of Nova Scotia by Mr. Walter Herd, the Mining Engineer of the Dominion Coal Company, dealing with the applicability of hydraulic stowing to the winning of the undersea coal areas off Cape Breton Island. Mr. Herd has confined his discussion to that portion of the undersea coal area lying between the 200 and 800-ft. cover line, the most accessible, and therefore the most important part of the submarine coalfield. Mr. Herd did not discuss the applicability of hydraulic stowing to the recovery of pillar coal under the land, nor the extension of the system to the undersea coal lying beyond the 800-foot cover line, but some very interesting possibilities suggest themselves in both connections.

It may be forecasted that beyond the 800-foot coverline we shall see extensive winning of the undersea coal by adoption of the longwall method of extraction, assisted possibly by such application of hydraulic stowing as may prove possible when that point is reached. The conveyance of solid stowing material by water in seams of small inclination will present difficulty, and may even lead to the establishment of underground crushing plants near the goaf areas requiring to be stowed. That, however, is a very long-range forecast, but we may look for experiments on a large scale in hydraulic flushing in inshore undersea workings that will lead to a development of a local technique suited to local conditions. Mr. Herd's paper probably will be looked back upon as marking a definite break with hitherto accepted methods of extraction in the Cape Breton coalfield. The greater adoption of longwall mining in this district, both in land and sea areas is a certainty. The reluctance of the local miners to engage in this form of coal extraction will be gradually overcome, as it becomes increasingly evident that thorough-going adoption of the longwall method offers about the only possibility of profitable mining of the undersea coal.

It is of interest to know that the iron-ore workings at the Wabana Mines are also being laid out with a view to the adoption of hydraulic flushing should it seem advisable at a later date.

Mr. Wilson is an unfortunate phrase-maker. That "panic-stricken Navy" is a term which will survive, and it will be surprising if it is not adopted by the British Navy as a nickname, much as the Army adopted the Kaiser's phrase, and became the "Contemptibles."

"WHOM THE KING DELIGHTS TO HONOR"

The presentation of the Czowski Medal at a recent meeting of the Engineering Institue of Canada to Messrs. Phelps Johnson, G. H. Duggan, and George F. Porter, in recognition of their brochure on "The Design, Manufacture and Erection of the Superstructure of the Quebec Bridge" which merited the award as being the best contribution to engineering literature of the year 1919, raises some interesting considerations. The engineers who have been so rewarded by their fellows do not require the congratulations of others, but this periodical desires to commend those who made the award, and undertook, in so doing, to name the Quebec Bridge as "the greatest engineering feat of the century." The reason we venture upon these remarks is that we believe that men who achieve success in the arts of civilization should be privileged to receive the commendation of others than their fellows, and that the accomplishment of engineering work of the outstanding character of the Quebec Bridge should be signalized by honor from that source, which in our guileless and archaic fashion we believe to be the fountain of honor in the British Empire, namely the King. Either that, or Canada should provide some means by which honor can be conferred upon her eminent citizens, (other than those circumscribed—although highly prized honors—that proceed from incorporated societies with specialized scope) through which the desire of the people to honor some chosen person may be expressed.

The resolution adopted by the Canadian House of Parliament requesting the King to confer no further honors upon Canadians meant, in fact, that Canada no longer looked upon the King and his advisors as the source and fountain of public honor. That, presumably, is a course of action well within the rights of the Canadian Parliament, but the good taste, not to say anything about the wisdom of the Resolution, are open to the gravest doubt. The offensiveness of the Resolution lies, to our mind, in its essential snobbishness. The ordinance was by no means a self-denying one, for, while the average parliament of a self-governing country usually contains these men who excell in shrewdness and oratory, it is also usually singularly lacking in those men whom it has been the custom to honor by public decree from the earliest times because they have contributed to the world's progress in literature, science and the arts of civilization, of which engineering is not least. The Resolution meant, therefore, in addition to its remarkable lack of good taste, that a group of persons unlikely to be made the subjects of honor for their achievments of real and intrinsic value undertook to prevent, for ever, the expression of the desire of the Canadian people to honor a worthy citizen by the conferrence of a title.

We would also submit that the conception of the office of the Sovereign as representing any other thing than the voice of the people is contrary to British ideas the world over, and there is no other way under our present institutions by which the desire of the people to signalise worth in an individual can be accomplished except through our ancient and national custom of titular honours.

There are in Canada many men who have achieved world wide recognition of their achievments in engineering, medicine, literature, and art, but, within the conception of our legislators, these men are not worthy of any distinction above their fellows.

A recent issue of the "Atlantic Monthly" contained the life-story of a Russian Jewess, who, despite excellent wages and kind treatment decided to leave Toronto, "because of its parochial atmosphere." The parish-pump outlook is not confined to Toronto, but it is unworthy to parade such a viewpoint under the guise of democratic ideals or republican simplicity.

There are men who should be publicly honored for scientific and engineering achievements, and the erection of the Quebec Bridge is such an achievement.

It has been truly said that a prophet is not without honor, "save in his own country and among his own people."

Correspondence

The Editor,
The Canadian Mining Journal.

Sir,

Regulations of the University of Toronto governing students in the Department of Mining Engineering contain the following:

> "Candidates for the degree in the department of Mining Engineering will be required to present satisfactory evidence of having had at least six months' practical experience in work connected with mining, metallurgy or geology, for which they must have received regular wages.
>
> "The time may be spent on geological survey, in ore dressing, smelter or lixiviation works, in an assay office in the vicinity of mining or metallurgical works, on any work in or about a mine other than as an office man or clerk, or in prospecting. Not more than three months on geological surveys will be accepted, and prospecting will only count one-half (i.e., four months' prospecting will be counted as two months) and must not be submitted for more than three of the six months."

These regulations which were introduced some ten years ago have met generally with commendation but occasionally I have heard adverse criticism. Within the last few weeks a number of students have gone to our mining districts and obtained work along these lines, and I suggest that the matter might be a good subject for discussion in your columns.

H. E. T. HAULTAIN.

The Suggested Application of Hydraulic Stowing to Undersea Coal Workings, With Special Reference to the Sydney Coal Field

By WALTER HERD.*

A Paper read before the Mining Society of Nova Scotia, Glace Bay, May 14th, 1920.

Introduction.

Although the hydraulic stowing of mine workings has long since passed the experimental stage and is today adopted with success in many European coal mines and in South African and Australian gold mines, yet with the exception of a few American thick seam mines the English speaking countries generally have been very slow to adopt what has proved to be the best method of filling the space left by the extraction of a coal seam so as to cause a minimum of subsidence.

History.

Hydraulic stowing was first attempted in Pennsylvania, but to Upper Silesia belongs the credit of first having demonstrated its practicability on an economic basis. Previous to its adoption in that coal field about 20 years ago, seams of 20 feet to 40 feet in thickness were being worked which caused great surface damage and there was a large loss of coal through the difficulty of taking out the pillars in these thick seams. At the same time spontaneous combustion was added to their troubles, often necessitating building off large areas of coal. Since the adoption of hydraulic stowing practically the whole of the coal is extracted with a minimum of surface damage and gob fires are almost unknown. Very much less timber is required and accidents considerably reduced.

Sydney Coal Field Conditions.

Although these conditions do not exist in the Sydney Coal Field, there is the condition of large areas of coal lying under the sea at comparatively shallow depths where it would be imprudent to extract the whole of the seam. To be more definite, this applies to seams lying under the sea and having a cover of from 200 feet to 800 feet of solid measures. Already between these depths the greater portion of the best seams in the coal field have been formed into pillars, representing at least 50 per cent of the seam left to support the roof. No doubt in the past when considerable areas of these seams remained to be worked on the land area, the loss in leaving in these pillars did not seem so apparent as it does today, when Conservation Commissions are bringing home to most of us the necessity of husbanding our natural resources. This should apply particularly to coal, which is a wasting asset. The Sydney Coal Field undoubtedly contains a large tonnage but it has not the illimitable resources popularly supported. The workings in the thicker and best seams extend a considerable distance seawards and the necessity of conserving coal suitable for metallurgical purposes is very apparent.

Recovery of Undersea Coal.

By hydraulic stowing it ought to be possible to recover the many millions of tons of coal left in pillars having 200 ft. to 800 ft. of cover. The cost of recovering all these pillars now after the lapse of many years since they were found, would in some cases be prohibitive due to the roof in the rooms having fallen and the difficulty in collecting the stowage water, and many will have to be left till coal has a greater value than it has today, but there are many pillars which could be economically recovered at the present time. However, the plea the writer wishes to put forward is not so much for the recovery of pillars which have been formed in the past as the need for guarding against a repetition of the same procedure in the future.

In the future working of seams underlying or overlying those already formed into pillars and which extend under the sea, the writer would suggest that the area in these seams down to 800 feet of cover below the sea bottom, be blocked off into panels of suitable size, which in the case of the thicker seams would be formed into pillars to be extracted as soon as the broken work in the panel is completed, the pillar coal pulled up hill to the top level and the space left stowed by hydraulic means, as shown in Fig. 1. In the case of thinner seams the panel would be worked out by retreating longwall, the space left being filled as in the case of the pillar extraction in the thicker seam.

Stowing Material.

Generally it may be stated that the economic success of hydraulic stowing depends upon the existence of suitable stowing material near at hand; to a lesser extent the distance the material has to be transported underground and the head against which the return water has to be pumped must be considered. Of all the substances tried as a stowing material, sand has proved the best, both from the point of view of cost and for forming a densely packed stowed area with a minimum of shrinkage. Less water is required to flush sand than other subsidences tried and less material is held in suspension in the return water, reducing the cost of renewal to pump parts and pipeline. Experiments in recent years have shown that in some cases a ten per cent mixture of clay with sand produces a better filling material than sand alone. This experience not being general may possibly be explained by some of the clays tried being more or less of a cement nature which would bind together the particles of sand after the water had run off. Where sand is not procurable, pit-refuse heaps, boiler ashes and granulated blast-furnace slag have been used with success. The last named material is however very hard on pipes and if of too porous a nature to be used alone. In one large European installation special quarries have been opened to supply stowing material, the whole of the stone being crushed before being sent to the mines. As high as 4,000 tons of stone a day has been sent from these quarries to the various mines they supply.

Supply of Stowing Material.

The Sydney coal field is fortunate in having within a reasonable distance of the mines an adequate supply of sand. This sand could be extracted by means of suction dredges which should work backwards and forwards across the various beaches and sand bars in the vicinity of the mines. The sand would be delivered from the dredges into railway cars for trans-

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port to the mines, or where the sand has only to be taken a short distance an aerial ropeway would probably be the cheaper form of transportation. 150 tons per hour can be economically carried by this means.

Where sand is employed as the stowing material it should be possible to extract the entire seam up to the present legal limit of 180 ft. of solid cover between the seam and the bottom with practically no risk of the sea breaking in. It is not possible to entirely replace the original seam with stowing material as there will always be a certain amount of shrinkage consequent upon the stowage drying, but at least 90 per cent and possibly 95 per cent of the excavated space is filled. It is a generally conceded fact that the better an excavated area is stowed the further is the line of fracture thrown ahead, making in the case of 95 per cent stowing a line which forms an angle of about 60 deg. with the vertical in a seam dipping one in nine. Conversely an area which is not stowed at all will make an almost vertical break to the surface. In other words, the better the stowing the further is the extension of the "draw," with of course proportionately less subsidence. Consequently the risk of the sea entering through a break with a line very little removed from horizontal is much less than through an almost vertical break.

Description of Plant.

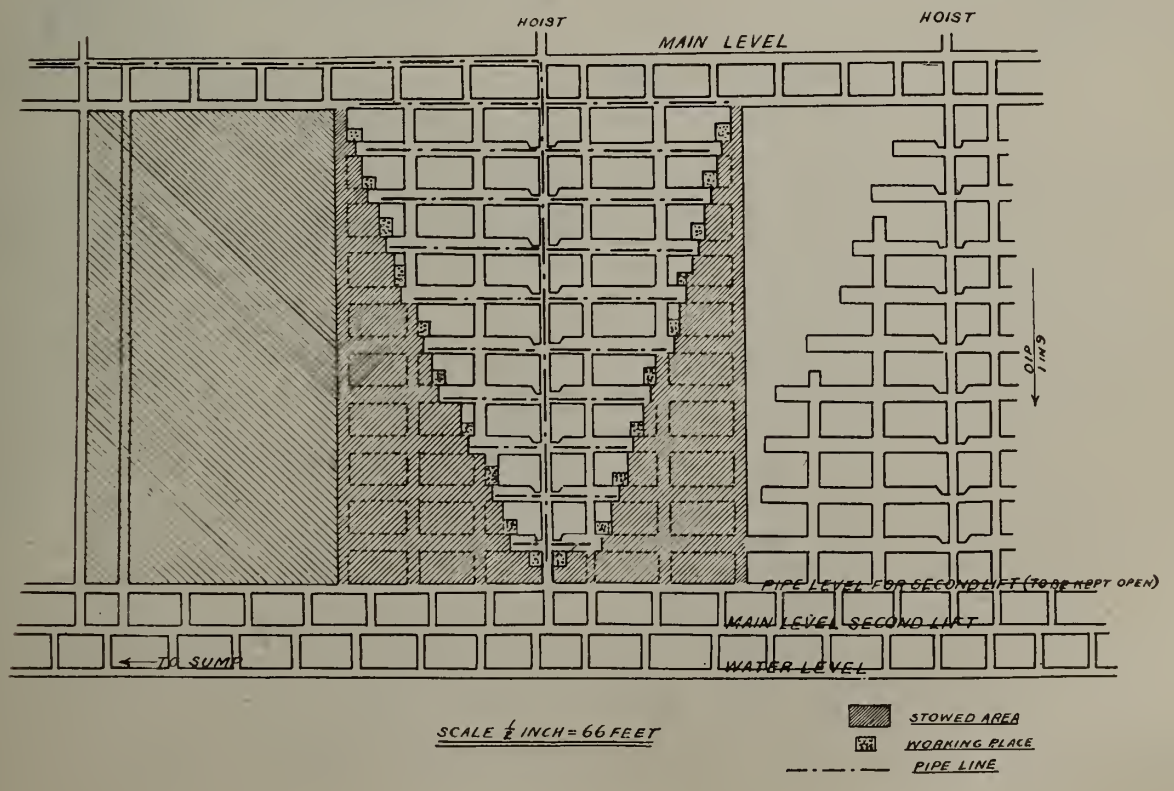
A short description of the procedure in hydraulic stowing may be of interest to those who have not seen it in use. The stowing material, whatever its composition may be, is conveyed from a storage bin by a spiral conveyor into a hopper in the shape of an inverted cone about 3 feet diameter at the top. The reason for using the spiral conveyor is that the quantity of material to be delivered can be accurately gauged to suit the water supply. The storage material is met at the bottom of the hopper with several jets of water and a little lower down the main jet enters ensuring a thorough mixture of the material with water. This water flushes the material down a pipe to which the hopper is attached. This pipe may either be placed in a shaft or slope from the bottom of which it is continued into the workings, or it may be placed in a borehole sunk close to the sea shore and as near as possible to the workings it is desired to stow. A simple arrangement is fitted on the hopper which stops the supply of stowing material should the water supply fail otherwise the pipe would fill with dry material which would soon choke it up. Branches are put in from the pipe to the various areas to be stowed and blank flanges instead of valves are used to divert the stowage to the required area.

Underground Layout.

In figure 1 the writer has endeavoured to show a standard panel formed into pillars in the usual way. These pillars are half cut and the sketch shows the panel at its maximum production. The next panel inbye is being split into pillars, the lower one being ready for extraction to replace the almost extracted lower pillar in the outside panel. These panels are designed to give a maximum output of 200 tons per day in a six-foot seam and an average output of 150 tons per day. The tonnage of sand required per panel would, due to it having a greater specific gravity than coal, be a maximum of 300 tons and an average of 225 tons per day to replace the coal extracted in pillars, but as the pillars only represent about half of the coal originally in the panel area the quantity of sand required daily will be double the figure on the average. An 8-inch diameter pipe will flush 120 tons of sand per hour under the conditions existing in this coal field, so that this size of pipe would be sufficient to store the output from two panels in one shift.

It will be observed that the stowing pipe is taken in the main level and down the headway, branches being put in to each room. The pillars are extracted

— FIG. 1. —



by a series of upward slices about 15 feet wide and when a cut is through it is immediately stowed. When a cut runs between the stowing and an old crosscut the latter should be stowed before the cut is begun.

The depth of the panel viz., 700 feet between main levels, may seem excessive in comparison to the width of 500 feet but the reducing of narrow work to a minimum has been kept in view also the fact that after a cut is through and has been stowed it will be a couple of days before the next cut can be started, as the stowage will take about that time to dry out, and a few extra places must be maintained to take care of the men n these circumstances. It will be noticed that after the first lift, three levels must be driven for future lifts, viz., a water level, main haulage-level and pipe level. The latter level is necessary to take out the pillar to the rise of main level otherwise the stowing would have to be forced uphill. Under certain conditions of good roof this level might be driven room width. For ventilation and also as a waterway it is necessary to keep open the main headway after the pillars have been extracted. It could be stowed as the pillars are extracted to a minimum width of 5 feet and left that way.

— FIG.2 —

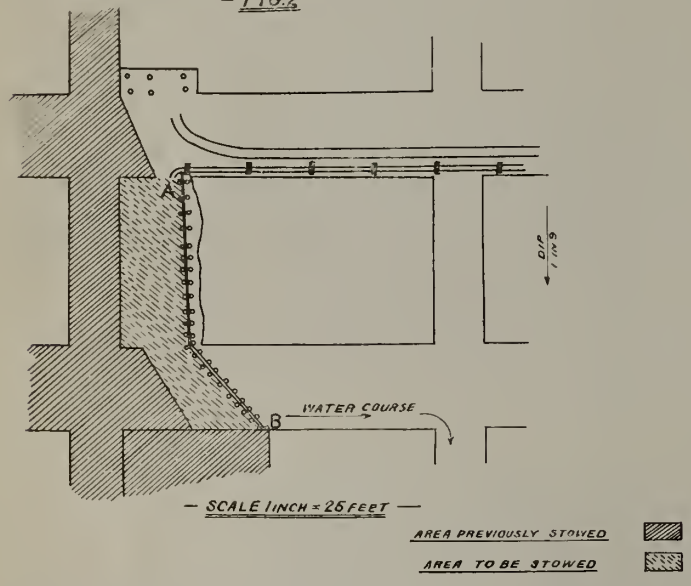


Fig. 2 shows an enlarged view of a cut-through about to be stowed. The stowing material and water pour into excavated area at point "A," From there to point "B" two parallel rows of props are set about two inches apart with 3 ft. between each couple, one inch boards are placed between the two-inch space forming a wall from roof to pavement, and this wall is backed with bratticecloth. As the stowing material and water flow into the space, the solid material gradually settles and the water drains off through the bratticecloth and spaces in the boards, leaving after a day or two, a hard compact filling, through which roadways can be driven. After a few days the props, boards and brattice are withdrawn and are ready for further use. The water will run through the various crosscuts till it reaches the water level and finally the sump from which it is pumped back again to the surface. In the case of using sand very little trouble is experienced in clarifying the water. All that is necessary is to lend it into the bottom of a wooden tank letting it overflow into the sump. The tank can be cleaned out after flushing ceases. Where material of a clay nature is used for stowing a series of silt recovery boxes would be required.

It will be noticed that the stowing is not flushed tight up against the next cut. If this were done it would not be possible to drain off the water. At the same time the leaving of a space ensures good ventilation, an open end for the next cut and the coal does not become mixed with the stowing material.

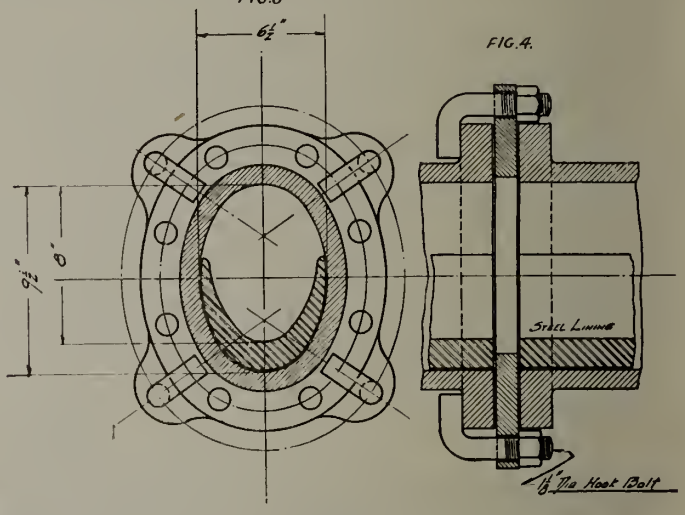
All stowing should be done on the night shift and telephonic communication established between the men in charge of stowing below ground and the surface.

Before the commencement and after the completion of stowing operations, water only, should be run through the pipes for a few minutes to make sure there are no obstructions.

Water.

The quantity of water required varies with the stowing material used. In the case of sand volume for volume is sufficient, that is 6 to 7 gallons of water will flush a cubic foot of dry sand into the workings. Twice this quantity of water would be required if material of a clay nature was used. This quantity of water is based on the assumption that no stowing material has to be forced into the workings to the rise as the water required increases very rapidly when a head is put against the stowing material.

FIG.3 FIG.4.



Pipes.

The choice of type of pipe through which to flush stowing material is a very important matter. In the early days of hydraulic stowing the cost of renewing pipes was serious, plain cast iron pipes being used which were given a periodic quarter turn to ensure even wear. Many wore completely out due to the scouring action of the stowing material before 100,000 tons was passed through them and this to some extent accounted for the scepticism with which hydraulic stowing was looked upon for a number of years. Attention was then given to various forms of liners such as earthenware, porcelain and wood all of which proved comparatively successful. The type of pipe which of late seemed to meet with the most general approval is the oval-shaped steel or cast-iron pipe fitted with a tapered steel or cast-iron liner as shown in section in Fig. 3. The diameter of the long axis is about 3 inches and the tapered liner when made of steel has a maximum thickness of one inch. These liners are made in 3 foot to 4 foot lengths and 500,000 to 1,000,000 tons of stowing can be passed through the pipe before the liner requires to be renewed. In order to prevent these liners slipping out in the event of replacing a broken pipe in a column set either in a shaft or incline, loose flanges are inserted between the fixed

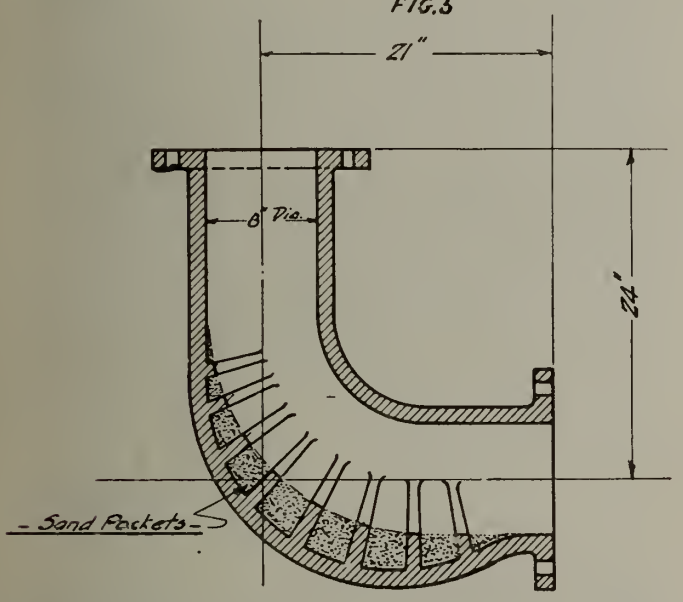
flanges as shown in Fig. 4. These loose flanges have a space area equal to the internal diameter of pipe and liner combined. Special bolts keep this loose flange fixed to the flange of the pipe above so that when the lower pipe is removed the liners are held in place.

The greatest wear takes place in bends and a simple and effective method of counteracting this wear is to have a series of ribs a few inches apart in these bends at right to the flow as shown in Fig. 5. The material collects between these ribs and protects the metal from excessive wear.

Cost.

It is often argued against hydraulic stowing that it will put a prohibitive cost on the coal mined. In some cases this would be so. Below, the writer has attempted to give an approximate estimate based on present day prices of the cost to instal a plant in this district under average conditions, also the extra cost it would put on the ton of coal produced. The estimate is based on one installation supplying two panels similar to those shown in Fig. 1, each producing 150 tons of coal per day for 200 days in the year. The writer does not consider it economically possible to

FIG. 5



continue hydraulic stowing during the winter months in the Sydney Coal Field. During this period the formation of panels could be pushed forward and in the thicker seams the pillars formed.

Cost of Average Installation.

2 Lined boreholes 600 ft. deep 8" and 6" diameter respectively	$ 7,000.00
2,000 ft. of lined piping (laid) at $2.50 per foot	17,000.00
Storage Bin, Hopper and water supply pipe	10,000.00
Return water pipe	3,000.00
Pump and Motors complete	5,000.00
Total cost of installation	$42,000.00

This, taking interest and depreciation at 20 per cent per annum entails a yearly charge of $8,400.

Approximately 1½ tons of sand will be required to replace every ton of coal taken from the panels, but at the time of stowing, in the thicker seams where the panel is first split into pillars, approximately 3 tons of sand is required. In arriving at the cost the total coal in the panel is taken.

Estimated Cost of Stowing Two Panels Producing 300 Tons of Coal per Day.

	Per ton of coal
450 Tons sand at 50c per ton = $225.	= 75c
Interest and depreciation on Plant	= 14c
Pumping	= 2c
Labour	= 7c
Total	98c

In the case of pillars already formed the cost would be practically double this amount.

This estimated cost is no doubt higher than would actually be the case in comparison with the coal won from the lower levels of the mine where hydraulic stowing was unnecessary; as, being nearer to the outlet, haulage charges and upkeep of roadways would be less, ventilation would be much simpler and more timber could be recovered. Again the pillars left are in the thicker and more profitable seams and their extraction, using hydraulic stowing, might not be actually more costly than certain seams now being worked. Also it must be remembered that these pillars will constitute an extra tonnage to the mines as presently developed, making possible an increase in output which would further reduce overhead charges, for which credit must be given.

Conclusion.

In conclusion the writer would suggest that some form of hydraulic stowing be adopted in the remaining seams to be worked under the sea down to 800 feet of cover. If this is not done then the seam could be left intact until a cover exceeding 800 feet, is reached, with the exception of driving winning places through this area to reach the coal having a cover greater than 800 feet. Beyond this cover there ought to be no danger in extracting the whole of the seam without solid packing. A Crown Lease permits of the total extraction of a seam eleven foot thick after a cover of 810 ft. is reached. It may however be necessary to carry hydraulic stowing beyond the 800 ft. cover mark, in the case of working superimposed seams simultaneously; in fact hydraulic stowing would allow of this simultaneous extraction, an operation that without it should be highly condemned, being the ruin of many mines.

The writer does not mean to argue that to introduce hydraulic stowing into the Sydney Coalfield is a simple and easy matter. There are many difficulties, but it well deserves the careful consideration and co-operation of those interested in the ultimate recovery of all the coal.

Jutland was fought in May, 1916. The United States did not come into the war until a year later. During the interval it is curious that the Germans, who had the second most powerful navy in the world, did not take advantage of the indecision and timidity in the British naval command that Washington so clearly perceived at long distance, and from a disinterested viewpoint. The Germans had the benefit of a closer acquaintance with the Navy, and were in an excellent position to judge the fighting qualities and spirit of our ships. They came out eventually, in 1918, on a piece of string.

BRITISH COLUMBIA ADOPTS MODIFICATION OF CANADIAN MINING INSTITUTE'S PLAN FOR SOLDIER PROSPECTORS.

An outline of proposals formulated jointly by the Provincial Departments of Mines and of Industries for the general encouragement of prospecting for minerals in British Columbia and in particular for the extension of aid to returned soldiers wishing to engage in that line of work is made public by Hon. Wm. Sloan, Minister of Mines.

Briefly it is intended that 25 parties shall be put in the field, each of which will consist of two men, one a practical prospector of experience and the other a returned soldier. The parties will be grub-staked and the total number for which provision is being made will be divided among the six mineral survey districts of the Province in proportion to the population of each of the said districts.

The details in connection with organization are being placed in the hands of the Resident Mining Engineers of the Provincial Mineral Districts and Hon. Mr. Sloan states that it is expected that the scheme will become operative, at least in respect of preliminary preparation for the season's work, in the course of a few days.

Following is the complete memorandum referred to:

The general idea of such assistance is not new; it was proposed by the Canadian Mining Institute over a year ago, and the scheme as then outlined in the May, 1919, Bulletin, page 521, was to send out parties under returned mining engineers, all of whom would be paid "a reasonable salary or wage," together with expenses.

Any moneys realized from sale of properties found would belong, 75 per cent to the Government, while remaining 25 per cent would be divided among the prospecting parties.

Dr. J. A. Dresser was deputed to elaborate this scheme and to lay it before the Dominion Government. The scheme as elaborated by Dr. Dresser was fully set out in the July, 1919, Bulletin, page 725. In brief, the organization consisted of a head office under a "Chief Engineer," with staff of accountant and clerks; Divisional Engineers; and with each party of four prospectors a Field Engineer. The estimated cost of from thirty to fifty parties was from $135,000 to $255,000 for the field season.

The ownership of the results of such prospecting was to be 50 per cent to the field party making the discovery and 50 per cent to be divided among the entire number of men employed.

The Government to be recouped from a royalty on output of such mines as might be discovered, but the Government having no direct ownership interest in these properties.

The memorandum indicates that this scheme was chiefly intended to provide employment for "mining engineers, miners, and other suitable returned soldiers in prospecting" rather than a direct stimulus to prospecting.

In the August, 1919, Bulletin, C.M.I., page 830, is a copy of letter from Dominion Minister of Mines, Mr. Martin Burrell, dated July 8th, 1919, in which he says: "The proposal has been definitely refused by the Department of Mines."

In October, 1919, General R. G. E. Leckie proposed a scheme which aimed, not so much at providing employment for mining engineers and miners, but rather to educate returned soldiers to become prospectors. In outline General Leckie's scheme was about as follows:—

(a) To establish in cities "Prospecting Schools or Schools of Mines," where returned men could receive instruction in prospecting, elementary mineralogy, and geology.

(b) After successfully passing the "prospecting course" these men would be formed into groups of, say, ten prospectors under charge of a more experimenced leader, outfitted with all requisites, and sent to some district selected by the Government, where a central camp would be established, from which the prospectors would radiate under supervision and control of the leader.

((c) When a discovery of mineral was made, it would be examined by the leader, who would sample it and send samples and report to the Resident Engineer of the District, and if he considered the discovery of sufficient importance, he, the Resident Engineer, would examine it and report, and might direct the whole party to do some development-work on the property.

(d) The Resident Engineer's report would then be sent to the larger exploration companies, and thoroughly advertised as for sale by tender or public auction.

The Government was expected to supply the men during schooling, etc., with a "good living." The proceeds of any sales would be divided, first, 50 per cent, to the Government; then, after deducting all expenses, the remaining 50 per cent would be divided among the men.

While both these schemes mentioned met with the general sympathy of the British Columbia Minister of Mines, neither of them seemed to be sufficiently practicable or directly to the point to meet with his unqualified endorsement.

The present need is for more prospectors in the hills, and the kind of training prospectors need, required to more nearly approach practical working conditions. Prospectors in real life do not go out in parties of ten under the control of any person; they are a very independent lot of men; the independence of the life is its very charm to them; are used to act on their own judgment, and ready to stand the consequences for better or for worse. They go out separately or in pairs, esldom more than partners.

The point desired is to offer good substantial assistance to the prospector who really desires to prospect for the chance of what mineral he may find.

With these points in view, Hon. Wm. Sloan, British Columbia Minister of Mines, has tentatively suggested a scheme only roughly outlined in the following:—

The object aimed at in this proposed scheme is to encourage prospecting in districts selected on the advice of Resident Engineers of the Department of Mines and, secondly, to create new prospectors by giving them a season's instruction in the school of practical experience under exact working conditions and under the guidance of an experienced prospector.

In extension of the present proposed scheme it would be intended to institute during the following winter a series of lectures by the various Resident Engineers, bearing on the technical and the theoretic aspect of prospecting.

The indirect benefits to be gained therefrom by the Province are considered sufficient to justify the expenditure required.

It would be proposed this season to put out twenty-five parties, each party to consist of two returned men who have been overseas. The leader to be an experienced prospector who would be in charge, and the second man a man who desires to learn prospecting.

Those selected would have to have a doctor's certificate as to physical fitness for the work. They should be vouched for as to character and willingness to work by responsible parties, and, if possible, should be recommended by one of the returned soldiers' organizations.

These prospectors would be obliged to determine to spend a definitely stated time specified by the Department of Mines, actually in the field, and at the close of the season and so often as the Department of Mines may require would be obliged to make report by affidavit giving time, places, dates, and nature of the work on which they were engaged, together with such other information as may be required of them as to the nature of the country traversed and mineral formations, etc.

The Government would undertake to provide camp equipment consisting of tent, fly, ground-sheet, blankets, cooking-utensils, and tools and incidentals, which at the end of contract would become the property of the prospectors, or in lieu of such equipment the government would contribute $50 towards the purchase of same; the prospectors to supply their own personal equipment.

Further, the Government to make an allowance, uniform for all the Province, of $1.50 for food and other expenses, etc., to each man for each day in the field, payable monthly or as might be arranged.

At the end of the season men who had served the full term of their contract undertaking properly attested to, would be allowed, to the experienced prospector the sum of $125 and to the inexperienced man $100. In exceptional cases the Resident Engineer might remit a portion of the contract time.

Further, transportation to the nearest point on transportation lines, including pack-train or boats, would be paid by the Government to men going in and coming out to starting-point. So as to bring amounts expended on transportation within reasonable limits, the Government reserves discretionary right with regard to men desiring to go to districts very distant from their starting point, in which case the Government might

offer to pay a portion only of such transportation costs.

The Government will provide each man with a free miner's certificate.

The services of Resident Engineers in the districts in which the prospectors are employed and of the assay laboratories and other branches of the Department of Mines, would be available for assistance and advice to these prospectors.

All recording fees, assessments work, etc., to be paid for by the stakers, exactly the same as an ordinary prospector, and as set out in the "Mineral Act."

The following is a tentative proposal as to disposal of any claims that might be staked:—

Any claims staked by such prospectors shall belong equally to the two partners, and be so recorded in the Record Office of the District.

There shall be recorded a first charge on behalf of the Government on such claim or claims equal in amount to sums advanced by the Government to such pair of prospectors with interest thereon at the rate of 6 per cent per annum, together with a bonus equal to the amount so advanced wtih interest at 6 per cent per annum, computed annually. It shall be payable to the Minister of Mines and shall be a first and paramount charge upon the claims as a debt due to the Crown in the right of the Province of British Columbia.

Eevery such Crown debt shall be recoverable in the manner following, and not otherwise:—

(1) By taking 10 per cent of the value of any ore or mineral or gold or silver or metal, precious or base, or coal or substance mined, won, or gotten from the premises charged;

(2) By charging and recovering a sufficient portion of the purchase price an any sale of the premises charged, provided that a sale of any premises charged may only be subject to satisfaction of the Crown debt; and

(3) By foreclosure of sale after ten years from the date of the recording of the charge.

It has been suggested that in selecting the personnel of the parties, comprising in all fifty men, these be assigned, as to their origin, to the various Mineral Survey Districts about in proportion to the population thereof.

The parties would not be restricted to the district of their origin, but could elect to go to any part of the Province, subject to the approval of the Minister of Mines.

The following rough approximation gives an idea as to how this would allot the assignment of the parties:—

Memo re Population from Health Department.

	Population	Percentage	No. of Parties
District No. 1	9,069	2	1
" 2	23,078	5	2
" 3	25,442	6	2
" 4	25,064	6	2
" 5	39,060	9	3
" 6	318,484	72	15
	440,197	100	25

DIAMOND DRILLING AT THETFORD MINES.

Diamond drilling on a large scale is now in progress at Thetford Mines. The Asbestos Corporation of Canada has let a contract for 20,000 feet of drilling to the Sudbury Diamond Drilling Co., and Mr. Fitzgerald, the president of the drilling company, has six drills in operation. A churn drill is being used in the overburden and five diamond drills are cutting cores. The drilling should give the owners of the property a much better idea of the future possibilities. There is a good demand for asbestos and the ever widening market makes it more necessary to learn what the resources or raw materials are.—R. E. H.

The President of the United States did not apparently believe in "watchful waiting" for the British Navy.

JAMES McGREGOR SUCCEEDS GEORGE WILKINSON AS CHIEF INSPECTOR OF MINES IN BRITISH COLUMBIA.

The resignation of George Wilkinson, Chief Inspector of Mines for British Columbia since early in 1917, and the appointment to the vacancy of James McGregor, senior member of the Mines Inspectors' Staff of the Province and a trusted official of many years service, are important changes recently announced by Hon. Wm. Sloan, Minister of Mines, in connection with his department.

Mr. Wilkinson, who has accepted the management of the Pacific Coast Coal Mines Ltd., succeeded Thos. Graham, now general superintendent of the Canadian Collieries (D) Ltd., as Chief Inspector. At the time of his appointment he was the manager of the Reserve Mine of the Canadian Western Fuel Company. His term of office has been marked by signal advances especially in respect of the improvement of underground working conditions. Mr. Sloan expresses regret at Mr. Wilkinson's decision, asserts that the civil service is losing a valuable member and the public a capable and loyal servant, and wishes him every success in the performance in the duties of an active mine operator.

The selection of Mr. McGregor to the important post thus vacated it is assured will meet with general approval and this applies particularly to the mining men of the Province who are familiar with his work during the twenty odd years he has been connected with the Department of Mines. Mr. McGregor is a native of British Columbia, his parents having come from Scotland when Vancouver Island was a Crown Colony. They were among the passengers by the sailing ship "Harpooner," which reached the Canadian West early in the year 1849, his father being one of a party of eight coal miners engaged by the Hudson's Bay Company to open up coal mines at Fort Rupert Vancouver Island, the first coal mining undertaking of which there is any record in western Canada.

Among the earliest recollections of the present Chief Inspector of Mines, therefore, are those of coal mines and coal miners. He grew up in the atmosphere and as a boy went to work in the Nanaimo mines, in this way obtaining a practical knowledge that has been invaluable to him in the official duties he was to perform later as an inspector in the service of the public. Ambitious to qualify himself technically for higher and more responsible position Mr. McGregor started when a lad to attend both day and night schools, obtaining by this means a foundation which later was supplemented by private tutition under the late C. C. McKenzie, formerly Superintendent of Education for the Province of British Columbia. While Overman at the South Field Collieries of the New Vancouver Coal Company in 1888 he qualified for a First Class Mine Manager's Certificate. His standing as a citizen in Nanaimo is indicated by his election in the year 1894 to represent that constituency in the Provincial Legislature. Later he was appointed to the position of Inspector of Metalliferous and Coal Mines for the Kootenays which position he still occupied at the time of receiving his present well earned preferment.

The policy of the British Navy during the war was one adopted deliberately, and its long, patient waiting must have galled Nelson's Navy to the limit of endurance, but in the Navy orders are orders. Scapa Flow was its supreme justification.

BUREAU OF MINES REPORT ON WEST SHININGTREE GOLD AREA.

The Ontario Bureau of Mines has just issued a report and geologically colored map of the West Shiningtree gold area, Sudbury Mining Division. It is the work of Mr. Percy E. Hopkins of the geological staff of the Bureau. Mr. Hopkins spent four weeks in the area last September and in spite of bad weather and the short time available for the work he succeeded in getting together much useful information.

The area mapped includes parts of four townships, Churchill, MacMurchy, Asquith and Fawcett. The properties mentioned in the report include the Wasapika, Herrick, West Tree, Saville-McVittee, Atlas, Churchill, Corona, Cochrane, Miller-Adair, Foisey, McIntyre-McDonald, Bennet, Wood, Gosselin, Buckingham, Holding, Kubick, Burke, Steep, McRae, Moore, Gibson, Moore-Macdonald, Clark, Thompson-Peterson, and McGuire.

Of these properties Mr. Hopkins says "a few have promise, but they are still in the prospect stage. Whether they will become mines or not will only be determined by further developing the veins underground and sampling the same. It is not the practice of the Bureau of Mines to undertake systematic sampling of gold or other deposits this being naturally a function of the technical or professional men employed by the property owners."

Mr. Hopkins states that the greatest development in the area has been done on the Wasapika property, but the poor transportation facilities and lack of capital have retarded development considerably. When he visited the mine in September cross-cutting at the 100 ft. level was in progress.

Tt the Herrich property Mr. Hopkins found that a shaft had been sunk 50 feet on the "Kingsley" vein and diamond drilling to test the vein at depth was in progress. At the West Tree a shaft was being sunk. At the Atlas a tunnel was being driven into a hillside, to test a vein exposed some 60 feet higher up.

Mr. Hopkins in his report outlines briefly the geology of the area mapped and gives descriptions of the several mineral deposits which he examined. He concludes from his examination that:— "The encouraging results obtained on a few properties will probably lead to mining being conducted on a larger scale. There seems no reason why the veins which have a satisfactory length and width should not extend to considerable depth. One would also expect to find the values underground much the same as they are within a foot or two of the surface, since any oxidized or weathered surface has doubtless been removed by glaciation. All the rock formations are worthy of prospecting except the diabase."

Copies of the report and map can be obtained on application to the Department of Mines, Queens Park, Toronto.—R. E. H.

SHININGTREE NOTES.

It is reported that "Tommy" Saville has sold his interest in the Saville-McVittie claims, Shiningtree, to Toronto parties for $10,000. Some work has been done recently on these properties which are now known as the White Rock claims. "Tommy" is a well known and popular prospector and guide and it is said that he and his wife were the first to discover gold in the West Shiningtree Area, though claims were staked by others a few days before they arrived to prospect an area in which the Tenagami Indians had told "Tommy" that there were outcrops of quartz. He reached Wasapika lake on his prospecting trip and found gold in a quartz outcrop at the edge of the lake on the property now known as the Atlas. It had been staked a few days previously by Mr. Jefferson. "Tommy" staked the adjoining claims and has held an interest in them for several years.

Mr. M. P. McDonald of Cobalt is at the Atlas property in the Shiningtree district. He will have charge of development work at this property and is at present engaged in making a preliminary examination of it.

The headframe is up and machinery is being installed at the Herrick mine. The early break-up made the transportation of plant difficult; but it did not prevent the accomplishment of the task. The company proposes to resume sinking of the shaft as soon as the plant is installed and can be operated. Last summer this company carried on exploration by diamond driling.

The road to Shiningtree has naturally been a rough one since the frost came out of the ground. The first 13 miles from Westree station to Boreland's is now in fairly good shape but the next six miles is bad and the last six almost impassible. There are some men at work on the road and it is hoped that a considerable improvement will be effected this summer. To as great an extent as possible the operators use the winter roads for transportation of heavy loads; but there is always some work that must be done after the snow has gone and any improvement in the waggon road is therefore much appreciated.

Those who travel the Shiningtree road this summer will be pleased to find improved accomodation at Shiningtree Lake. The "Palisade" Hotel, built last fall, is reached by stage from Westree. Bob Adair runs the place and it is proving popular.—R. E. H.

DR. SORBY OF SHEFFIELD, ENGLAND.

Pioneer of Microscopic Examination of Rocks and Metals.

At a symposium held in London, England, by the Faraday Society, the Royal Microscopical Society, the Optical Society, and the Photomicrographic Society on the design and uses of the microscope, fitting tribute was paid to the magnificent pioneer work of the late Dr. Sorby, of Sheffield. It was Sorby who first hit upon the notion of studying the structure of rocks by cutting thin slices and examining them under the microscope. In the face of ridicule he continued his experiments until he founded the science of microscopic petrography. When he turned his attention to the structure of meteorites, he found it impracticable to obtain thin sections and accordingly he developed the plan of etching a polished surface with acid and examining it microscopically under reflected light. Thus he gave birth to the microscopic study of iron, steel and other metals—a study which has been of incalculable benefit to industry. One remarkable fact about this British genius is that he did all his work in a private room in his house, with only the simplest materials. As Sir Robert Hadfield remarked at the symposium, "from the humblest of beginnings this method of research has grown into a giant."

The foregoing tribute to the late Dr. Sorby, of Sheffield is from the South African "Mining and Engineering Journal". Dr. Sorby's memory is perpetuated in the "sorbite" constituent of steel, and is also fresh in the recollections of those who remember him in his old age at Sheffield University. Dr. Sorby, among other things, was an authority on deep-sea organisms, and on Egyptology.—Ed.

THE TREASURE VAULT OF ONTARIO.

By J. A. McRAE.

From the silver and gold mines which have been developed in the district of Temiskaming during the past sixteen years, a total of $240,911,729 has been produced in new wealth. Nor does this appear to comprise more than the result of having developed what mining geologists declare to be only the southern fringe of the Canadian pre-Cambrian Shield, which spreads over the most northerly reaches of northern Ontario.

The silver production from this district up to the end of 1919, having amounted to 303,610,836 ounces valued at $182,039,972, and the gold output which only commenced in 1911 having $58,871,757 at the end of 1919, marks a commencement which compares favorably with the world's most important precious metal mining areas.

Beginning at North Bay and extending to the northward is the great Canadian pre-Cambrian Shield above referred to. It has its narrowest point at North Bay, and spreads like a giant fan to the north, north-east, and north-west, attaining a width of perhaps 2,000 miles at its widest point, where it reaches into the Arctic Circle. This great stretch of territory has been described by geologists as the vertebra of the earth. This is believed to have been a debutant of geological time, having probably been the point where earth first projected above the sea. The series of rock formations over the greater part of the area are essentially metal-bearing.

In that part of the territory already penetrated by the railway, silver and gold in lavish quantity has been found to be associated with the rocks peculiar to the region. With this fact in mind, and also mindful of how small is the area so far opened up, and how enormous is that territory which still awaits the pioneer, the careful observer cannot avoid the logical conclusion that as wherever the outer edge of this territory has been explored it has been found to contain rich stores of precious metal, so in the unexplored area there exists excellent possibilities of similarly rich stores of metal.

Silver was first discovered in Cobalt in 1903. The discovery was the direct result of the construction of the Temiskaming and Northern Ontario Railway. The veins at outcrop were exceedingly rich, but were extremely narrow—being measured in inches. Not a few experienced mining men predicted a short life for the mines that were subsequently developed. The production of 303,610,836 ounces of silver bears testimony to the inaccuracy of the early predictions. The dividend record of $81,000,000 is material evidence that the deposits have been worked with a high degree of commercial success.

As to the present, the silver mines of the district are producing at the rate of about $1,250,000 monthly. An average of about 30 mines are being operated. The important producers amount to about one-half that number. Working forces engaged total about 2,700 men, while an abundant supply of motive power is generated in hydro-electric plants located on the Montreal river, within a few miles of Cobalt. For the operation of machines, etc., compressed air is supplied by a 5,000 h.p. hydraulic air compressor plant located at Ragged Chutes about nine miles from Cobalt. The largest silver-producing mine in the district is that of the Nipissing Mining Company. This property produced 3,731,892 ounces of fine silver during 1919, thus clearly demonstrating that age has not yet impoverished the mine. The mine is rated among the leading silver producers in the British Empire.

Silver deposits in Northern Ontario are not confined to the producing area of Cobalt. Contrary to the impression often gained by visitors to Cobalt, they cover a large area. The Casey-Cobalt mine situated fifteen miles north-east from Cobalt has been a heavy producer of silver, while the Wettlaufer mine, fifteen miles south from Cobalt, produced large quantities of silver ore. In the Gowganda district about seventy miles north-west of Cobalt, the Miller Lake-O'Brien mine is located and is producing about $1,000,000 a year. The intervening territory offers abundant scope for further exploration.

The proven riches, and the enormous potentialities lend to the silver-bearing area an excellent opportunity for capital to be employed to good advantage. The high quotations for commercial bar silver offer added incentive to intensify effort in connection with the exploration for new deposits, and the unremitting operation of those already found. In addition to this, the mining laws of the province of Ontario are such as to command the admiration of all who come into intimate touch with them; while the government, fully cognizant of the added prestige arising from the possession of a basic industry of such importance, is constantly endeavoring to encourage the development of mines. To the individual or corporation actively engaged in the mining fields, the abundant reasons for confidence in the Government's mining policy is a very favorable factor. It is to this desire of the Government to at once offer encouragement as well as protection that the citizens of this country point with much pride. Actual achievements justify the expectation of even greater rewards from future prospecting and mining in the unexplored areas.

The Gold Mines.

After thus reviewing the record of the silver mines of the district of Temiskaming, and finding that, barring a slight decline caused by the labor strike in 1919, the value of the metal produced compares favorably with the average of the past decade, it is interesting to turn to the gold-bearing areas where the industry, though young, is experiencing rapid growth despite the economic strain to which it has been in common with other industries subjected to during the past few years.

The gold mines of the Porcupine district, though having only commenced production in 1910, had up to the end of 1919 produced $54,205,836 out of the total of $58,871,757 produced by the entire province of Ontario during the ten years referred to.

Perhaps the most significant feature in connection with the gold mining industry of this district is the fact that during 1919, the province of Ontario produced a total of $10.451.688 in gold, of which Porcupine accounted for $9,941,804. Both for the province as well as for the Porcupine mines, the 1919 achievement was the best in their history.

The leading gold mine in Canada, in fact the leading gold mine in the western hemisphere, is the Hollinger Consolidated Mines, Limited, located in the Porcupine field. This mine during 1919 recovered a net value of $6,722,266. It closed the year 1919 with an ore reserve estimated at $39,928,430.

The vast area over which occur gold-bearing formation has caused a significant phrase to be coined among even the most conservative mining engineers,

which is: "Northern Ontario has been scratched only."

Gold mining, while having attained leading proportions in the Porcupine district, is being carried on successfully in other localities throughout Northern Ontario. For instance, at Kirkland Lake, some sixty miles south-east from Porcupine, there are four mines which are equipped with modern mills, each with a capacity of from 60 to 150 tons of ore daily. Mining has been carried to a depth of 700 feet, the average grade of the ore for the entire Kirkland Lake camp being $11.99 a ton up to the present. This compares with an average of $9.19 a ton to date at the mines of the Porcupine district.

In the order of their importance, the five leading gold producing mines of Ontario are the Hollinger Consolidated, Dome Mines, McIntyre-Porcupine and Porcupine Crown, all four being located in the Porcupine field; and the Lake Shore, the leading property in the Kirkland Lake field. These five mines are each earning substantial profits, in the case of the Hollinger amounting to close to $2,500,000 a year net, after paying all costs and providing liberal allowance for depreciation.

Diamond drills are exploring far ahead of actual mining operation, showing no change in the geological conditions down to 2,000 feet below the surface. Conformation of this is established by mining at a depth of 1,150 feet on the Dome and the Porcupine Crown, 1,250 feet on the Hollinger Consolidated; at the time of writing, and, 1,560 feet on the McIntyre-Porcupine. In each case commercial deposits of gold ore have been found to continue, while in the case of the McIntrye-Porcupine, the gold content of the ore has increased at depth.

It is certain that but for the scarcity of labor caused by the war, the gold mining industry of Northern Ontario would be even further advanced. This is made clear by repeated statements from the mines that many hundreds of mine workers are required.

Extensive building operations, comprehensive development schemes, and a general enlargement of the scope of work throughout the gold mining districts is held in abeyance pending the time when a full quota of men will be available.

As brief but conclusive evidence of the growth of the gold mining industry of Ontario, are given in the following figures, the importance of which is that despite the economic strain experienced during 1919 the gold output actually established the highest record in the history of Porcupine, as well as in Ontario:—

Ontario's Gold Production.

Year	Total Ontario Production	Porcupine
1910	$ 68,498	$ 35,539
1911	42,637	15,437
1912	2,114,086	1,730,628
1913	4,558,518	4,294,113
1914	5,529,767	5,190,794
1915	8,501,391	7,536,275
1916	10,339,259	9,397,536
1917	8,698,735	8,229,744
1918	8,567,178	7,833,966
1919	10,451,688	9,941,804
Totals	$58,871,757	$54,205,836

Following is a summary of gold produced in 1919 from the various parts of the British Empire from which it is interesting to note that Canada was the only country to record an increase.

	1919		1918	
	Ozs.	Pds. Sterling	Ozs.	Pds. Sterling
South Africa	8,330,091	35,383,974	8,418,292	35,758,836
Australia	1,074,713	4,565,088	1,277,474	5,426,360
Canada	767,167	3,260,459	699,681	2,973,644
Rhodesia	585,700	2,499,498	624,000	2,652,250
India	461,171	1,959,976	485,236	2,062,253
West Africa	292,500	1,240,691	307,950	1,333,553
Other Regions Estimated	175,000	750,000	200,000	800,000
Totals	11,686,342	£49,659,686	12,012,633	£51,006,696

	1919	1920
British Empire	$241,556,689	$248,301,124
United States	58,488,800	68,493,500
Other countries (Est.)	50,000,000	56,700,000
Totals	$350,044,489	$373,494,624

Canada's favorable record for 1920 is attributable to the successes met with in Northern Ontario, particularly in the Porcupine district.

Regarding the outlook for 1920, it is believed that the Canadian output will increase at least twenty per cent over that of 1919.

Our Northern Ontario Letter

THE SILVER MINES

The second week of May was marked by a further decline in quotations for silver. Influences at work are difficult to discern, but the chief one appears to be the British Government. As to this, the commonly accepted view of the situation as gathered from careful local observers is that the British Government has induced the banking houses of the Chinese Empire to curtail their silver purchases to a minimum, and, also, has caused the complete curtailment of silver shipments to India. The two ordinarily heaviest purchasers thus practically eliminated has so lessened the demand as to make the current supply appear adequate to meet immediate requirements.

That leading metal authorities in the United States may be more or less mystified is indicated in the presence of perhaps a million dollars in silver bullion stored in the vaults of the Nipissing Mining Company of which E. P. Earle of New York is president. That New York authorities believed prices would rule high is obvious, and has given rise to the belief that while a matching of wits may not have been indulged in between British and United States Governments, yet such may have reasonably been the case between the metal brokerage houses of the two countries mentioned.

As to the future prospects in connection with the price of silver, the "bear" raid is believed now to have perhaps attained its objective, and prices may rule for some time at around the present level. This, of course, is mere presumption, based upon the belief that further pressure would cause low-grade silver mines in varions parts of the world to close down, and by thus lessening production defeat the very aims of the British Government. For that reason, pressure is expected to be regulated, and not become too severe.

As regards the outlook in Cobalt, with silver quoted at around $1 an ounce at the time of writing, the margin of net profit is still high. The mines as a whole are able to produce silver at an average of around 55 cents an ounce. This leaves around 45 cents net profit on each ounce of silver produced, and is almost equal to the gross value of the metal in 1915.

Statistics being prepared show the mines of the Cobalt district to have ended the year 1919 with a greater amount of ore in sight than that with which the year was commenced.

The annual report of the Mining Corporation of Canada for 1919, just issued, is favorable. Production during the year amounted 1,230,652 ounces of silver, as compared with 1,708,252 ounces during the preceding year. Net profit amounted to $908,748 as compared with $925,760 the previous year. During the period $622,518 in dividends were paid, thus leaving a balance sufficient to increase the surplus from $3,025,347 at the end of 1918 to $3,311,577 at the end of 1919. The report deals at length with the activities of the company in other fields, and contains the important announcement that from this date forward less attention will be paid to properties in faraway countries,and that the home field of Canada will receive greater attention. All other things being equal, Canada will be given the preference, with the United States taking second place and with Central America coming third. A feature of the report is that while the year's production amounted to almost as much as the total estimated reserve at the beginning of the year, the period was ended with a greater new reserve than that with which the year began.

During the month of April the Kerr Lake mine produced some 61,000 ounces of silver, as compared with 99,400 ounces in March, the decline amounting to more than fifty per cent. It is intimatetd that this decline may be permanent for the reason hat the higher grade ore shoots in the mine are bing exhausted, and that from now on it may be found necessary to deal with lower grade material. The question of making arrangements to have its 75,000-ton dump treated is still under contemplation and appears likely to be considered favorably, although definite announcement is still withheld at the time of writing.

A favorable feature of the week is the receipt of official advice that the Nipissing mine during the first four months of the current year produced $1,501,521. This being at the rate of more than $4,500,000 a year, is the highest record for any previous period of similar length in the company's history. In his regular monthly report, Hugh Park, manager, states that during April the mine produced $364,258. This compares with $384,723 in March, $329,401 in February and $423,139 in January. The report shows that during April no bullion shipments were made, the output being stored in the company's vaults at the mine.

Cobalt mining men and prospectors are taking considerable interest in the Butt township area in the district of Nipissiing where the promising discovery of radium-bearing ore was made last year. The Mining Corporation plans an early commencement of exploration work on its claims in that district, adjoining the original discovery group.

The assent of the Lieutenant-Governor is still being awaited in connection with the proposed construction of a light narrow gauge railway from Elk to Gowganda. The indications are that the construction of the line will mark the commencement of added activity in that district.

Stuart M. Thorne has taken over the management of the Castle property of the Trethewey Company, and has engaged Wm. Gowans as assistant. Mr. Thorne was manager of the Trethewey prior to enlisting for service overseas in the late war. His re-appointment is in accordance with an understanding at the time of his enlistment.

The Oxford-Cobalt is making good headway with its exploration work on property in Gillies Limit. The shaft is now down 50 feet and is being driven to a depth of 200 feet at which point lateral work will be carried on. Later on it is proposed to continue the shaft to a depth of 300 feet.

Arrangements in connection with the operation of the Victory Silver Mines, formerly the Hylands property, are again being made after a temporary delay in connection with the details. It is now proposed to increase the authorised capital from 500,000 shares as at present to 2,000,000 shares.

ORE AND BULLION SHIPMENTS

During the week ended May 14th four Cobalt companies shipped an aggregate of ten cars containing 715,131 pounds of ore. Nipissing was the heaviest shipper, sending out five cars, as shown in the following summary:—

Shipper	Cars	Pounds
Nipissing	5	388,707
Mining Corp	3	214,809
Coniages	1	87,360
O'Brien	1	64,255
Totals	10	755,131

During the corresponding period, no bullion shipments were made, although it is learned in official circles that a limited amount will be released during this week.

THE GOLD MINES.

On account of the distinction won by the gold producing mines of Northern Ontario during 1919 in making it possible for Canada to lay claim to being the only country in the world to increase its gold output during that year, added attention is being directed to this country by leading mining interests the world over.

Also, despite the most severe economic conditions, the mines of Porcupine and Kirkland Lake are actually producing now at a rate about twenty per cent greater than during 1919. Events following one upon another tends to make the likelihood of quite general expension in the leading gold-mining areas of the province.

Shareholders of the Porcupine Crown Mining Company, and the Thompson-Krist Company have ratified the by-laws authorizing the transfer of the two properties to the newly incorporated Northcrown Mines Company. The management will continue as at present at the Porcupine Crown.

Shareholders of the Porcupine V.N.T. await with interest the holding of the annual meeting of that company to be held May 27th. It is thought that some action may be taken with regard to obligations entered into some three or four years ago by Sir Henry Pellatt to underwrite a block of treasury shares. The agreement at that time specified a price ranging from

40 to 60 cents a share, as compared with current quotations of around 18 to 20 cents on the open market.

It is stated that the annual meeting of the Dome Mines Company will be held about June 18th, and that the annual statement for the fiscal year ended March 31st will soon be in the hands of the printers. While reticence is maintained as to the contents of the report, it is understood that a surplus of upwards of $750,000 will be shown. The achievement is regarded as exceedingly favorable as when the company resumed operation of its mill a year ago, the surplus at that time amounted to only $56,000 and during the intervening period the shareholders have been paid $200,000 in dividends.

Discussion of the affairs of the Gold Reef Mining Company will take place this week with a view toward arranging a program of work for this year. It is intended to sink a shaft to a depth of perhaps 300 feet for the purpose of exploring a vein indicated as a result of diamond drilling the property last year.

In the Kirkland Lake field the large volume of money being subscribed by United States interests toward exploration and development of new prospective mines is steadily increasing. Buffalo, Dayton and Rochester appear to have become alive to the favorable prospects and are now heavily interested.

Arrangements are being completed to resume work at the Tough-Oakes at the end of this week, and by June 1st it is hoped to have operations again well under way. Through the merging of the Tough-Oakes, with the Aladdin-Cobalt and the Burnside, ample funds have been provided to take care of the aggressive development program outlined, and sufficient ore is assured upon which to resume milling operations about the middle of July.

The Ontario-Kirkland has established another working level at a depth of 450 feet and the lateral work required to prove up the downward continuation of the ore bodies found at the 300-ft. level is underway. Following the completion of this work, the question of installing a mill will be gone into.

The Lake Shore, Teck-Hughes and Kirkland Lake all continue to produce at a normal rate, with prospects of an early further increase in output. The supply of labor is still below normal, but conditions seem to be showing some improvement.

The work in connection with mill installation at the Wright-Hargreaves is under way at full swing and it is evident that this mine will join the producing list by the end of the summer.

Farther east in the township of Lebel some real progress is being made, and the prospects of new mines being developed appear bright. The Bidgood property is standing up well under aggressive work, while on a number of other properties good results are also obtaining.

The Boston McCrea Company, controlled by Buffalo and Dayton interests has purchased the Jerred group of claims on which a vein some three feet in width and containing tellurides of gold has been opened up for a distance of about 200 feet on surface. In a test-pit driven to a depth of 15 feet the vein is found to carry an average gold content of about $25 to the ton. It is proposed to add to working forces immediately and to prosecute a vigorous exploration and development campaign.

Other properties in Lebel where good results are reported include the Wood-Kirkland and the Pinelle group.

From Skead township, returning prospectors report at least two new gold finds, and further increased activity. On their own initiative the enterprising claimholders of this area have cleared a road to the railway by way of Boston Creek, thus reducing the distance to rail by some 26 miles to between 8 and 12 miles. The road is now passible for teams and wagons with the exception of the crossing of the Blanche River. The Ontario government is being requested to bridge the stream.

At the 500-ft. level of the Miller Independence, while the cross-cut has not yet reached the point where the downward continuation of the main ore body is expected to be encountered, it is officially reported that in a small vein cut gold tellurides have been found. This is taken to indicate the likelihood of satisfactory mineralization at that depth.

Re port last week that the management of the Fort Matachewan Gold Mines had undergone a change were erroneous. Official advice to the "Journal" conveys the information that T. J. Flynn is still manager of the mine.

The report written by Percy Hopkins, geologist for the Ontario Bureau of Mines of the West Shiningtree Gold Area is receiving favorable comment in the mining centers. The frank declaration that mineral deposition has so far been found to be patchy, but that considerable inducement is offered for further work is received with fairly general satisfaction. It has appeared to place the standing of the district on a firmer footing than that formerly enjoyed, and the early future is expected to witness greater attention being paid to the exploration and development of the numerous promising prospects in that field.

PERSONAL.

Mr. Henry Schoch, Sales Engineer of the General Briquetting Company, has been elected Vice President of the Nukol Fuel Company, of Ontario, Canada—and will take up his work for that Company with headquarters in Toronto on May 17th.

The Nukol Fuel Company is actively manufacturing "Nukol," a high-class anthracite briquette for the Ontario Market. One plant is operating in Toronto; another is in course of construction at Port Stanley, and three more are prospected within the next two years.

Dr. Edwin T. Hodge has accepted the position of Professor of Economic Geology at the University of Oregon, and expects to leave Vancouver about October first.

During the past few years Dr. Hodge has been active in furthering the advancement of the mining industry in British Columbia. At the present time he is President of the British Columbia Chamber of Mines, on the executive of the Vancouver Branch of the Canadian Mining Institute, and is a member of the Mining Bureau of the Board of Trade. He was convener of the last C. M. I. convention, held in Vancouver. He was at the head of the contingent of B. C. Mining men who attended the recent International Mining convention held at Seattle, and took a very active part in the proceedings.

For the present Dr.Hodge has opened consulting offices in Vancouver, and will have branches in Seattle, and Portland for a group of engineers.

British Columbia Letter

THE METAL MINES.

Stewart, B. C.

The concentrator designed to treat the lower grade ores of the Premier Mine should be ready for operation before many weeks as the last of the machinery has been despatched over the trail. The mill will have a capacity of 100 tons daily and will be the first unit of a larger plant. Diamond drill development on the property is proceeding the contract being in the hands of Boyle Bros., of Spokane Wn.

It is stated that Boyle Bros., of Spokane Wn., have obtained a contract to perform 12,000 feet of diamond drilling this season on the Province Claim of the Big Missouri Group, Salmon River.

High grade ore, recently struck on the Forty Nine Group, Salmon River, is being developed, drifting being underway. Wesley W. Warren, consulting engineer, is directing operations and it is expected that it will be possible to commence shipping this year.

Lieut.-Col. T. A. Hiam, who is connected with the Pacific Coast Exploration Company which controls the Big Missouri Group, Salmon River, as well as other properties in which Sir Donald Mann is interested, is responsible for the statement that a limited service may be inaugurated this year on the Canadian Northwestern Railway. This road traversed the Bear River Valley from tidewater to its upper waters. The railroad was constructed years ago and has been lying idle since. If it is possible to put it in shape for rough and intermittent service it will be a boon to prospectores and mine operators.

Hedley, B. C.

A dispute between the employees and the management of the Hedley Gold Mining Co., regarding wages has been settled, the former receiving fifty cents a day increase. The minimum wage paid to any man in the mine now is $5 a day. G. P. Jones, the manager, states that it is not certain that the property will be able to operate at a profit under these conditions but he was willing to give it a trial, hoping that the Government would pass a bill giving a bonus to gold mine operators of $10 per oz. for gold used for manufacture.

Trail, B. C.

The supply the new concentrator to be installed at Trail B. C. the Consolidated Mining and Smelting Co. of Canada is constructing a pumping plant possessing some novel features. In order to be at the required disance from the water in the Columbia River at its lowest stage, and to avoid being flooded at high water, the plant is being housed in a waterproof solid concrete chamber approached by a waterproof sloping tunnel also of concrete. The tunnel portal is well above high water mark.

Kalso, B. C.

At the annuel meeting of the Gibson Mining Co. Ltd., held recently, officers were elected as follows: President, F. E. Archer, Kalso; vice-president, S. C. Warr, Spokane; secretary-treasurer, E. H. Latham; directors, W. H. Phillip and D. P. Cosgriff. The property now is involved in litigation which, however, it is hoped will be straightened out before long, thus permitting operation on a satisfactory basis.

Sidney Inlet, B. C.

It is announced the the new 300-ton mill, recently installed by the Alaska-British Columbia Metals Company at Sidney Inlet, Vancouver Island, has commenced operations.

Nelson, B. C.

The Vincent Development Co. has relinquished its bond on the Eureka Mine, Eagle Creek, after doing considerable development. This work done consists of stoping on the 250-ft. level and driving a long crosscut on the 450 foot level with the object of striking the vein at depth. The Company proposes making a thorough examination of the Granite-Poorman Property, which it also has under bond, as soon as the snow leaves, with the idea of formulating plans for its development.

Dawson, Y. T.

The ice has broken on the Yukon River. This occurred some weeks ago. Navigation on the entire river soon will be possible. A considerable influx of miners and prospectors will take place to the Mayo Silver Camp. Spring operations are already underway in the Klondyke. The thawing of the dredges is underway and before the end of May it is expected that much hydraulic work will be started.

Vancouver, B. C.

Counsel representing the Dolly Varden Company has made application to the Supreme Court of British Columbia for an extension of time in which to file its statement of claim in connection with action being brought against the Taylor Engineering Company, holders of the Dolly Varden Mine, Plant, Railway, and general mine and transportation equipment. The explanation of this course is that the first mentioned Company does not wish to act until the Dominion Government has had an opportunity to disallow the legislation passed at the last session of the Provincial Legislature re-affirming the title of the Taylor Engineering Company to the rich Alice Arm property.

Metalliferous mining in the Slocan District of British Columbia has been tied up by a strike of the miners, who are demanding an increase of one dollar a day in wages. One of the richest silver producing camps of the Canadian West thus has become inactive for an indefinite period.

THE COAL MINES.

The coal miners' strike in the Crow's Nest Pass, which has more or less affected the mines of that district, particularly in the Alberta section, since the beginning of March, has been settled, according to a statement issued from the office of the Director of Coal Operations. There is a full crew working at Blairmore; at Bellevue the men are being taken on rapidly and much the same condition is reported from Hillcrest. The adoption of a new wage scale in line with United States' rates which would mean an additional increase to the miners' wages of about 11 cents a day, is to be discussed.

Lump coal for domestic use now is selling in Victoria, only eighty miles by rail from the Nanaimo collieries, at $13.50 a ton. For nut coal the charge is 50c. less. A few days ago the retail merchants an-

nounced an increase of $1 a ton which brought the sale figures to the point named. They state that no benefit whatever will accrue to them from the advance which will be absorbed by the following increased charges; (a) An advance of 65 cents per ton at the mine. (b) A towing-charge advance of 10 cents a ton. (Most of the coal used in Victoria is transported from the mines by water.) (c) An increase to the men employed in the handling of coal at the wharves and delivery of 25 cents per day. (d) An increase in gasoline and oil for deliveries.

TECHNICAL EDUCATION IN RELATION TO COAL MINING

British Columbia Night Schools and Correspondence Mining Classes

Pursuant to the Public Schools Act passed in 1914 night classes were established at different coal mining centres of the Province for the benefit of those who wished an opportunity to continue studies left off when they went to work and to qualify technically for higher and more responsible positions in connection with coal mining operations.

While admittedly this was a move in the right direction, it was agreed by the Provincial Departments of Mines and of Education in 1919 that this did not go far enough, that the miners on leaving the mines after a day's work could not be expected to leave their homes to spend the remainder of the day's leisure hours in school, and that more good would be derived by the establishment of a system of education by correspondence. This would permit the student to do his work at home, to study in quiet without leaving the house, to answer the questions asked by mail and to prepare his replies for posting the next day.

This system, therefore, was introduced and its popularity and success have been gratifying. Of a total of 88 applications received for registration for instruction by correspondence, 44 are boys who are taking the preparatory mining course, 16 of whom are residents of Nanaimo and 28 of Cumberland, so that a large proportion of those who are taking advantage of this educational opportunity belong to the chief coal mining centres of Vancouver Island.

As to the Mining Classes it is interesting to note that they continue to serve the purpose for which they are intended. These classes are established at Nanaimo, Fernie, Coal Creek, Merritt, and Cumberland. The average attendance at each of these schools per course follows:—

Nanaimo	7
Fernie	8
Coal Creek	8
Merritt	11
Cumberland	7

As to fees the Provincial Government has made them so low that they may be termed nominal, causing no hardship to those who are in earnest. For instance applicants for registration in the correspondence preparatory course are required to pay only $5.00. This course, it may be explained is sub-divided or graded in sections running from "A" to "F," the former grade providing for elementary study and the various intermediary grades to "F" carrying the student to the point where he may sit for a Mine Manager's Certificate. It is interesting and gratifying to note in this connection that the operating companies of Nanaimo and Cumberland (Canadian Western Fuel Co. and Canadian Collieries (D) Ltd., have shown their interest in the ambitious boys of their respective sections and in their employ by paying their admission fees.

Other courses, together with the fees set, are as follows:—

Preparatory course in arithmetic	$10.00
Course for Fireboss, Shiftboss, or Shotlighter's papers (3rd Class)	15.00
Course for Overman's papers (2nd class)	25.00
Course for Mine Manager's papers (1st Class)	35.00
Course in Mine Survey Work	35.00

The laying out of these studies, setting the questions, correcting answers, etc., is in charge of James Hargeaves, who is attached to the Department of Education. He is a mining engineer, a holder of First-Class Mine Manager's Certificate, in short a highly qualified man technically as well as a practical miner with experience covering years in this Privince as well as in Alberta.

In regard to the mining classes in the different centres, the teacher is selected by the Department of Education from residents of the districts in which the school is opened. He must have the necessary qualifications, of course, and the utmost care is exercised in his selection. His salary is paid as follows: Four-fifths by the Government and one-fifth by the School Board of the Municipality, this last named body also taking care of incidental expenditure.

Correspondence

IRON ORE BOUNTIES IN ONTARIO

Port Arthur, May 8th, 1920

To the Editor,
"Canadian Mining Journal."

Dear Sir:—In your issue of March 6th, 1920, there is an article taken from "Iron and Steel of Canada" on the Iron Bounty question which is being presented again to the Federal Government for consideration.

Special attention is drawn, and rightly to Mr. Mills' expression as to the advisability or necessity for developing our own iron ore deposits.

The Port Arthur Board of Trade has a mining Committee entirely of owners, prospectors, geologists and engineers who have, as far as lay in their power, given very careful consideration to the question of develop the iron ores of Northern Ontario. Up to the present time, however, the Minister of Mines has not met this Board, or as I can learn any member of it to discuss this matter at all. While it was quite true that in an issue of your journal of January 23rd, there was an article stating that a deputation of mining men from the City Council had been invited to meet the Minister of Mines, it was also quite true that this invitation never reached the Mining Committee of the Board of Trade and as far as I have been able to ascertain, there was not a single man in that City Council who has any special knowledge of mining, more particularly the more intricate subject of the development of our iron ranges.

In connection with the conserving of our iron ore reserves as stated by Mr. Mills, why not go further if we wish to take that line of thought and conserve all our coal, go on importing in huge quantities, our nickel deposits, also our pulp-wood areas, and only manufacturing what we need absolutely for our own use. As it takes forty years to grow spruce trees of

merchantable size, it can readily be seen our present areas might easily be largely or partially used up before new forests can be brought into service, We have iron-ore reserves in Northern Canada that will fill all demands for probably several thousand years. Many of these ranges are of course inaccessible at the present time, but can always be made available when urgently needed.

The Minister of Mines of Ontario is also much interested in the project of bringing iron ore from the Belcher Islands, Hudson Bay, down to the proposed Terminal of the T. &. N. O. Railway, thence over that line to Lake Ports. As this ore is admittedly of low grade, freight charges alone would more than cover the total returns of the ore, leaving nothing for mining costs or any other branch of the work. This project was carefully considered a few years ago by very competent engineers who simply stated that it was economically impossible and the condition now exists that though iron ore prices have increased greatly in the last two years, freight charges and costs of production have also increased in proportion.

In the article taken from the "Iron and Steel," it is stated that those who are requesting a bounty desire it to be paid upon the quantity of pig iron or steel made in Canadian furnaces or mills from domestic ores. **There is absolutely no foundation for such a** statement. A large number of Boards of Trade made representations to the Government asking for a bonus on iron ore to be payable to the operator of the mine, for the principal reason that formerly when bounties were paid on pig iron produced, the operator of the mine received none of this assistance and he is the one who does all of the pioneer work, puts up with the fluctuations of iron ore prices, etc., while the smelter received a great amount of assistance from the bonus during the lean periods. This plan was proven to be a failure by the results of the former bonus which was given to pig iron produced, and the fact that the same bounty given recently in British Columbia to smelters has not had the desired effect, the development of the iron ore resources remaining as before.

The Algoma Steel Corporation is in the rather unique position of being mine operator, beneficiator and user of its own beneficiated ore. Last year they produced a beneficiated ore from the Magpie Mines which ran, natural analysis, Iron 49.41 per cent, Phos. .014 per cent, Silicia 8.68 per cent, Mang. 2.72 per cent Lime 7.82 per cent, Sulphur .16 per cent, Loss by ignition none, Moisture 1.72 per cent. This makes a very desirable product, and while it is quite true that individual furnaces might not take a very great tonnage, the same reasons for not doing so would apply to many of the larger producers of straight mine-run ore in the United States. The marketing of beneficiated ore should not be any special worry as this is going on quite steadily from different States.

For its own furnaces and mills at Sault Ste. Marie the Algoins Corporation expects this year to use 40 per cent of its beneficiated ores and there will be ample demand in the American markets for any surplus. The granting of a bonus on pig iron would suit this isolated case admirably, but as the greater ore reserves are tributary to the head of the lakes, these would not receive any benefit.

The smelters and steel mills of Eastern Canada have received millions in subsidies, while the production of iron ores for domestic uses has dropped to 4 per cent of the raw material used. As this plan was a complete failure, why not give the bonus to the operator of the iron mine, and get this great import reduced.

The Western Provinces which were the strongest in opposition to the granting of the bonus on iron ores had no hesitation in recommending expenditure of public monies on the development of their coal resources, as is evidenced by the programme now arranged in the Western Provinces for the expenditure of $400,000 in experimental work on the western coal ranges. This sum is divided as follows:—50 per cent paid by the Federal Government and 25 per cent payable by each of the two Western Provinces, Manitoba and Saskatchewan. The principal objection would seem to be the word bonus.

Other writers in different articles have stated that the Government should give a bounty sufficient to pay the beneficiation. Personally, I would not be in favor of such a plan as the cost of the beneficiation varies so much that there would be endless controversies. The mine owners do not want to be guaranteed a profit, but simply assistance to tide over the installation of large plants which could only be planned after extensive and costly experiments on the individual ranges. This would be absolutely necessary as the operation that would suit one selection of ore might be entirely unsuitable for another. To give a bonus on Canadian ores equivalent to cost of beneficiation, to place these ores on a parity with straight ore mines, would mean that as soon as the bonus stopped the mines would have to shut down.

Suggestions have been made and it has been broadly hinted that if a bonus is granted at all it will be for $1.00 per ton and for a short term of say, from three to five years. This would suit Moose Mountain and the Magpie Mines, but would be absolutely worthless to any other part of Ontario.

It would take weeks, if not months, to complete negotiations in connection with the acquiring of a range; months for an expert survey of the same; still more months for diamond drilling to ascertain tonnage and get information as to plant needed at least a year to get this plant delivered and erected; another year to get on a reasonable shipping basis, but it would not take many minutes to figure out how much of the short-term bonus one would get. The benefit in figures would be represented by ciphers only.

A bonus of 50 cents per ton on iron ore for a term of fifteen years would have a far greater effect and a much more equitable distribution than a larger grant for a shorter term of years. This bonus should be payable only on production of certificate of sale to smelters or manufacturing agent.

Beneficiation must come and soon. So far as is known there are no large ore bodies of commercial grade in any of the provinces, but so little exploration has been done, and so many miles of favorable structure have been found on of the iron ranges that is is quite safe to assume that large bodies of good grade ore will be found, but it may take years to locate these, while it would take but a few months to bring our large deposits of easily accessible low grade material into active service.

The United States operators are turning their attention to this problem more and more every year and in a generation or two, when the larger deposits of marketable grade ores are worked out, they have only to turn to their own almost inexhaustible supplies of lean ores. They will probably never have to call on the Canadian ore reserves for any supply.

The solution of the problem of the iron and steel supply for west of the Great Lakes and provinces east of the Rocky Mountains woud be comparatively easy by following out the same line as was followed in establishing shipyards and dry-docks where **most needed** in the Dominion. Given a similar subsidy for for a term of years on actual capital invested, we would see large steel works established where Iron, Coal, Power and Shipping meet, at the Head of the Great Lakes. Enough of a subsidy to give the iron mine operator 50 cents per ton for an equal number of years could easily be arranged and this development could go on at once, as would be absolutely necessary before the establishment of mills and furnaces. The Government would not pay out one dollar unless it was well earned, and the resultant revenue, not only to the Government, but also to the Canadian National Railways which serve 75 per cent of the Iron Ranges of the Canadian Lake Superior Districts, would in itself much more than balance the expenditure. Every agriculturist in the west utilizes from $1,000 to $5,000 worth of steel and iron implements. On every one of these there would be effected a saving of from eight to twenty per cent of cost in the freight charges alone by the establishment of such a system, and the tariff critics would be saved much labor and argument.

Yours very truly

.... J. E. MARKS

TORONTO NOTES ON MINING COMPANIES.

Among the new mining companies recently incorporated under the Ontario laws is the Miller Lake Silver Star Mines, Limited, with an authorized capital of $2,000,000 and head office at Gowganda. The Camburn Silver Mines, Limited, have been granted authority to increase its capital stock from $1,500,000 to $3,000,000. The Bousquet Gold Mines, Limited, with head office at Haileybury, has been formed and granted a charter, with an authorized capital of $2,000,000. The provisional directors are R. R. Tough, G. Tough, J. H. Tough, Pearl Devenny and Dollie Dwyer.

At a meeting held on May 10th the shareholders of the Thompson-Krist Mining Company approved of the action of the directors in the amalgamation of the company with the Porcupine Crown and the North Crown Mining Co. of the company's stock of $1,900,000 there was represented $1,800,000. It was also stated that a meeting in Montreal gave similar endorsement to the merger. Plans for the operation of both mines will be discussed at a meeting of the directors of the new company to be held in Toronto in a few days. The board will comprise six directors of the Porcupine Crown and three of the Thompson-Krist.

The Iroquois Mining Co. which was incorporated in 1911, with head office in New York, was wound up in Toronto this week on the application of R. T. Newman, a creditor for $858. The capital stock of the company was $1,000,000 and the liabilities are $4,122.

OBITUARY

L. T. O'SHEA, Hon. Secretary of the Institute of Mining Engineers,

The "Canadian Mining Journal" regrets to learn from English advices to hand of the death of Captain Lucius Trant O'Shea, Professor of Applied Chemistry in the University of Sheffield and Honarary Secretary of the Institution of Mining Engineers.

Professor O'Shea was a pioneer worker in the chemistry of fuel, and the phenomena of mine gases. In the chemistry of the coke-oven he collaborated with Mr. G. Blake Walker at the Wharnclife Silkstone Colliery, where the first by-product coke-ovens in Britain were installed. To his work on the chemistry of mine gases, and his lectures to mining students on this subject is due a great deal of the improved knowledge of the behavior of mine gases now possessed by coal miners in the Midlands District of England.

Professor O'Shea was the son of Major Rodney O'Shea of the 20th Regiment, and his mother was a daughter of Admiral Lucius Curtis, and, he was to be expected from such parentage, he took a keen interest in military affairs. He served, as a Royal Engineers Volunteer, through the whole course of the South African War, and during the recent war was commander of the O. T. C. of Sheffield University.

The respect in which the late soldier-professor was held is shown by the attendance at his funeral, which included the faculty of Sheffield University, representatives of the Institution of Mining Engineers, Coke Oven Managers' Association, Sheffield Society of Engineers and Metallurgists, Midland Counties Institute of Engineers, Manchester Geological Society, Mining Institute of Scotland, Midland Institute of M. C. and M. Engineers, North Staffordshire Institute, many colliery companies, military organizations and other technical societies not mentioned.

One of the most valuable historical papers of recent years was "Notes on the History of the Safety Lamp," which Prof. F. W. Hardwick and the late Prof. O'Shea prepared in collaboration for the Institution of Mining Engineers in 1916. This is the completest monograph on the safety lamp as yet published.

The Editor was a student under Professor O'Shea and received many personal kindnesses from him, and desires to be included in the hundreds of mining men to whom Prof. O'Shea's forceful and yet kindly personality is still a source of inspiration and pleasant memory.

Those who month after month watched the assemblage of convoys, and their regular departure under naval guard from the harbours of Sydney and Halifax did not notice any signs of panic during the late war.

Coal and steel shipments from Sydney, Nova Scotia, were never once interrupted during the war. It was very very occasionally that watchers on Canadian shores saw a glimpse of the ships of the Navy, but they also never saw a German ship.

Labor Turnover of Industrial Plants, and What Steps Can Be Taken To Minimize It.*

By A. W. MACDONALD, Welfare Superintendent Dominion Steel Corporation.

It is only within the past few years that the question of this factor in the labor problem has received very much attention from executives.

When it is realized that labor cost is by far greater than material cost in producing, it behooves companies employing large numbers of men to devise ways and means of reducing the turnover of labor on their plants to the lowest figure possible.

It has to be admitted that the putting to work of new men is one of the most important causes of a high accident rate.

Comparatively few employers have realized that for every man on their pay-roll they are probably hiring at least one new man every year. This shows a labor turnover of 100 per cent and should be a sufficint argument to cause any employer to study the reason for his works labor turnover. Any manager or superintendent of an industrial plant or other works employing large numbers of men, who is still of the opinion that the methods that obtained ten years or more ago are good enough to-day, as far as the hiring and discharging of workmen is concerned, is making a mistake that is costing his company dearly.

It might be well to give some consideration to what it costs a company to make a new employee efficient, that is to bring him from the stage of a "green man" to that of being a productive workman.

Some of the sources of this cost are:

(a) The difference between a standard day's work and that which a new man does while getting used to the job.

(b) The extra supervision required by a green man.

(c) Interference with the work of other men.

(d) Accidents caused by green men.

Various executives have computed the total amount of the costs according to their own conditions, and the results range from $25.00 to $100.00 per man as the cost to a company of bringing a green man up to the stage of a productive workman.

It is evident therefore that the cost of replacing workmen is enormous and the necessity of taking drastic measures to prevent labor turnover is of first importance.

Of course to get rid of an employee is far easier than to help him "make good" and to let him go less troublesome than to find out in advance any condition of dissatisfaction and to attempt to remedy it.

One of the chief reasons why this matter has received so little attention from companies in the past is that they have no records to show what their labor turnover was, and therefore they did not know what it was costing them.

In the last analysis this hiring of men to replace men who have left the employ or, in other words labor turnover, is simply wasting labor, particularly at this time when men are scarce and most companies have already passed from the position of buying labor to selling employment, and it is clearly a matter of sound business for industrial organizations to hold out inducements for capable men to enter their employ, and to fully develop the capabilities of those they get.

The only reason why a company engages in business is to make profits, and any activity of the company that does not tend toward that end is poor business.

Large companies developed slowly from the primitive stage of industry in which each employer was his own foreman, and the tradition has been handed down that in order to preserve discipline the foreman must be able to hire and discharge his own men.

It has been pointed out in a foregoing paragraph that the labor cost of production is very much in excess of the material cost, probably in some instances two and one-half or three times as much, and we find that every company purchases its material through a well-organized purchasing department, while in the majority of cases its labor supply is picked up haphazard. More attention is certainly paid to the purchasing of material and the designing of equipment than to the selection of workmen.

This in no small measure contributes to unrest and dissatisfaction among workmen, and consequently is a dominant factor in labor turnover.

Work of all kinds can be analysed to determine the qualifications necessary for its performance, and in some places efforts are being made by executives along the line of selecting and training workmen, and the time is not far off when this will be a regular part of industrial activitiy. The majority of men are neither lazy nor unwilling to work. The trouble is that they are picked up without any effort at selection and placed at work for which they are unfitted.

The question of hiring and discharging workmen, on which alone rests the labor turnover of a plant, may be placed under two headings:

(1) Hiring and discharging by foremen.

(2) Hiring and discharging through a properly organized Employment Department.

In the first place hiring by the foremen frequently leads to practices that are detrimental to all concerned. It very often leads to the building up of racial and other cliques in a department that will cause trouble later. This is inevitable, as the only source of labor supply that is open to a foreman is through his relatives and friends and the friends of the men in his gang.

The only basis of judgment the foreman has in interviewing an applicant for work is the impression the man makes on him at the time. If the applicant is unknown to him personally he cannot tell anything at all about his ability, and he has not the time or means at his disposal to make the enquiry necessary to even approximately determine the fitness of the man for the work that has to be performed.

We can now consider the centralized hiring of employeees through an employment department.

One of the objections to this method was that it interfered with the authority of the foremen and superintendents. As a matter of fact it does nothing of the sort. It does not mean that they cannot dispense with the services of any man who is not doing his work in an efficient way. Instead of the faulty workman being discharged from the plant to the

* A paper read before the Mining Society of Nova Scotia at the Annual Meeting, Glace Bay, N.S., May 4th and 5th, 1920.

street, he is sent back to the employment office, where a further effort will be made to have him placed on a job where he will fit. It is evident that although a workman may not suit one job he may do all right on another one. If after a reasonable number of trials have been made, the man persists in being "no good" he should be discharged. In a modern organization no man should be allowed to leave the service without a searching enquiry into his reasons for doing so. These interviews with men who are leaving the employ frequently reveal objectionable conditions that in many cases can be easily remedied, and that are actually a disadvantage to the company as well as to the workman. The modern employment bureau is the only agency that is equipped to handle the problem of distinguishing between the man who is no good and the man who is wrongly placed.

Certain things are essential to successful centralized hiring of workmen. In the first place the employment manager should be personally familiar with the various works for which he has to secure workmen. He should have notice as far as possible in advance of the number and class of men required, so he can provide them when needed. He should have sufficient assistant so that his time will not be used up doing work that can be equally as well done by an ordinary clerk. He should have the standing and the authority in the organization that will enable him to perform his duties satisfactorily, so that the company for which he is working will get the best possible results.

Summary.

(1) The cost of labor turnover in industry is so large as to justify the adoption of any means to bring about its reduction.

(2) The most important and effective method is the establishment of an employment department properly administered.

(3) Hiring through an employment department does not impair the authority of the foreman or superintendent immediately in charge of the work.

(4) He hires his men from the employment department and discharges them back to it instead of to the street.

(5) The employment department is able to give the applicant for work special attention, and properly conducted it is able to devote special skill and knowledge to selling employment in the organization to the workman.

DIAMOND DRILLING AT KINGS ASBESTOS MINE.

The Sudbury Diamond Drilling Co. has taken a contract for drilling at Thetford Mines, Quebec, for the Asbestos Corporation of Canada. The contract calls for the drilling of 20,000 ft. and is an exceptionally large one. Mr. S. J. Fitzgerald, President of the Company, is on the ground and has started five diamond drills and one churn drill at the Kings property.

This drilling exploration should give the mining company much useful information concerning its property.

VANADIUM--Its Occurence and Utilization

(Abstracted from a paper on the Development of Ferro-Vanadian Metallurgy presented at the Boston Meeting of the American Electrochemical Society, April 10th, by B. D. Saklatwalla, General Supt. of the Vanadium Corporation.)

We will discuss briefly the technical evolution of the processes of reduction, and the general properties bearing on such processes, of an element which up to only a few years ago was characterized as a chemical curiosity, a so-called rare element. Following a recognition of its useful properties, this element, "vanadium," was suddenly converted from its laboratory obscurity into a commercial necessity of far-reaching importance. In this commercial evolution it resembles, to some extent, the element aluminum, which was similarly transformed from an element of chemical catalogs into a metal of everyday necessary technical domestic use. Vanadium, like aluminum, destined to be a great engineering factor, was known to exist, and its chemistry fairly well developed, years ahead of its actual entry into commerce.

This neglect of its useful properties was due to various substantial reasons. In the first place, its technical uses were limited until Prof. Arnold's researches conclusively proved its value in the manufacture of steel; hence there was very little incentive for its technical development. In the second place, though its presence was widely manifested, it was of rare occurrence in a commercially workable deposit. Vanadium had been classed among the rare elements, with very little justification. It was not the distribution of the element, but its occurrence in a concentrated form at one locality that was lacking until the discovery of the Peruvian deposits in the Andes, near Cerro de Pasco, by Don Antenor Rizo Patron, in 1905. In fact, vanadium is one of the most widely distributed elements on the face of the earth. It is diffused through all primitive granites and many sedimentary rocks and clays. Besides forming a number of special minerals, its presence has been proved, as accompanying other elements, in at least fifty different minerals. In large amounts it occurs in lead ores, and in very small quantities in iron and copper ores. It is found in the ashes of very many coals and various plants. Its distribution as to locality also is not restricted, none of the continents of our globe being free from it. To get an idea of the quantity of vanadium contained in our globe, Vogt comes to the conclusion from various quantitative determinations in minerals, that the entire crust of the earth would show an average content of between 0.0025 and 0.05 per cent vanadium. Further, the presence of vanadium is no restricted to our planet alone. Sir Norman Lockyer has shown its presence in the spectra of various heavenly bodies. Also a number of meteorites have been shown to contain vanadium.

The history of vanadium is more than a century old. It was discovered in 1801 by Manuel del Rio, in the lead ores of Zimpan in Mexico, but was considered by Collet Descotils, who analyzed these ores in Paris, to be identical with chromium. Thus del Rio's discovery was forgotten, until Sefstroem, in 1830, rediscovered the element in iron produced from certain Swedish ores. Then Woehler, taking up the analysis of the Mexican lead ores investigated by del Rio, conclusively proved that Sefstroem's new element was

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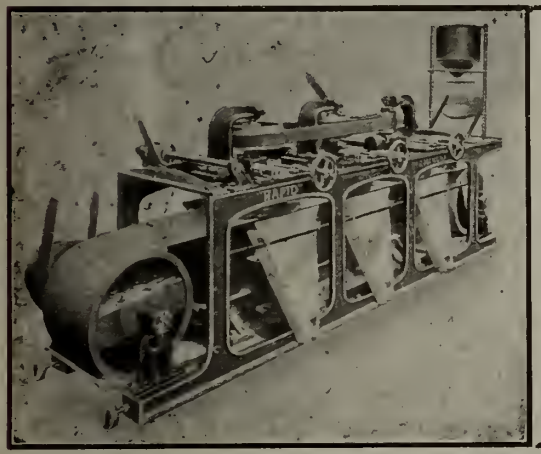

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the same as that found by del Rio., viz., vanadium. This controversy inspired Berzelius to investigate the chemistry of this new element in a most thorough manner. It will not be too much to say that the foundation on which the chemical knowledge of this element is erected is formed by the work undertaken by this old master in 1831. Comparatively little was added to it, until Sir Henry Roscoe, about 40 years later, through his researches from 1867-1870, furnished additional valuable data. The first suggestion of technical application of vanadium to metallurgy carries us back to the year 1863 when Lewis Thompson expressed the idea of vanadium having a similar effect to nickel on iron, since it was found in iron of remarkably ductility. A year later, Edward Riley suggested the extraction of vanadium from pig iron, which being analyzed by him, seemed to contain this element.

The treatment of vanadium-bearing materials and minerals can be said to have started following Roscoe's work in 1867-1870, when vanadium found application in the dyeing and ceramic industries, but it was not until 1896 that its entry into metallurgy can be said to date. In that year the Firminy Steel Works in France experimented with the use of vanadium in armor plates. However, the superiority of vanadium steels cannot be said to have been established until the year 1900, especially by the comprehensive investigations of Prof. Arnold in Sheffield, England, which work was further completed by the publications of Sankey and Smith in 1904. Immediately after these publications, establishing the usefulness of vanadium in steel metallurgy, the most important known deposit of vanadium-bearing mineral was discovered in Peru in 1905, thus ensuring a permanent supply for the establishment of a vanadium industry and a commercial technology for the treatment of vanadium minerals.

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:-: EDITORIAL :-:

Capitalization of British Empire Steel Corporation Coal and Ore Reserves

A series of three well-informed articles on the financial condition of the nine companies which it is proposed to consolidate as British Empire Steel Corporation appears in the Toronto "Globe," and is concluded with the following discriminating comment, viz.:

> "On the question of total assets Col. Morden insists that there has been a conservative valuation of the iron-ore and coal in the ground belonging to the various companies, the value of which is now placed at $203,000,000 of the total assets valuation of $407,000,000. The fact remains that the total assets of the leading companies of the nine in the merger are placed at slightly less than $200,000,000 in their last annual reports. It is manifest that Col. Morden has adopted a different basis of valuation from that of the unit companies in preparing their annual reports. It is to be presumed that the coal and iron ore has hitherto been regarded as a nominal asset, which may explain the difference. This does not, however, relieve the new company from the necessity of most efficient management in seeing to it that the valuation put upon the coal and iron as in the ground is not above what is warranted in consideration of the coal and iron as a marketable commodity —in other words, the plan of organization to this extent capitalizes the future and contemplates many years of successful operation in bringing the raw materials to the Corporation's plants, and making them into millions of tons of marketable articles."

The capitalization of minerals in the ground is a difficult matter, and probably the safest method is to regard them as a nominal asset. This is particularly so where the mineral deposits are so largely submarine, as in the case of the coal and iron-ore areas of the constituent companies of the new Corporation. The greatest asset of the new Corporation will be its complete control of the points of access to the submarine mineral deposits, and the advantages that will accompany unified direction of the technical operations of winning the minerals. Another substantial asset is the land area of unworked coal. With the exception of the winning of the three upper seams in the Sydney Field the land area is virgin coal. The seams crop concentrically each outside of the next superimposed seam, and thus, as the lower seams are reached, each one contains a larger superficial area of ungotten coal. These lower seams have hitherto been disregarded because of the better quality and great accessibility of the upper seams. Nevertheless, it may be stated that the ungotten land coal will provide the most dependable and lasting asset of the future. Comparative thinness of seams, less desirable quality, and, to an inexcusable extent, lack of accurate knowledge of the lower seams, are hindrances to profitable extraction that will gradually disappear under the compulsion of necessity, improved methods of extraction, and modes of preparation that have long since been matters of ordinary practice in other countries.

In connection with the submarine area, both coal and iron-ore, only a nominal value should be placed on the estimated content of mineral, because, while the supposition of their extension at least to the limits of profitable extraction is founded on excellent grounds, in the absence of actual knowledge there can be no absolute certainty such as is required in actuarial calculations.

There are also some fixed and unavoidable first charges on coal and iron-ore won from the most accessible and certain situations, which are emphasised in making future calculations on ungotten submarine areas, namely charges for depletion of areas, for redemption of capital, and for the provision of new openings to take the place of abandoned winnings. It will be an essential to the permanency and success of the new Corporation (which we desire again to emphasize, believing that exaggeration of emphasis on this point is impossible, is founded on the extraction of coal at a profit) that these charges shall be a primary addition to the other costs of coal production.

We note that the nominal capital of the new Corporation is fixed at $500,000,000, and that while the appraised value of the aggregate assets of the constituent companies is placed at $407,000,000, it is only proposed to issue securities of a par value of $207,000,000, or approximately the sum of the assets of the combining companies as shown by their respective

balance-sheets. From this we deduce that it not the intention of the promoters of the new Corporation to issue share capital to the full extent of the appraised assets. In view of all the factors of uncertainty that surround the profitable winning of coal and iron-ore from submarine areas—some of them very remote from land—it is probable that the technical advisers of British Empire Steel Corporation will counsel the inclusion of the ungotten coal and iron-ore tonnages in the balance-sheet of the Corporation at purely nominal figures. It is also to be expected that the cost-sheets of the mining companies will be complete cost-sheets, showing the ultimate cost of coal over the whole expected life of the deposit under consideration, and not partial, and therefore inaccurate, cost-sheets such as have too often in the past led to erroneous conclusions and consequent financial embarrassment.

PIT TIMBER VERSUS PULP WOOD

At the recent meeting of the Mining Society of Nova Scotia, Mr. J. W. Revere, the veteran Purchasing Agent of the Dominion Coal Company, made the significant statement that the present growth of timber in Nova Scotia is not making up for the current consumption, and that in ten years' time the pit-prop timber of Eastern Canada will be exhausted.

Taken in conjunction with Mr. Frank J. D. Barnjum's exposè of the forest situation of Eastern Canada (see issue of January 30th, 1920) and the ravages of the spruce-bud worm, Mr. Revere's pronouncement, coming as it does from an expert of unique experience in the pit-timber trade of Nova Scotia, should alarm the coal operators of that province.

The competition of the pulp-wood industry is now being felt in Nova Scotia, and in Cape Breton Island itself the mills are paying twelve dollars a cord for pulp-wood.

We suggest that the acquisition of an adequate pit-timber reserve is fully worth the immediate consideration of the coal interests of Nova Scotia. The associated companies who will form the British Empire Steel Corporation own, it is true, some valuable lumber limits, but these are not particularly suited for growing pit-props. There are, however, areas in Cape Breton Island, which if properly forested and looked after, and reserved for the growing of pit props, could assure the coal mines of a fairly well-sustained supply for the future. The timber on these areas is well-suited for pulp-wood manufacture, but it should not be a hard matter to decide which is the more essential requirement, pulp-wood, or the provision of coal.

Mr. Jack Hammell is in Toronto. He is confident that a large amount of development work will be carried on at the Flin Flon property. The New Yorkers who have taken the option on the property are making good headway.

BRITISH EMPIRE STEEL GRANTED CHARTER IN NOVA SCOTIA.

British Empire Steel Corporation applied for a Dominion charter, but the way was made hard for it by the legislators at Ottawa, who criticised the proposals at long range and without understanding them. Nova Scotia, because of her vital interest in the main constituent companies of the consolidation, made the way of provincial incorporation easy, knowing from close acquaintance with the coal and steel industries, and through a thorough understanding of the problems that counsel consolidation, how desirable it was. Nova Scotia has tried independent operation of the coal fields, and has seen it fail.

A province which depends on coal royalties to the extent of between $750,000 and $1,000,000 annually, is not likely to gauge incorrectly the benefits which will follow the new capital investment, the larger markets, and the merged energies and purposes of its major industries, nor are the people of Nova Scotia to be accused of any lack of native shrewdness. The incorporation fees and corporate taxes of the new Corporation, added to those of the existing companies are not to be despised, but what chiefly disposes the Nova Scotians to favor the consolidation is the knowledge that it will effect economies in operation and in marketing, will increase the production of coal, steel and ships, and in many other ways will bring much grist to Nova Scotia's mill.

PERSONALS.

Mr. J. C. Murray is in Toronto.

Dr. W. L. Goodwin will preside at the Convention of Canadian Chemists in Toronto this week. The meetings will be held at the University of Toronto May 27 and 28.

Mr. David Rorison has resigned as Manager of the Inverness Colliery, Cape Breton, and has been appointed Manager of the Ridge Coal Co., near Minto, New Brunswick. He assumes his new duties at the beginning of June.

Mr. Balmer Neilly, secretary of the recently formed Ontario Mining Association is now located in the Trust and Guarantee building, 55 Bay St. Toronto.

Mr. Geo. R. Rogers, president of the Wasapika Consolidated Mines Ltd. is in Toronto this week, after being at the property for several weeks. He reports that the shaft has now reached a depth of 204 ft. where a station has been cut and a cross-cut run into the ore-body.

Mr. Jas. McEvoy expects to leave for the West this week. He will examine coal properties in the Edmonton district.

Mr. C. H. Hitchcock, of Sudbury, was in Toronto this week. He reports that diamond drill exploration is being carried on in several districts.

Mr. T. R. Jones, who lived for several years at Cobalt and managed the Buffalo mine is visiting Cobalt this week. Mr. Jones has taken an active part in developing properties in many districts in Northern Ontario.

Coast Erosion of the Coal Measures in the Sydney Coalfield, Cape Breton

By the Editor.

In a Bulletin on the coalfields of Eastern Canada, prepared by the writer for the Department of Mines, Ottawa in 1916, two photographs were re-produced showing the effect of the sea and the elements upon a sandstone spur that lies between the crops of the Hub and Harbor Seams, not far from the Harbor of Glace Bay. By the courtesy of Mr. B. A. L. Huntsman, of Sydney, an amateur photographer of much skill, the writer has been able to obtain a chronological series of later views of this spur that show the rapidity with which coast erosion proceeds on the exposed Coal Measures of the Sydney Field. The series is of sufficient interest to justify re-publication of the two original photographs with those that have been taken at later dates, the whole extending over a period of twenty years. For the original photograph of 1900, the writer is indebted to Mr. Stuart MacCawley of Glace Bay.

By the courtesy of Mr. C. M. Odell, the following view of the disintegrating and wasting Coal Measure sandstones and shales is reproduced from a photograph taken near Point Aconi in 1908 (on the North Sydney side of the coalfield) and originally published in a description of the operations of the Dominion Coal Company by the writer that appeared in serial form in the "Canadian Mining Journal" in 1908. In this view it will be seen that the overhanging marls have been undermined by wave action, much as a miner undermines the coal seams, and eventually the whole face of the cliff will slide into the sea.

The isolated sandstone spur, the completed work of erosion, shown in the following photograph, is to be seen near Indian Head, between New Waterford and Glace Bay.

Isolated Sandstone Spur at Indian Head, Sydney Coalfield, Cape Breton.

Another view of a sandstone spur is given, which is in the Waterford District of the Sydney Field. The spur is undergoing the same process of destruction that is illustrated by the Glace Bay series. This photograph was taken by Mr. Odell.

It is certain that a large portion of the undersea coal seams—probably nearly all the workable portion—is overlain by waters of the sea that have steadily encroached upon the land by the unceasing wave erosion along the shore line of Cape Breton. The ancient shore line can be detected by soundings at varying distances from the existing coast-line, and the intervening ocean floor has undoubtedly been gained from the land in modern geological time. The late Richard Brown, from observations extending over thirty years, estimated the wastage of the coast at about five inches a year, but the photographs will demonstrate, it is probably much more rapid in exposed spots. The shales and sandstones, because of their parallel bedding, and their seaward inclination, easily slide into the sea when loosened by the winter frosts. In the Spring, under the combined action of the thaw, the scour of the drift-ice and the frequent storms, the cliffs waste very rapidly.

The probability that the workable portion of the undersea coal seam is, in greater measure, overlain by an area of modern encroachment of the sea, has a favorable bearing on the extraction of the coal in undersea workings, inasmuch as the sea bottom will present a slight inclination seawards, free from pockets and fissures. The wave action prevents any heavy deposit of sand, and the ocean floor, for a long distance out is probably a rock bottom. There is also every likelihood that the earth movements which caused the four parallel folds of the Sydney Field, separating the main basins, were much prior in time to the modern sea encroachment, and that no disturbances of the measures in the areas intervening between the folds has occurred in modern geological time.

Some Examples of Coast Erosion of the Coal Measures of the Sydney Coalfield, Cape Breton Island.

A Sandstone Spur of Strata Lying Between the Outcroppings of the Hub and Harbor Seams, Glace Bay. Photograph dated 1900. Wreck is that of "Napoleon" an iron ship.

Eight Years Later. Sea has Broken Through the Spur.

Photograph about 1908. Drift-ice in Foreground. One of the Causes of Erosion in this Neighborhood.

Photograph dated June 1917. Taken by Mr. B. A. L. Huntsman, of Sydney. Coal seam crop in cliff in middle background.

July 1918. Spur separated from land and bridge of sandstone left unsupported. Photo by Mr. Huntsman.

Winter of 1918-19. End of spur isolated. Notice face with cap on right-hand side of middle portion of original spur. Photo by Mr. Huntsman.

Sandstone spur near Barrasois, New Waterford, midway in the shore-line of the Coal Measures of the Sydney Coal field, Cape Breton Island.

The Importance of Cheap Power to the Industrial Life ot Nova Scotia

Presidential Address by Colonel Thos. Cantley to The Mining Society of Nova Scotia, Glace Bay, May 4th, 1920.

Gentlemen:—

Officers, and Members of the Nova Scotia Mining Society, I bid you hearty greeting. The Mining Society of Nova Scotia is entitled to congratulations for the success which has attended its yearly gatherings during past years, and this Annual Meeting now in session in the chief mining centre of our Province, will, I doubt not, prove as important and profitable as any in our history.

The Province also may be congratulated on possessing a Society composed of its leading miners and metallurgists, active men mainly of the class known as practical, men for the most part not only practical, and of seasoned experience, but also of commanding personality, proved ability, with that resourcefulness which practice in mining and metallurgy in a new country, and in some respects an isolated country, demands and creates. Of such is the Mining Society of Nova Scotia—a body for many years composed of men who have perhaps done as much to advance the material prosperity of our native province as any similar group of men, given equal opportunity, have accomplished elsewhere.

In any remarks I may now make it is not my intention to refer to present business conditions, the labor situation, or the present world unrest. All of us naturally must look forward with some misgivings to the future—the immediate outcome of which is uncertain, but as to its final issue I personally have no doubt. Without a League of Nations, or in spite of one, men of the British breed can and will hold their own in the ship, the mine, the field, or the main. All these our fathers and our sons have worked, wrought, fought and sailed, and in all won the respect of our peers, and we have "aye been provided for and saw will we yet."

The custom of our Society is that your President should address the Society on some topic of mutual interest, yet pertinent to the community at large. Certainly there is no lack of problems that might with advantage be considered—and equally no doubt there may be many opinions concerning the subject most worthy of attention at the present time.

The mineral resources of the Province and the processes in the mining and metallurgical industry have been dealt with in their many and varied aspects. transportation and labor problems today have the eyes of the world focussed upon them—while familiarity with the laws and operations of high finance and so-called "big business," not to say mergers, is expected in all well informed citizens, and certainly assumed in industrial executives.

Possibly the most important remaining problem of wide spread concern to industry in Nova Scotia is the production of cheap power. And I have selected it as the subject of my address, treating it from an economic rather than from a strictly professional or technical angle, with a hope of perhaps better orientating our views on the situation in Nova Scotia at the present time. This position in one or more of its several forms, is of vital interest to most industries, which with cheap power may make considerable progress, but under the reverse conditions, will find it diffi-

cult to meet the competition of those more favorably supplied with this necessity.

The amount of power required and the relationship between cost of power and the cost of product vary a good deal, probably reaching a maximum in the electro-chemical industry—and the metallurgical processes used in the smelting, refining and manufacturing of metals.

In these cases power is one of the principal factors and reaches a requirement in the manufacture of certain chemicals of about 5,000 H.P. continuous load per 100 tons of raw material converted into finished product. Reference might be made in this connection to the recent discovery of salt near Malagash, the development of which makes the future establishment of important electro-chemical plants in the Maritime Provinces probable, provided cheap power is obtainable, as salt and coal are basic materials for such an industry, and a most important one it is.

In the electric steel furnace from 200 to 800 K.W. hours per ton treated is used, depending upon the materials charged and the degree of refinement required. Following these we have the more familiar application of power in iron and steel plants, mining and the transportation of materials where mechanical power originally was a secondary factor, but now has become of great importance as a means of increasing production and reducing costs, especially in countries where wages are high. And we find the power consumption amounts to 6 h.p. per ton of pig iron made in blast furnaces, 2 h.p. per ton produced in open-hearth steel furnaces, and 5 to 15 h.p. per ton of steel rolled in steel mills, depending in the latter case largely on the amount of work done in reduction, etc. · In the further manufacture of steel into unusual shape, or where tonnage manufactured to any single section or pattern is small, this percentage may be appreciably increased.

In mining, where the power employed is steam and compressed air, the costs cover a wider range, and may reach from 10 per cent of the output for machine operated, heavy pitching, wet coal seams, to 5 per cent where the mining equipment is electrically operated. In metal mines, too, extreme examples may be cited—on the one hand in the case of rarer metals, given outputs of various magnitudes ranging from a comparatively few tons to several thousand per day, frequently located in inaccessible regions, and at points where a supply of fuel is obtainable only with great difficulty. The opposite type is represented by mines producing large tonnages under favorable conditions, such as our iron ore deposits where, on account of the nature of the materials to be mined, and the unusual thickness of the seam, lying at a moderate pitch, it is possible and necessary to use relatively large amounts of power for the operating of mechanical loading, trimming, and haulage equipment. Such a situation may demand 1 to 1½ h.p. per ton mined.

In the field of transportation, we have for land service on steam railways an average figure of 3 h.p. per ton moved, with a fuel consumption of about one-quarter pound of coal per gross ton-mile. At sea one-quarter h.p. per ton moved is required for bulk freight carriers, of moderate size, to one-sixth h.p. for the largest size, with coal consumption of 1¾ and 1½ lbs. per h.p. hour, and 0.045 and 0.032 pounds per ton-mile, respectively.

The principal prime movers in use at the present time are the reciprocating and turbine steam-engines, internal-combustion engine and the water-turbine. Each has its field of service, and under certain conditions is most economical, which fact must be considered together with its reliability for the service required. By way of comparison, the thermal efficiencies of each type considered as heat engines, may be stated as for modern steam-turbine installations of moderate size, 10 to 15 per cent, and in the case of the largest modern units 15 to 21 per cent. Engines using blast-furnace gas 18 to 26 per cent, while with the full Diesel type of oil engine 33 per cent is obtained, even in small units.

The improvement in thermal efficiency of what is as yet the greatest of our prime movers—the steam engine—during the past 220 years, has been really great. Beginning with the year 1700 Savery's engine then required 40 lbs. of coal per h.p. hour. Newcomens' engine, introduced in 1711, required 55 lbs. Watt's engine of 1778 required only about one-quarter of these amounts, or nine pounds per h.p. hour. The Cornwall engine of 1844 again divided this quantity by three, or to be exact, 3.2 lbs.. Higher pressure and greater ratio of expansion some years later reduced this to two pounds, and in the first decade of this century to 1½ lbs. The turbo generator of 1903 demanded a consumption of about two pounds—fifteen years' study and the outcome of designing experience brought the coal consumption of the turbo-generator in large units down to one and one-tenth pounds, and it would be very unwise to predict that that figure represents finality in that direction.

In Nova Scotia our principal source of power is coal used directly, or indirectly in the form of waste heat from coal in gas fired furnaces, and burned under boilers to actuate steam engines. In the Sydneys, blast-furnace gas might be used to actuate steam engines, while water powers of moderate size are available in various parts of the Province. In some districts use might be made to advantage of oil-driven engines of the internal-combustion type, but it now seems probable that this will be limited to requirements taken care of by small units due to the rapidly increasing price of fuel oil. In view of the efficiency of this type of engine and the other advantages this method of producing power affords, the shortage of fuel oil is regrettable—and a situation already serious is being augmented by the increased use of oil to generate steam in the merchant marine.

As the amount of oil available is far from inexhaustible, and it is a natural resource not replaceable by any known means, we are faced at the present rate of increase in consumption with finding the world's oil reserves depleted before many years, and the problem of finding a substitute is important. Tar, tuluol, and other coal distillation products are now being used to replace natural fuel oils, but while this practice will undoubtedly increase, their source is also circumscribed, due to their being the by-products of coal. What is needed is a fuel capable of replacing them produced from vegetable products. Crude alcohol meets these requirements, and as it may be produced in quantity by systematic cultivation without depletion of natural resources, this problem is one deserving serious attention by governments and departments of conservation.

The situation may in the future be materially relieved by the development of our oil-shale resources, which show marked indications of considerable extent in some districts of this Province, and as they can be mined cheaply, speaking generally, it should be only a short time when these resources will be utilized.

The power of the tides now wasted in the Bay of Fundy, and its tributaries, has received considerable attention from time to time. In our opinion the scheme of this development by the use of two tidal basins is technically practicable, where the land features are such that basins of requisite capacity can be built at a reasonable cost. The initial expenditure would, of course, be great, but so would the power. With the increasing scarcity of fuel and demand for power this source of energy will surely be put to practical use in the future.

In addition to these there are rather indefinite possibilities in the use of peat, which will be of great local value in Newfoundland and elsewhere where there are extensive deposits, when we have learned how to utilize its heat value economically.

While the use of blast furnace and coke-oven gas in internal-combustion engines has been to a very considerable extent tried out, and is still used with success in some localities, such use of these fuels locally seems problematical, especially where the gas can be used to advantage for heating purposes, as the capital expenditure for a gas engine-driven plant of reasonable reliability is very high, and while it is true that the fuel used per unit is still lower than the most efficient steam-driven units, this difference is now very small, as compared with the figures of a few years ago, due to the relatively greater advance made in steam turbines designed for the higher range of steam pressures and superheat; and the higher efficiencies now obtained in the regular boiler room practice where 76 to 78 per cent is maintained without the use of economizers.

Having briefly outlined the probable sources of power, it will be of interest to take up the question of cost production. In consideration of this phase of the question, the cost of electric current generated by steam power plants will be first taken up, and as we all have, to some extent, a conception of the operating cost of most common units, we will not deal with them other than to point out the marked variation in the coal consumption, which is the principal item.

The average consumption of coal per K.W. hour with compound expansion engines of the best type, condensing, ranges from 2½ to 5½, perhaps 4 lbs. might be taken as a fair average, equivalent to, say, 7 per cent efficiency. In the case of non-condensing engines, simple and compound, such as used for pit-winding and rolling mills and similar class of factory engine, where power is distributed by shafting, ranging from 5¼ to 8 lbs., averaging 6¾ lbs., or an efficiency of, say, four per cent.

Miscellaneous small engines, steam pumps (the former located where power is required all over factory and engineering shops, deriving steam through a long system of pipes) probably take from 10 to 20 lbs. or more, and would not average less than 13 lbs., or, say, 2 per cent efficiency.

The efficiency of the units of the two last mentioned classes is so low that their use should be restricted where possible for more economical means, although there is a field for their usefulness within certain limits in plants using large quantities of low pressure steam for the purpose of heating.

Within the last five years large central steam-driven stations received close study as an important factor bearing on the conservation of coal, and the possibilities of obtaining relatively low cost electric power from this source has been fully demonstrated in both the United States and England. The unusual size of these stations should be kept in mind, as generators of 20,000 to 45,000 K.W. are used, and units of over 60,000 K.W. are building, indeed, if not now actually operating, and size has a most important bearing on power costs.

With the use of somewhat smaller units the efficiency, while not as high, is closely approached—as is shown from the operating cost of a central station of this class—which has a switchboard cost for the year ending December, 1916, of 0.262 cents, and for a later period of three months of 1917, when coal was more expensive, of 0.360 cents.

In Table No. 1 the first column shows the various items entering into the switch board costs here referred to, and opposite it is a revised cost using native coal at $5.00 per ton, also allowing for increase in labor and supplies and showing a cost of 0.528 cents per K.W. hour for local conditions:—

TABLE I.

For Three Months Ending March 31, 1917.

	Expense per K.W. hr. Original.	Expense per K.W. hr. Corrected for local conditions.
Superintendence	.009	.009
Wages	.050	.056
Coal	.264	.418
Lubricants	.001	.0015
Station Supplies	.005	.006
Station Buildings	.013	.016
Steam Equipment	.016	.019
Electrical	.002	.0024
Total	.360c	.5279c

For year of 1917 corrected column based—
Labor increased 12½ per cent.
Fuel increased $5.00 per ton.
Lubricants, Supplies, etc., increased 25 per cent.
Maximum demand (20 minutes), 45,000.
Average load, 25,300.
Total K.W. hours, 54,654,900.
Coal per K.W.—pounds, 1.56 lb.
Total cost coal, $144,735.71.
B.T.U. per K.W.H., 20,300.

Twelve (12) *Months Ending December* 31, 1916. ..

	Expense per K.W. hr. Original.	Expense per K.W. hr. Corrected. for local conditions.
Superintendence	.013	.013
Wages	.042	.047
Coal	.174	.391
Lubricants	.001	.0015
Station Supplies	.006	.007
Station Buildings	.007	.0087
Steam Equipment	.016	.019
Electrical	.003	.0037
Total	.262c	.4909c

For year of 1916 corrected column based—
Labor increased 12½ per cent.
Fuel increased $5.00 per ton.
Lubricants, Supplies, etc., increased 25 per cent.
Maximum demand (30 minutes) 36,000.
Average load, 18,500.
Total K.W. hours, 162,117,600.
Coal per K.W., pounds, 1.45 lb.
Total cost coal, $262,135.47.
B.T.U. per K.W.H., 19,800.

These figures do not include interest or depreciation.

It might be well at this point to refer to the differences in cost of power due to variation in local conditions. It will be apparent that high peak loads require reserve generating capacity in proportion to their magnitude, and this condition may apply to boiler capacity also, and, when for this reason the ratio of the average station load to short period peaks is low, and we have a low load factor, this results in increased capital expenditure and operating costs. This has an important bearing, as this factor varies considerably under different conditions and a considerable diversity in industries is desirable when locating such a power unit.

The magnitude of the plant, the costs of which we have given ranging as they do to 200 million K.W. hours per year, is considerably in excess of the requirements of our industrial centres at the present time. The consumption of electric current in the Sydney district is, say, about 100 million K.W. hours, while in Pictou County forty million K.W. per year will possibly take care of present requirements. These smaller outputs materially affect the cost of production, and in order to show the extent of this effect the following estimate is submitted to demonstrate what practice might be expected under present day conditions, using local fuels.

Plants of three different capacities are given producing 46, 72, and 126 million K.W. hours a year, and at a switchboard cost of 1.07, 0.903 and 0.877 cents per K.W. hour, respectively.

TABLE 2.

Station Power Costs.

Items.	Plant A. Costs. Cents K.W.H.	Plant B. Costs. Cents K.W.H.	Plant C. Costs. Cents K.W.H.
Operating—			
Labor	.204	.101	.065
Material	1.16	.756	.701
Maintenance—			
Labor	.0411	.037	.038
Material	.0784	.018	.070
Total Labor	.2021	.138	.103
Total Material	1.238	.754	.771
Total Labor & Material	1.446	.892	.874
Other Items	.025	.011	.003
Total	1.071	.903	.877
Net output in mill K.W.H. Month	3.84	6.14	10.5
T'l power gen. mill, K.W.H. including auxiliaries	4.04	6.21	10.6
Lbs. coal per K.W.H.	3.78	2.68	2.18
Cost of coal 2,000 lbs. ($)	5.00	5.00	5.00
Load factor Machine p.c.	49.0	59.6	64.56
Load factor, 15 min. max.	55.0	45.3	36.37
B.T.U. per net K.W.H. Output	43627	38289	30716
Net K.W.H. per yr. (mill)	46.08	75.26	126.0

Another source of power might be made available by the development of our water powers There are within the Province a number sufficiently large which if developed, would provide several moderate-sized if not large units of electrical energy. While some of our larger rivers and a number of smaller streams have not been investigated in detail, the Nova Scotia Power Commission are of the opinion that 300,000 h.p. may be ultimately developed, and if the present programme as we now understand it is carried out, we may have soon installed transmission systems supplying the greater part of the Province, with the exception of the extreme Eastern section.

A considerable section of the public sometimes referred to as the "man on the Street," has a general idea that water power, in view of its being a natural product, provided by Nature and annually replaced, must therefore provide energy at the lowest possible cost. Unfortunately, however, the cost of such industrial power depends upon a considerable number of factors, and none of the energy possible of development at any of our Nova Scotian streams can be made available to the various manufacturing establishments and our towns and villages, except as the result of very considerable expenditures in the way of extensive dams, storage barrages, the installation of expensive hydro-electrical machinery, and a considerable mileage of transmission lines, and while operating expenses in one direction are low, the interest charges are bound to be high and these must be met.

So far as the cost of water power is concerned, we find that the tentative estimates made by the Commission suggest a total cost, including fixed charges and operaion of 0.7 cents per K.W. hour for the St. Margaret's Bay development. This plant is now under construction and is expected to supply the Halifax district with a possible thirty million units per year.

Another possible development, and in this case of very considerable importance to Pictou County, is that of Sheet Harbor on East River, St. Mary's. From this development we are advised the estimated total cost of current delivered at a point in the vicinity of New Glasgow would be three-quarters of a cent for a total consumption of thirty million, or 1.10 cents for twenty million K.W. hour per annum. Indeed, it is stated that the output can be increased to 45 million K.W.H. at a cost of one-half cent per unit, when such a hydro system is completed, and tied together in a manner which will permit an exchange of current from one development to another. It is to be understood that these prices are based on delivery in the quantities mentioned at transmission line voltage, to a distributing station, and would approximately apply to a very large consumer, but would have to be increased to cover local distribution in order to serve the smaller industries located in a town using current at lower pressure.

The proposed system will link up many of the towns and pass through agricultural districts of the central part of the Province supplying current at a rate which would materially aid in the development of the country, and increase production along many lines.

A great deal has been written on the subject of internal combustion engines of the Diesel type, burning crude oil, especially for marine work, and certainly oil has many advantages over other kinds of fuel, either when used direct in the cylinder of an engine or by combustion under steam boilers. Unfortunately, we are to a large extent prohibited from its use in recent years on account of its high cost.

In the isolated locations where freighting of coal is a serious expense or storage a determining factor, or in cases where boiler feed-water supply is lacking, there is still a field for its use, and we have under these conditions, a very satisfactory and highly efficient plant in engines of the full Diesel and semi-Diesel type, particularly if they are operating under constant load or very light overloads.

As an indication of the operating cost to be expected in a small plant, we give the following figures from a station with semi-Diesel engines having an output of about 130 thousand K.W. hours per month, where the fuel oil consumption is in the vicinity of .0936 gallons per K.W. hour, or which based on the present cost of oil sixteen cents per gallon in tank car lots, the fuel cost is 1.50 cents per K.W. hour. An engine of the full Diesel type would give lower cost figures to some extent—the difference of the two types being represented by consumption of 0.40 lbs. per B.H.P. hour for the Diesel against 0.50 lbs. for the semi-Diesel type. Greater allowance in both types would have to be made for repairs and maintenance than in the case of steam plants.

The figures given in our estimates of cost are for power delivered at switchboard, which will be increased by distribution cost necessary to deliver the current to the ultimate consumer. Owing to the loss in transmssion, cost of equipment and maintenance, this charge will depend on the distance, quantity of current to be transferred, and type of service, and the costs vary considerably. It is usual, however, to have losses of from ten to twenty per cent on power consumed in quantity—while two to five cents per unit is added in the case of current delivered within city distribution system for lighting service.

In estimating the possible saving it will be apparent that two principal classes of power consumers must be considered. First the large independent manufacturer whose requirements are sufficient to warrant operating an independent power plant. The other, the general consumer, dependent on a public course of supply, whose present cost of power probably varies from three to seven cents per K.W.H. It will be apparent that under any unification scheme that the saving to the latter class will be very great.

Some idea of the overall saving that may be effected will be given by the results obtained by the North-east Coast Electric Power Scheme which supplied power to the largest industrial area in England. It is stated that the average price paid this company for current totalling one-third of a million horse-power a year delivered at the customer's terminals, is less than one cent while the coal consumption is 2.06 lbs. per K.W.H. It has been estimated that this latter figure has replaced former coal consumption of 9 1-5 pounds when various industrial establishments now connected with the power scheme generated their own power individually.

As power plays so important a part in manufacturing, it is a factor next only to those of fuel, market and transport costs in deciding the location of a factory. At the present time while we have the coal power is relatively dearer in Nova Scotia, and it is only to be had by installing the necessary power plant to meet each individual requirement. This is a decided handicap to the manufacturer starting a new business, and at best gives very expensive power. It surely is apparent that if manufacturing in Nova Scotia is to develop in a satisfactory degree some effort must be made to improve the situation.

From the figures already given it is evident that large production of power is essential to low costs, whether steam or hydro-electric, and the fact that large central steam plants are now being worked and others developed in the United States and Great Britain confirms this view. Here, as in most cases of human endeavor, unity is strength, and need for all working together is self-evident.

It is important in this connection that all power users should, where possible, employ electric equipment of the same frequency. Unfortunately, this is not the case today, as in two instances in this Province we have practically adjoining districts using current which is not interchangeable without the use of frequency converters, and in this connection it is worth mentioning that the Nova Scotia Power Commission proposes using 60-cycle generating equipment in their various developments. While differences in voltage is not so serious, it should also be given consideration, and limited to as few standards as is economically possible. Standardization would also simplify the local supply of electrical equipment and make neighbors a more dependable friend in the day of spare part troubles.

Some of the larger companies in the Province have a surplus of waste heat or electric generating capacity or both, and could supply power to manufacturers in their locality at a comparatively low cost. Power sold in this way would tend by increasing total production to reduce the cost per unit, and such a policy would have the effect of stimulating the growth of associated subsidiary and smaller trade in the community, and in time build up an important market near at hand.

The situation in this Province from a manufacturing point of view is in some important, if not vital, respects far from favorable. We are situated far distant from the chief consuming centres of the Dominion, and while the cost of transport per ton-mile in the past has not been high, the distances involved have been so great as to make the transport cost a very large factor, particularly in the case of coal and heavy manufactured products, such as iron and steel. During the past few years the cost of railway operation has very largely increased, and is still advancing, and there is little reason to hope for much improvement in this connection.

If Nova Scotia is to advance along manufacturing lines and so provide employment giving a satisfactory return both to labor and capital employed, it is absolutely essential that power be supplied not only to our large but also to our smaller manufacturers, at rates at least as favorable as those enjoyed by like industries in the other Provinces of the Dominion.

A really economic national policy must be based on the necessity of using our coal for such forms of work as cannot be performed with other sources of energy. While our coal reserves are large they are not inex-

haustible, and after that section of our deposits which are immediately available is worked out, the cost of production will increase as our mines and workings become deeper and more extended. The question of man-power necessary to work over the greater and more extended areas of production, when the deposits near the surface are exhausted, is another factor which cannot be overlooked. In view of these considerations we must so far as possible obtain our supply of energy by increased development of hydro-electric generation of power, reserving our fuel supplies for the reduction of our iron and other ores, and the purifying treatment and manufacture of metals, which cannot be accomplished save by the agency of heat, whether this be supplied by solid or gaseous fuel.

To this end all should work together to improve the situation, and to enlist public interest in this subject of vital importance—which we gladly note is now commanding the attention of the Government of this Province, with, we trust, the likelihood of helpful results.

PAYMENT OF BRITISH EXTERNAL DEBTS ADVOCATED IN GOLD COIN.

Mr. Francis A. Govett, Chairman of the Ivanhoe Gold Corporation, in his speech to the shareholders at the Annual Meeting in London, May 3rd., expressed some unusual opinions regarding the status of gold. Among other remarks he stated "the notes issued "(British notes) are only really backed by gold so "long as gold is not seriously demanded, but in times "of panic or serious danger, either the Bank Act is "suspended, or the convertibility at once suspended. "That is to say the gold backing for the paper is en"tirely Christian Science, you can get gold for your "paper only so long as you do not want it."

Mr. Govett's conclusions were as follows:—

"Gold has rendered good services; it has provided a most convenient common measure for the internal exchange of all commodities, and for international exchange, there being a fixed amount of fine gold in the unit coin of any country. This being so convenient, it is absurd that complications involved by the use of silver as a collateral basis of exchange should be tolerated, or that any country should remain on a silver basis; still more absurd that any of these countries should be a country, within the British Empire, like India, Ceylon and East Africa. (Hear, hear.) We cannot compel China to come in, but there should be a uniform currency for the Empire, with its base the British sovereign. It does not matter what may be the denominations of the subsidiary token coins so long as they are really tokens and not, like the rupee, a coin of value above 2s, and possibly a token when silver falls below. Internally the use of gold itself as pocket coinage is most extravagant, for six years past we have done well without it, and I have shown that in practice it is never used in times of need for one of the purposes for which it nominally is available, the backing of the note issue in circulation. To me it seems, then, better to recognize the actual facts, that the note issue are not backed by gold at all, but rest on national credit; to confine the use of gold to the sole function of the adjustment of international indebtedness and actually to use it when it is wanted; that is to say, instead of hoarding the useless gold in the bank vaults, it should be used in paying our external debts at 4.86, instead of our buying bills, as we have done, as low as 3.20 at a heavy loss, which means that we were paying 40 per cent to 50 per cent more for what we buy and increasing our indebtedness by that amount. Take the whole of the gold and hurl it at them; one of two things will happen—either the exchange will immediately rise in their unwillingness to take gold, or they will take it, and we shall have saved some further debts, and then we shall be no worse off than at the present moment, and at least we then shall know where we stand, for we shall be back on the real basis of our national credit, when perhaps at last we may begin to grasp the facts and to economise a little, while the internal credit of the Bradbury will still be unimpaired."

NOVA SCOTIA NOTES.

Colliery Doctors and the Workmen's Compensation Board.

The colliery doctors in Cape Breton refuse to make out the accident returns which the Workmen's Compensation Board require to establish the claims of the injured workmen, alleging that to do so entails a great amount of clerical labor for which they receive no compensation. The Board states it is not empowered to pay the doctors for doing this work, and that it cannot make payments of compensation without the certificate of a physician. As the colliery doctors are paid by the workmen, who contribute a monthly sum, in the neighborhood of a dollar per month, to the doctor of their choice, through the medium of the colliery payrolls, the workmen naturally consider the certificate of injury to be of a service included in the monthly deduction for doctor's services. The Compensation Act contains the following provision, namely; "It shall be the duty of every physician in attendance upon any injured workman to give all reasonable and necessary information, advice and asistance to enable such work or his dependants to make application for compensation, and to furnish such proofs as may be required by the Board." It is very much to be doubted whether such a statutory provision is enforceable, because nothing is said regarding the payment of the doctor for the services asked, and it is generally understood that no services can be commanded under a statute of this nature for which remuneration is not made in some form or other. The Board is probably correct in demanding medical certificate of injury, but this it requires only for its own satisfaction. Someone, however, should pay the doctor. It is a generally accepted principle of Workmen's Compensation Act as recently enacted and amended that the workmen himself shall be put to no charges for medical aid, and there is no good reason why the workmen should be asked to bear the cost of whatever charges the doctors may consider cover the work entailed by making out the compensation returns. It is probable the doctors are making much of little, and that on the other hand the Compensation Board is asking something for nothing. It is also possible that the returns which the doctors are asked to fill out are unnecessarily detailed, and that if the doctors were asked to certify returns already made out and requiring only a signature for completion, the dispute could be compromised without the necessity for paying a fee to the doctors. The vagueness of the provision above quoted from the Act, and the duty required from the doctor without specification of his remuneration was certain sooner or later to raise a question. "Such proofs as may be required by the Board" is a phrase capable of indefinite extension according to the interpretation placed upon it by the Board.

METAL QUOTATIONS.

Fair value for ingot metals at Montreal, 27 May 1920.

	Cents per lb.
Electric Copper	24
Castings	23½
Lead	10¼
Zinc	11
Aluminum	38
Antimony	12

OUR NORTHERN ONTARIO LETTER

The Silver Mines.

At the time of writing, silver quotations appear to have become fairly steady at a fraction below $1 an ounce. This is believed to be due to the United States having entered the market to replenish its somewhat depleted treasury supply of the metal. Opinion now is that as the United States, according to the Pittman Silver Bill, is to replace more than a quarter of a billion ounces previously sold which must be repurchased at not more than $1 an ounce, the price may be expected to show no further serious decline. Outside buyers, therefore, would be obliged to bid over $1 to get the market. This is pointed to as indicating at least $1 silver, plus the rate of exchange on New York funds at present around ten per cent, leaving the mining companies of this country still in a favorable position.

Work at the Temiskaming mine is one of the most favorable factors in recent months in the Cobalt district. Less than two years ago the ore reserves were pretty well depleted and the mill was closed down, while today, as a result of an aggressive and wisely directed exploration campaign the mill is treating ore at the rate of 135 tons daily, the highest record of the Temiskaming. A considerable quantity of the ore is high grade. A further indication of the expectation of the management and directorate that the mine has a big future ahead of it is that at the present time the company is installing silver refining equipment of its own in the present mill. These facts, taken together with the knowledge that the present surplus is over $900,000 and may be approaching $1,000,000, offer reasonable indications of steady dividends from this date forward.

At the Beaver Consolidated, the low cost of treating the ore is enabling the company to maintain its earnings, while the recent leasing of the Prince property, and the probability of also acquiring the Badger offers fair promise of operations being still further enlarged.

Combined, the Beaver and the Temiskaming mines lend an importance to that part of the Cobalt field, which, with the other smaller operations now getting under way, is fully maintaining its place as one of the most productive parts of this rich silver field.

Normal conditions, or at least conditions to which the mines have become fairly familiar, prevail in Cobalt, with the one exception of a labor supply slightly below requirements. That this shortage will continue for the summer seems probable. An indication of this is shown in the presence this week of a representative of the international Nickel Company who is in Cobalt to engage all the drill-runners he can at a wage somewhat higher thau that being paid locally. Whether or not the mining companies of Cobalt will be content to work at a slightly reduced capacity by maintaining the present wage and bonus schedule or will also enter into competition with outside industries is not yet clear. Just now opinion appears to be more or less divided on this phase of the situation.

The Cobalt Radium Syndicate, made up of a number of Cobalt men, has engaged men to explore the surface of property held in the township of Butt in the near vicinity of the radium-bearing ore discovered in that district last year. The Syndicate holds six mining claims in that area.

In connection with the proposed light railway from Elk Lake to Gowganda, the Bill has passed its third reading, and it is learned that the Northern Light Railways is making a bond issue of $300,000 in denominations of $1,000 bearing interest at 7 per cent with a bonus of one share of common stock per $1,000 bond. The company is capitalized at $500,000 made up of 5,000 shares of the par value of $100 each. In addition to the mines already in operation, more than a dozen other property owners have signified their intention to commence work just as soon as rail transportation is provided. The promoters of the enterprise are confident of success. Indications are that other work in the district, particularly lumbering will provide additional freight revenue. The Bill to establish The Mining Court of Ontario bids fair to pass, and may become law in September. The proposal has met with quite general favorable comment throughout the mining districts.

Sir Clifford Sifton, together with Geo. Glendenning has just concluded a visit to the Bonsall property in the Gowganda district. It is understood arrangements will be made to operate the property if rail transportation is actually provided this year.

The Coniagas Company is proceeding with the preliminary working connection with exploring their recently optioned property in the Gowganda field. A road is being cut, and camps erected preparatory to taking on miners.

Ore and Bullion Shipments.

During the week ended May 21st, five Cobalt companies shipped an aggregate of ten cars containing approximately 776,648 pounds of ore. The Nipissing alone sent out four cars containing 356,424 pounds.

Following is a summary:—

Shipper	Cars	Pounds
Nipissing	4	356,424
Mining Corporation	3	199,409
La Rose	1	83,416
Beaver	1	72,799
Right of Way	1	65,800
Totals	10	776,648

During the corresponding period the Nipissing made one shipment of bullion, sending out 74 bars containing 100,416.48 fine ounces. This is the first shipment of bullion to be made since March from the Nipissing.

Arthur A. Cole, Mining Engineer, has issued the following statement of ore shipments over the T. & N. O. Ry., for the month ending April 30th, 1920:—

Silver Ore.

Cobalt Proper.	Tons of 2,000 lbs.
1. Coniagas	118.00
2. Dominion Reduction	32.50
3. Hudson Bay	30.76
4. La Rose	105.17
5. Mining Corporation	423.52
6. McKinley-Darragh	94.59
7. Northern Customs	65.20
8. O'Brien	104.17
9. Peterson Lake	30.00
10. Temiskaming	78.33
	1,082.24

The above shipments were made to the following Companies:—

Canada.

Deloro Smelting & Refining Co., Marmora Deloro	759.95
Coniagas Reduction Company, Thorold	183.09

United States.

American Smelting & Refining Co., Pueblo	139.20

Note.

April 6th. Highest price of Silver during month	127.000
April 30th. Lowest price of Silver during month	111,500
Average price of Silver during month	119,779

The Gold Mines.

The expected relief in the way of labor supply has not materialized in the Porcupine gold area, and the mines are all still operating under this handicap. In spite of this, however, the earlier prediction of the Ontario Bureau of Mines that the output for 1920 would set a new high record promises to be fulfilled. According to figures now being prepared, the production from January 1st to May 31st will about equal that from January 1st to June 30th during the previous year.

Ore being treated at the Hollinger Consolidated has been reduced to around 1,700 tons daily, as compared with an average of 1,950 tons during 1919, and compared to 2,200 tons monthly earlier during the current year. The performance, therefore, at the Hollinger promises to about equal that of the preceding year, and tends to show that the increase in output from the Camp as a whole will be due to the operations of the Dome and Porcupine Crown, and, also, to an increase at the McIntyre-Porcupine.

The question of increasing dividends on the Hollinger was shelved at the annual meeting of the company. Shortage of labor is stated officially to be the only reason why the dividend could not be increased to one per cent every four weeks, or 13 per cent annually. At the same time, some of the shareholders have expressed the opinion that the company could continue its present policy of paying one per cent every eight weeks, with one extra at the end of each year or a total of seven per cent per annum, and in addition to this pay an extra of one per cent in July of each year and thus increase to a return of 8 per cent interest instead of 7 per cent as at present. As to this, the fact that no action was taken at last week's meeting would indicate no change until perhaps the end of the current year.

Following are the directors of the North Crown Porcupine Mines, Ltd., the newly incorporated $3,000,000 company which takes over the combined Porcupine-Crown and Thompson-Krist properties;—Sir John Carson, president of managing-director; J. R. L. Starr, K.C.; Wm. I. Gear; J. B. Bertram; Percy Galt, K.C.; James G. Ross, C.M.G.; James Cooper; A. G. Gardner; and Ziba Gallagher. Messrs. Starr, Bertram and Galt represent the Thompson-Krist in the new merger, while the remaining six are original members of the former board of the Porcupine Crown Company. The North Crown begins its career as a going concern, with $30,000 in its treasury and mill in operation treating ore at a substantial current rate of profit.

The Clifton-Porcupine, as a means of overcoming labor shortage has decided to engage diamond drills for exploration work. Following up its policy of keeping its shareholders fully informed as to progress and results achieved, the Company has issued a quarterly statement, dated May 19, as follows:—

Since our last report, dated February 19th, was mailed, considerable progress has been made in the development of your property.

On the 200-foot level a crosscut has been driven East for 160 feet. Nos. 7, 5, 6 and the Boulder Veins have been encountered in this crosscut. The first three have increased in width, while the Boulder vein has shown a tendency to split up on the first level. The same high values encountered on surface and on the first level, persist at this greater depth, considerable free gold being in evidence in the vein material.

70 feet of drifting has been done on No. 7 vein, both North and South of the shaft, with good results. A crosscut has been run west for 90 feet, but at the date of writing, the objective—No. 8 vein—has not been reached. 125 feet of drifting has been done on No. 6 vein North, with the object of proving the values in this vein and of reaching the contact area which lies North of our present workings. In this contact area, we are advised by our Consulting Engineers, lies our best possibilities of an increase in size of our ore bodies. It is significant that at every producing mine in the camp, the largest ore bodies lie in reasonably close proximity to the contact between the keewatin and porphyry rocks.

The labor situation is a hard problem to solve. Employees of the mines, lured by equal or higher wages in less hazardous occupations, have been leaving the mining districts in considerable numbers. The gold mines, with a fixed price for their finished product, have advanced wages to the highest possible point, in spite of which they have found it impossible to compete with other employers for the necessary labor to operate at the highest efficiency.

All of the mines have been affected by this situation. The larger mines have found it necessary to curtail operations to some extent, while the smaller mines have been affected in even greater degree. We have found it almost impossible to replace the skilled workmen who are leaving.

For these reasons, your Directors deem the present an opportune time to carry on an extensive diamond-drilling campaign recommended by our Consulting Engineers. Contracts for several thousand feet of this work will be immediately let on tenders in hand, and the work will start as soon as the drills can be moved to the property.

The results of this drilling will provide us with information as to the size and depth of the ore bodies that will make it possible to carry on the further development of the property in the most efficient and economical manner.

Announcement is made that property owners in the Boston Creek district are making arrangements to engage the services of Alfred R. Whitman, mining geologist, to make a study of the geological structure as revealed by mining to date. The work is to be done with the full cooperation of the property owners interested, and will include a very careful examination of the Miller-Independence mine, now working at a depth of 500 feet, and the Mondeau, where work is being carried on at the 250-ft. level.

Tenders are being called for the sale of the assets of the Kirkland-Porphyry Gold Mines, including several unpatented mining claims in the township of Teck in Kirkland Lake, and also a lease on the Orr Gold Mines. It is learned from usually well-informed quarters that there is likelihood of early resumption of work on the Orr property. It is intimated that the differences which arose between Hamilton B. Wills and the Wettlaufers of Buffalo are being so adjusted as to make it possible to resume work on the promising property. The Orr lies adjacent to the Kirkland lake as well as the Teck-Hughes mine, and has a substantial tonnage of good grade ore already blocked out.

On the Fidelity property in the township of Teck, the main shaft has reached a depth of 192 feet, and is being driven at the rate of about 80 feet a month, indicating that the 300-ft. level will be reached by the early part of July.

The shaft is being driven on an incline, following the vein. It is stated the main vein continues quite uniform in width, and that a small vein measuring about four inches in width has come in along the foot-wall side of the shaft.

The first or 100-ft. level has been reached at the Bidgood property in the Lebel township part of the Kirkland Lake gold area. The vein is stated to have dipped north out of the shaft at a depth of about 65 feet, and a crosscut consisting of a round or two of shots is being driven to intersect the vein at the 100-ft. level. Sinking is proceeding at about 100 feet a month at the Bidgood, inclusive of timbering. In addition to cutting a station at the 200-ft. level it is thought the shaft will reach the 300-ft. level by the last week in July.

At the Kennedy-Boston, the newly installed mining plant is now in operation and the deepening of the former 100-ft. shaft has commenced. The shaft is down 120 feet, and it is officially announced that the vein which dipped north out of the shaft at a depth of about 60 feet has come back into the shaft at a depth of 112 feet where it measures about three feet in width and is highly mineralized, with visible gold.

Mining claims Nos. 4655 and 4656, situated in the township of Skead, between the Manley property and the Wisconsin-Skead Gold Mines have been purchased by a syndicate from Niagara Falls.

The deal is stated to have been arranged by A. C. Thorburn, and arrangements have been made to commence work at once. It is proposed to spend about $2,000 in determining the most suitable place for the commencement of underground operations.

BOOK REVIEWS

PROSPECTOR'S FIELD-BOOK AND GUIDE. By H. S. Osborn. Revised and enlarged by Mr. W. Von Bernewitz. Ninth Edition. 4⅝ by 7⅛ ins. 400 pages. Flexible Fabrikoid backs, designed for pocket use. Price $3.00. Henry Carey Baird & Company, 2 West 45th St., New York.

This volume is a completely reset and revised edition of the issue of 1910. The information regarding ore occurrences outside of the United States is fuller and more correct than is often the case in New York publications and Canadian references, particularly in the new chapter on alloy minerals, are reasonably accurate. The chapter on petroleum, asphalt and oil-shales contains much information in condensed space.

The introduction to the work gives preparatory instruction in elementary geology, the use of the blowpipe ore analysis and surveying, and the work emphasises that "the search for ore deposits is becoming "a specialized profession, and those that keep this fact "in mind are the ones most likely to benefit by it."

From a United States viewpoint, the list of minerals and metals prepared by C. K. Leith of the U. S. Geological Survey is interesting, as showing to what extent the United States is self-sustaining in minerals supply. Minerals which our neighbours must import include nickel, mica, graphite, asbestos, and cobalt, all found in Quebec or Ontario.

The book appears to be well worth the price asked. It is well bound and adapted for pocket use. The condensed accounts of ore occurrences throughout the world constitute one of the most valuable features of this book.

The revisor has had practical mining experience in New Zealand, Australia, Dutch East Indies and America, and, judging from the Canadian references, his facts are reliable

BRITISH COLUMBIA LETTER.

Hazelton, B. C.

J. D. Galloway, resident mining engineer, has returned to take charge of the season's government operations in his district. He states that much road and trail work is planned to assist in the opening up of mining properties on Hudson Bay Mountain, on Driftwood Creek, and in other sections of the wide area covered by the Northwestern Mineral Survey District of the Province. Mr. Galloway intends making an early inspection of placer mining in progress in the Cariboo and hopes later on to be able to arrange to make a trip of inspection into the Peace River Country. The examination of a group of mica claims near Tete Jaune Cache is proposed at an early date, the owners having in mind the opening up of the deposits on a large scale, it having been shown that the mica yield is of as fine a quality as can be secured on the North American Continent.

Stewart, B. C.

The Provincial Government, as a result of recommendations made by George Clothier, President Engineer for the District, proposes the expenditure of a substantial sum this year in further opening up the Salmon River mineral area, as well as the zone north of the Portland Canal Mining Division. The wagon road, built last year to the Premier Mine will be continued and trails will be constructed to assist both operators and prospectors. In order to make easier the recording of mineral claims staked in this country the whole of the region where are found the head-waters of the Naas, Unuk, and Iskut Rivers has been included in the Portland Canal Mining Division so that hereafter prospectors will travel along the line of the Salmon River, making use of the trails mentioned, to Stewart to make official record of their claims and assessment work. The change simply means that an imaginary line has been drawn by the Department of Mines from Mount Brown to a point where the 56th parallel intersects the eastern boundary of the Omineca and Naas Mining Divisions which throws all that part of the Naas Division lying to the north of this line into the Portland Canal Mining Division. The section to the south of this line will beadministered as before from Anyox, where there is a mining recorder. Previously it was thought to be easier to reach Anyox from the headwaters of the Unuk, Naas and Iskut Rivers that to get to Stewart owing to the intervening coast mountains. Recent exploration in connection with the opening up of the Salmon River zone, however, has proved that a comparatively good pass exists and that, with the development of the past two years and that underway, prospectors will be better able to get to Stewart than to Anyox.

Kamloops, B. C.

The report that diamond drilling operations on the Aspen Grove Group of Mineral Claims had been suspended indefinitely has been denied by J. H. Bate, one of those interested in the property. He asserts that powerful machinery is being installed and that a programme of exploration and development has been prepared that is likely to take two or three years to complete.

Cranbrook, B. C.

A copper deposit has been located on the Skookumchuch River, about thirty miles from Cranbrook, which

is said to have exceptional merit. Development work to a depth of about 40 feet is announced to have shown up a considerable body of high grade ore. The property has been bonded by Dan McIntosh, a well-known mining man, for $15,000.

Kaslo, B. C.

At the annual meeting of the Utica Mines Ltd., it was decided to decline an offer received for a controlling interest in the property.

Barkerville, B. C.

L. A. Bonner, manager of the Lightning Creek Hydraulic Company, Cariboo, who returned recently from a business trip to England, states that the season in northern British Columbia in respect of placer mining is extraordinarily backward. A few weeks ago he snowshoed into his property over four feet of snow and expects that later on trouble will be experienced through freshets. Mr. Bonnar looks for a greater output of placer gold from the Cariboo this season notwithstanding the handicap which the operating companies face owing to the scarcity of labor.

Vancouver, B. C.

A mining property known as the Opporgol, situated on Howe Sound, a short distance from Vancouver City is attracting considerable attention as recent development, financed by a syndicate of business men of Vancouver, is reported to have brought ore to light carrying gold, silver, and copper values. The first work done at elevation of 1500 feet and in the initial forty one feet of cross-cut four veins were cut ranging from 2 1-2 feet wide. Between the veins is a replacement of the same character and values as in the veins. The ores in the cross-cut are reported to have averaged $8.51 a ton. Both copper and lead occur in sulphides. At sea-level another adit was run opening up the ore vein. The company plans to instal a couple of drills, an air-compressor, and an hydro-electric plant, power for which can be secured from any one of several waterways in the vicinity. The property is most advantageously situated for operation as it can be worked from a portal practically at sea-level.

New Denver, B. C.

The strike of metalliferous miners of the Slocan Silver Mining Camp of this Province has been settled, the operators at a meeting held recently having decided to grant the men an advance in wages amounted to practically 75 cents a day. The mines ascribing to this agreement include the Roseberry-Surprise, the Noble Five, the Cunningham properties, the McAllister, the Carnation, the Lincoln, the Rambler-Cariboo and the Standard. There has been little work done on any of the properties mentioned since the 1st of May. It is understood that the Silversmith Mine at Sandon compromised with its men before the general readjustment was arrived at, allowing its men 50 cents a day increase in wages and blankets.

Victoria, B. C.

It is announced that the issue between the Taylor Engineering Company and the original Dolly Varden Mines Co. which threatened to develop into long sustained litigation through the courts of Canada has been settled. Under the terms of the agreement the Taylor Company, who are in possession of the Dolly Varden Mine and all the plant in connection therewith, undertakes to pay a debt of approximately $613,000 without delay. This charge was an incumberance against the property in favor of the first owners, and those who accorded them financial assistance, but it was not specified that the amount should be paid over on any particular date. The settlement, therefore, means that the obligation will be discharged at once and that the Taylor Engineering Company will be allowed to retain posession and to operate the mine without further molestation, the agitation in progress for some weeks at Ottawa for the disallowance of legislation passed at the last session of the Provincial Legislature being discontinued.

B. C. GOVERNMENT CONSIDERING ESTABLISHMENT OF IRON AND STEEL WORKS BY THE PROVINCE.

The Hon. Wm. Sloan, Minister of Mines for British Columbia, in an address on the second reading of the Bill to extend the operative period of the Iron Ore Bounties Act until 1925, said with reference to the much debated possibility of an iron and steel industry in the Province:

"That the Government has received many applications from various quarters for substantial support in the launching of this industry. All these applications have been given careful consideration, but in every instance it has been found that the individuals or corporations concerned, required that the Government enter into financial responsibilities of a very serious nature, in many instances to the full financial requirements of the enterprise. This, it will be appreciated, would involve a binding obligation not lightly to be undertaken under the conditions with which the Province has been faced during the past few years. For this reason consideration has been given the question of whether it would not be the best policy of the Government itself to lead the way to the establishment of an industry for the manufacture from our iron ores of commercial iron and steel rather than finance private enterprise to do so.

Province will take the initiative..

"It is proposed therefore," continuld the Minister, "that should no more favorable terms be submitted by private enterprise to assemble full and complete data, having special reference to the recent important discoveries of hematite ore in the Whitewater district, all with a view of considering the undertaking by the Government of the establishment of an iron and steel industry at an early date in the Province of British Columbia, thereby paving the way to the obtaining for our Province what is recognized as the basis of all industrial enterprise."

Government is Determined to Grant Every Encouragement to Iron Industry.

"The bill before the House," he continued, "is merely one of a series of measures each of which, directly or indirectly, has the same object. Others that may be instanced are the Mineral Survey and Development Act and the Iron Ore Supply Act of 1919. The former furnishes the machinery through which more detailed and accurate information regarding our mineral resources—and our iron ore bearing areas are in an important part of these resources—may be obtained. In passing I may say that it has served and is serving this purpose."

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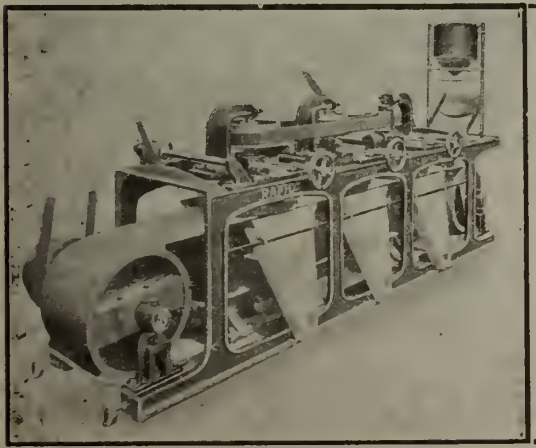

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By those who had been and were concerned in the establishment of an iron and steel industry Mr. Sloan wished it to be understood that the Government was behind them to the full extent of its power having regard to the serious financial obligations of the country and to its responsibility as the representatives of the taxpayers and electors of the country. The Government was sincere in its determination to help those whose enterprise and confidence in the future of the Province had induced them to take up the task of launching the industry which, everybody was agreed, would mean the opening of a new, a broader and a more prosperous era in the commercial and industrial development of British Columbia.

The Whitewater Discovery.

"Possibly the most noteworthy of recent events bearing on this subject," recalled Mr. Sloan, "is the discovery of large deposits or what are described as limonite and hematite ores in the Whitewater River section of the Lillooet Mining Division. When information was received regarding the existence of these bodies of iron ore Wm. M. Brewer, one of our mining engineers, was instructed to proceed to the district to make an examination and submit a report thereon. This he did last summer. While Mr. Brewer was unable to make a full and complete inspection he was able to see and to satisfy himself of enough to demonstrate that the field merits the very closest examination in the public interest. Mr. Brewer places himself on record as estimating the 'actual ore' at 7,200,000 tons, the 'probable ore' at 15,000,000 tons, and the possible ore' at 50,000,000 tons. Assays of the ore show it to be of high commercial value.

Steps Taken.

"Recognizing the importance of such a deposit," said the Minister, "the Department of Mines immediately took steps to interest the Geological Survey of Canada. Through Charles Camsell, its western representative, the services were obtained of S. J. Schofield, who proceeded to the district to make a further report. His party, however, was too late to make any extensive investigation. In the meantime, through the instrumentality of the Department, a reconnaissance of possible route of transportation from the Whitewater District to the coast has started, having been partially completed last season. It will be continued this year.

Further Work Promised.

"This work," Mr. Sloan went on, " both in regard to the geology of the section, the extent and quality of the iron ore available, and as to the feasibility of arranging transportation facilities, will be proceeded with this year as soon as conditions permit. The assurance of the Geological Survey has been received that although hampered by a shortage of properly qualified geologists, every effort will be made to assign a party for exploration in this section during the Summer months.

"It is scarcely necessary," he said, "for me to emphasize the importance of such a deposit of accessible Hematite and Limonite ore to British Columbia. If all is as represented it means that the establishment of blast furnaces in this Province, is as practical as it has been found in any other industrial centre of the American continent. In short it simplifies the problem of the treatment of the Magnetite Ores of the Coast and brings the establishment on a firm and lasting basis of an iron and steel industry within easy reach of those with capital looking for a sound investment that will assist at the same time in the opening up and the development of the country.

Progress Has Resulted From Government's Action.

"Broadly speaking," the Minister concluded, "we are, unquestionably, some distance further ahead towards the solution of the problem of the development of the iron ore resources of the Province. The Government has not lost sight of the importance of the question and is using every means possible to bring about the result so fervently desired. With our policy of obtaining more information regarding the deposits at our disposal, of bonuses, of assisting those undertaking experiments in treatment, and lastly of obtaining from the Legislature the power to prevent the tieing up of such holdings for speculative purposes, we may expect action soon."

BOOK REVIEW.

TECHNICAL WRITING. By T. A. Rickard, Editor of "Mining and Scientific Press." First edition. John Wiley & Sons, New York and Chapman & Hall, London. 178 pages with index. Buckram and Boards. $1.50 net.

Those who have read Mr. Rickard's previous work, "A Guide to Technical Writing," will need no introduction to his abilities to point out the frequent faults of technical writing, a subject which, as the editor of a technical publication, must be constantly before him. "This little book" states Mr. Rickard in his preface, "has grown from a set of five lectures delivered before the engineering classes of the University of California in 1916. It is a ticklish task to write on writing, because the effort provokes self-consciousness. All I hope to accomplish by means of these printed lectures is to cause members of my former profession to 'sit up and take notice.'" We believe Mr. Rickard can claim to be master of two professions.

As a writer, Mr. Rickard is well qualified to advise on style, having himself developed one of the most lucid and readable styles in contemporary technical literature. A mode of expression such as that employed by Mr. Rickards is not, however one that can be easily come by, and it will be admitted by those who have any experience of writing that what is apparently the happy and spontaneous expression of the moment is in reality the outcome of much reading, much experience, much labor, and a thorough knowledge of the subject written about. Those who have had occasion to look over the papers of students and immature writers will have noticed that half assimilated and incomplete knowledge leads to a turgidity that no amount of use of technical terms will help to clear, and, conversely, the speeches of eminent scientists, who thoroughly comprehend their subject, are remarkable for their simplicity of wording and the clearness with which the ideas they discuss are presented to the reader.

One of Mr. Rickard's happiest essays dealt with the romance of mining, and was doubtless much appreciated by the International Mining Convention before which it was delivered recently at Seattle, but this essay could not have been undertaken without wide knowledge, and revealed an acquaintance with litera-

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ture, old and new, sacred and profane, that is attained by few technical writers. While, therefore, the attainment of Mr. Rickard's own felicity of expression is only possible to those, who in addition to the ability to think clearly and the possession of accurate technical knowledge, are deeply read and possess more than an ordinary education in English, there is a widespread necessity existing among engineering students to improve their use of English as an instrument to convey technical knowledge to others.

Mr. Rickard's slogan is "Remember the reader," which he correctly terms the fundamental rule of writing. "Somebody must put hard work into every technical article that is written for publication, if not the author, then the editor; if both the author and the editor shirk their duty, the reader will have a headache."

A quotation from Quintillian by Hill is used by Mr. Rickard, to emphasise the necessity for clearness, that is very apt. "It is not enough to use language that **must** be understood."

"Superlatives and other Diluents," is a chapter touching a common fault of writers. "Diluent" is a delicious sarcasm. The word "very" it is stated can be deleted nine times out of ten. The qualification of the unqualifiable word "unique" is properly condemned. "Considerable" is described as "a woolly word, usually out of place in a technical statement." Such loose and indefinite terms as " more or less," "some," "greater or less extent," "more or less completely" are shown to be a source of weakness. "The secret of a vigorous style is the rejection of the superfluous word" is Mr. Rickards conclusion. At the same time he shows that clearness is desirable even if it requires seeming tautology.

A helpful chapter is that on hyphens and compound words, the trend of which is to be seen from the following examples :

"A 'single stamp-mill' is a lonesome mill.

" 'A single-stamp mill' is a mill consisting of batteries of one stamp each.

"A 'single-stamp-mill is a mill containing only one stamp.

"A 'crude ore-bin' is an ore-bin of crude construction.

"A 'crude-ore bin' is a bin made to contain crude ore.

" A 'crude ore bin' is an example of crude writing."

In the chapter of "slovenliness" Mr. Rickard criticises, not too hotly, the befouling of the English language with vulgarisms and colloquialisms that are understood only locally or regionally. "Chucking muck in the gob" may be a phrase understood in Yorkshire coal-mines, but it is not preferable to "packing the waste," a term that does permit of ambiguity.

"Jargon" is dealt with entertainingly but in a root and branch fashion. It is described as dealing in periphrases rather than going straight to the point, it loves the abstract rather than the concrete, it dabbles in words of sound rather than meaning." Sir Arthur Quiller-Couch is quoted as writing; "In literature as in life he makes himself felt who not only calls a spade a spade, but has the pluck to double spades and re-double."

We think Mr. Rickard's truest statement is that slovenly writing is the result of slovenly thinking, "for slovenly habits of expression corrode the very substance of thought." A notable quotation is given from Whewell, who in the "Philosophy of the Inductive Sciences" writes: "Language is often called an instrument of thought, but it is also the nutriment of thought; or rather it is the amosphere in which thought lives; a medium essential to the activity of speculative powers, although invisible and imperceptible in its operation, and an element modifying, by its qualities and changes, the growth and complexion of the faculties which it feeds."

Mr. Rickard's little book is commended to all who desire that their writing shall clearly express the thoughts they desire to communicate. While not all can hope to attain to the ideal of language expressed by Mr. Rickard in the concluding sentence of his book, is here quoted as a fine example both of style and idealism. "Language is a factor in the evolution of the race and an instrument that work for ethical progress—it is a gift to be cherished as the ladder by which man has climbed from his bestial origin and by which he may ascend to a loftier destiny, in which, ceasing to stammer in accents that are but the halting expression of swift thought, he shall unfold his mind in the fulness of speech, and, neither withholding what he wants to say nor saying what he wants to withhold, shall be linked to his fellows by a perfect communion of ideas."

F.W.G.

:-: EDITORIAL :-:

Coal—A First Essential of National Independence

The Report of the United States Committee on Canadian pulpwood embargoes contains the following statement:—

"The testimony also conclusively shows that we must "have pulpwood from the Crown Lands and three pro- "vinces in the Dominion, otherwise our papermills will "be eventually compelled to close down or move into "the Dominion of Canada. Canada must have coal, "sulphur, kaolin and dyes from the United States, or "suffer a similar misfortune."

The ending of this phrase is ambiguous. Whether it is intended to imply that it would be a misfortune to United States mills to move into Canada, or that it would be a misfortune to Canadians to have to move into the United States we are unable to gather from the wording, but there is no ambiguity about the statement "Canada must have coal coal, sulphur, kaolin and dyes from the United States." Nevertheless it is an incorrect statement. Canada does not have to obtain either coal, sulphur, kaolin or dyes from the United States. All, or any of these materials we can supply from our own resources, if we care to.

Ontario can produce the sulphur, Quebec can supply the kaolin, and either Nova Scotia or Alberta can supply the coal and the dyes, if it is considered necessary.

There is one thing, however, that Canada can not do. She cannot maintain her national independence unless she will proceed to make the Dominion self-supporting in coal supply.

We do not make the statement that Canada can obtain coal from her own mines as cheaply as it can be brought from the United States, but we venture to reaffirm the opinion expressed before the Annual Meeting of the Canadian Mining Institute in relation to our coal supply, namely, that "Canada cannot be run as a successful economic whole if we ignore the obligations of nationality and insist on buying goods in the cheapest market merely because they are cheap. That way lies loss of independence and national disintegration."

These definite opinions are admittedly dogmatic. The circumstances do not, in our opinion, admit of any modification, if it is admitted that the possession of a sufficient supply of bituminous coal is a necessity of national independence and defence. On this point the rulings of the Supreme Council are specific. Pick out any part of Europe affected by the war where coal occurs, and there the fighting will be found to have been most prolonged and bitter. Select any territory regarding which the framers of the Peace Treaty found greatest difficulty in satisfying the disputants, and usually it will be found to be a coal district. The places that are recorded with greatest pride on the war banners of the Canadian Expeditionary Force might also be a record of the coal-mine villages of France and Belgium. There is no activity of peace or war in our modern life that is not based on some phase of the utilization of bituminous coal.

If therefore, Canada, through lack of taking thought, or following a policy of ease, continues to allow her own coal deposits to remain undeveloped, and voluntarily places our country in a position of economic dependence for the essential and indispensable raw material of our times, there is no escape from the conclusion that little by little Canada will become economically subservient to the United States. We express no opinion on the desirability of such an evolution. That is politics, and not the business of a technical journal, but it cannot be otherwise than proper to point out how inevitable are the consequences of continued lack of national interest in Canada's coal supply.

In the Canadian Mining Institute "Bulletin" during May 1917, the Editor contributed the following opinions, which are quoted as reflecting to some extent the more pleasant spirit of those crucial days; as a reminder that the foregoing opinions are not expressed with any desire to be captious or lacking in appreciation of the comradeship that has existed between this country and its neighbor; and also as bearing on the national importance of coal.

"The Allied Nations are grateful to the United States "first, because the adherence of this great Republic is "an open vindication of the righteousness of the com- "mon cause, and secondly, because the United States "is an Ally possessing unlimited potentialities."

"The idealistic and spiritual strength of her people, "her great wealth, her large population and military "possibilities, are gratefully acknowledged and duly "weighed, but what is the greatest asset of the United "States as the Ally of the free nation of Europe?

"Is it not undoubtedly that the United States possesses "within its borders the largest, most accessible, and "the most valuable bituminous coal deposits in the "world? That is the basic fact underlying all the "wealth and industrial activity of the United States."

"The part that the United States will play in the "war will be measured and limited by the production "of bituminous coal."

So also will Canada's progress towards a place of honor in the councils of the Empire and among the sovereign nations of the World be measured and limited by her production of bituminous coal.

INVESTIGATION OF INTERNATIONAL NICKEL COMPANY'S OPERATIONS.

A Toronto newspaper, commenting on Premier Drury's promise to investigate the questions affecting provincial taxation of the profits of the International Nickel Company, writes editorially:—

"Perhaps Mr. Curry will not succeed in having his "view adopted that all the International Nickel Com- "pany's lands should be confiscated if it is shown that "nickel reached Germany during the war with the "Company's knowledge."

So far as the operations of the International Nickel Company are concerned, these were investigated by a Royal Commission that had an unassailable personnel, and were reported upon in one of the completest and most satisfying documents ever issued by the authority of a legislature. In this Report no less than twenty-three pages are devoted to consideration of the taxation of mines and the mining industry as practised in all parts of the British Empire and in the other countries of the world, and as bearing upon the question of taxation of the nickel industry in Ontario. Whatever form the promised investigation may now take, it may be stated that the basic and pertinent facts are all to be found in the Report of the Royal Ontario Nickel Commission of 1917.

As to the implications that nickel reached Germany during the war with the knowledge of the International Nickel Company, this is as unworthy as, in the best-informed circles, it will be considered unfounded. Probably the problem that gave most worry, not only to the International Nickel Company, but to the British Government and the State Department of the United States, was to prevent nickel finding its way to Germany. Up to April 1917 the United States was a declared neutral, but there was a very large portion of the population in the United States that during the interval between the Summer of 1914 and the declaration of war upon Germany — a space of thirty-two months — was whole-heartedly in favor of Germany's cause. The cordial reception given by the people of Newport to the "Deutschland" is an instance of the forces that had to be overcome by those who desired to keep munitions of war from reaching Germany, nor was there anything illegal in supplying such munitions to a German vessel. If, in spite of all precautions, Canadian nickel reached Germany during the war, the persons who managed the International Nickel Company were not in a worse or more blameable position than the secret service men of the Allies who labored night and day to close the door to Germany.

If the Government of Ontario contemplates wading through the portfolios of Dr. Albert, the memoirs of Count Bernstoff, the "ditty-box" of Capt. von Papen, and tracing the spoor of German intrigue through the mucky labyrinth of the period immediately preceding and following August 1914, the imposing bulk of the 1917 Report will have to be far exceeded. It is a long trail, very sinuous, and will be found to lead-nowhere.

SIR AUCKLAND GEDDES ON OIL PROPAGANDA.

Sir Auckland Geddes shows wisdom and courage in giving an unqualified denial to the statements which have recently been given prominence in both British and United States' newspapers that the British Government, in conjunction with the Dominion Governments, is seeking and deliberately planning a world monopoly of oil.

We have previously expressed the opinion that the sedulous dissemination of false statements of this kind is the work of the propagandists of rival oil interests, and Sir Auckland Geddes' categorical statement corroborates that opinion. In the time of her gravest national emergency, when oil and coal supplies were a matter of life of death for the Empire and its soldiers, British interests controlled, according to our Ambassador's statement, but five percent of the world output. At the same time, he reminded his United States' hearers, "you have 82 percent of the present world supply of oil under your control."

In the paper prepared by C. K. Leith of the United States Geological Survey to show his country's relative economic world position with regard to mineral supplies, petroleum is listed along with copper as one of the two minerals "of which the exportable surplus dominates the world situation". This statement, from such a source, should be authoritative.

Sir Auckland Geddes' characterization of oil wells in the British Isles as "a geological curiosity, not a commercial proposition" may not please some people, but it correctly describes the oil occurrences in the British Isles to date.

English newspapers are much to blame. The cables that are sent to Canada and to the United States purporting to come from well-informed British sources are all too often wrong in fact and foolishly provoc-

ative in purpose. When the proposals for the British Empire Steel Corporation were first given publicity in London, the titbit of the journalist who cabled the news was that English experts had examined the Sydney Steel Works, and had decided they were fit only for the scrap pile. Here was an instance of important news of very general interest turned into provocative nonsense. The instance is typical of many. We cannot conceive, for example, that Sir E. Mackay made the statements attributed to him by a London "Sunday World" cable claiming control of the world's oil resources by British interests in words that no patriotic citizen of the United States could fail to take umbrage at.

Those who send news cables from Great Britain to Canadian newspapers should remember the many bonds of mutual interests that tie this self-governing Dominion to our friends in the United States. Canada's whole-hearted adherence to every British ideal, and her ability, while strictly guarding her national status, to live and work amicably with her great neighbor, need no demonstration after the years 1914 to 1920. We need no spur, or preachment, from jejune imitators in Great Britain of Wm. R. Hearst, nor do we desire that the business game which our citizens and their compeers in the United States have played with energy, yet in all friendship, for a century of peace, across an unguarded frontier that has not its like in history, shall be embittered and endangered by the paid propagandists of selfish interests.

The world is not at peace. In many respects the chances of a world catastrophe are greater today than they were before Germany attacked the pillars of civilization in 1914. From motives of simple self-protection against the forces that threaten to dissolve society, the United States and Britain should hold together. Our Ambassador's categorical exposure of the lies that are being disseminated by the press of the British Isles and the United States is a wise and necessary step, and one that in Canada will be properly appreciated.

"Meantime a new field of perhaps promise looms "on the slopes of James Bay, where Professor Williams "of the Dominion Geological Survey has been making "an examination. His Report, stripped of its "geo-"logical ornamentation,' is practically to the effect "that there is plenty of evidence of seepage, and the "future may yet find much of commercial value."

So states a well-known Toronto newspaper. The term "geological ornamentation" is ill-chosen. Dr. Williams' condensed report on the James Bay region was, as a matter of fact, rather remarkable for its clearness and avoidance of unnecessary use of geological terms. (See page 82, issue 30th, Jan. 1920.)

THE LATE G. G. S. LINDSEY.

The "Journal" desires to voice a general feeling of regret among the mining profession of Canada at the loss by death at a comparatively early age of Mr. G. G. S Lindsey. Mr. Lindsey was an illuminating example of the distinctive advantage of combining legal ability and a practical acquaintance with mining. During his term as President of the Canadian Mining Institute, Mr. Lindsey was very largely responsible for the affiliation of the Mining Society of Nova Scotia which followed his visit, accompanied by a most representative delegation of members of the Institute, to Sydney, Nova Scotia, in the Spring of 1914. This was a courtesy not forgotten by the members of the Institute in Nova Scotia, where Mr. Lindsey, by his alert and engaging personality, left a pleasant and enduring memory.

By Mr. Lindsey's death, the mining profession in Canada, and in particular the Canadian Mining Institute, loses a member whose lifework has added distinction to its annals, and permanence to its foundations. Mr. Lindsey's attendance at the March meeting of the Institute in Toronto was doubtless made at the expense of much physical effort, but it was an instance of his devotion to the affairs of the Institute, as is only too plainly evidenced by his death at this time.

GOOD PROGRESS BEING MADE AT FLIN FLON

Mr. Jack Hammell has returned to Toronto after spending some time at The Pas and Flin Flon making prepartions for the development of the great sulphide orebody at Flin Flon Lake. Acting for the men who have taken option on the property, Mr. Hammell has assembled at the mine the necessary machinery and and supplies for the work to be done this summer. The plant at the Mandy mine and that at Beaver Lake have been purchased and taken to the Flin Flon mine. The dismantling was successfully accomplished before the winter roads broke up. Owing to the difficulty of moving machinery and supplies in this district during the summer months, an effort was made to fully utilize the winter roads while they lasted. This meant haste, but Mr. Hammell believes that the engineers who take charge of the development work will find the necessary materials on the job.

It is planned to sink two shafts. The Mandy plant will be used for one and the Beaver Lake plant for the other. The contractors have an excellent reputation as shaft sinkers and it may be expected that no time will be lost in opening up the orebody. It is understood that work at one shaft will proceed to depth without interruption, while at the other lateral work will be started at several levels as soon as the necessary depths are reached. It is said that about $85,000 has already been spent in making preparations for the work. Col. W. B. Thompson and associates, of New York, and the Mining Corporation of Canada, of Toronto are said to be the holders of the option.

The High Grade Silver Ores of the Stewart District, British Columbia

By VICTOR DOLMAGE.

The rich silver deposits of the Stewart District, British Columbia, are now engaging more attention than any other silver deposits in the world. The camp is still in its infancy, no development work having reached a depth greater than 250 feet, and, as in the case of all high grade deposits, the operators and investors are facing the vital problem of whether the orebodies are of the secondarily surface enriched type, and consequently of relatively shallow depth, or whether they are high grade primary ore-shoots with good chances of persistence to relatively great depths.

At the Western Annual Meeting of the Canadian Mining Institute held in Vancouver in November, 1919, Mr. E. E. Campbell[1] read a paper on the mineral deposits of this district in which he stated somewhat arbitrarily, that the high grade orebodies were "rich surface ores," which I take to mean ores enriched by downward moving surface waters and commonly referred to as secondary ores. Although he spent considerable time in pointing out the great importance of the discovery of this class of ore in the northern districts of the Province, he entirely neglected to give any evidence that would prove that these ores have a secondary origin. He mentioned the fact that the deposits carried minerals of "unquestionable secondary origin" but failed to give any examples of this small uncertain and rapidly dwindling class of minerals. He named the following as the minerals occurring in the rich orebodies; pyrite, native silver, argentite, rubysilver, sphalerite, galena, and chalcopyrite, but we fail to find in this list any of the "unquestionably secondary" class, rather they are conspicuously absent. Ruby silver is the only one of those mentioned which approaches this class, and of it W. H. Emmons[2] goes only so far as to say that it is *nearly* always secondary. The other minerals of this list undoubtedly occur as primary minerals.

In the discussion which followed the reading of this paper, the present writer took exception to the arbitrary manner in which this vital problem had been handled, and pointed out the lack of any evidence to prove the statements made. A few months later, when a splendid collection of ore from this locality was submitted to me at the British Columbia Branch of the Canadian Geological Survey for examination, I naturally took advantage of the opportunity of searching for evidence having a bearing on this point, and made a careful microscopic study of the ore, the results of which follow.

The specimens were collected and brought in by Mr. Charles Bunting, one of the original locators of the rich deposits of this district, and the author of the first authentic history of the Salmon River Camp.

Three classes of ore were represented in this collection, namely: (1) stephanite-native silver ore, which is the richest silver ore of the district, carrying as high as 3,000 oz. of silver to the ton; (2) a type which is known in the district as "Black sulphide ore," which carries from 500 to 1,000 oz. to the ton, and (3) lower grade silicious ore.

The Stephanite ore, though exceedingly rich, is not abundantly distributed, but confined to a few small veins less than a foot in width. In appearance it is quite spectacular, consisting of masses of stephanite and tetrahedrite cut by a close net-work of native silver veinlets and sprinkled through with a few small grains of pyrite. Gangue minerals are absent excepting for small inconspicuous grains of milky quartz. Plate 1, 2, 3 and 4 illustrate this class of ore.

The microscope revealed the following minerals and structures in them which indicate that they were deposited in the order named:—

1. Pyrite
2. Quartz
3. Zincblende
4. Tetrahedrite
5. Chalcopyrite
6. Galena
7. Argentite
8. Stephanite?
9. Polybasite?
10. Native silver
11. Native gold.

The Pyrite occurs as sparsely scattered grains ranging in size from a few millimeters to a centimetre, which are invariably rounded, embayed and veined by replacements of quartz, zincblende, chalcopyrite, tetrahedrite, galena, native silver and gold. One of these pyrite grains is shown in Plate 5.

Zincblende, though abundant in the black sulphide ore is comparatively rare in the ore of this class, and only visible under the microscope. It is sprinkled through with minute grains of chalcopyrite and is replaced by tetrahedrite and stephanite.

Tetrahedrite is an abundant mineral in this ore, as is shown by Plate 1. It is replaced by stephanite and native silver.

Stephanite is the predominating mineral in this ore and constitutes at least 50 per cent of the total volume of the specimens examined. It replaces the pyrite zincblende and tetrahedrite, and is itself replaced by native silver.

Polybasite is a rare mineral in these deposits and is found closely associated with stephanite and native silver.

Native silver is abundantly present in this ore, occurring as small blebs in the pyrite grains as shown in Plate 5, and as veins in the stephanite and tetrahedrite, as shown in Plates 1, 2, 3, and 4. These veinlets in some places have sharply defined contacts such as those in Plates 2, and 3, and in other places they gradually merge into rich disseminations, such as is shown in Plate 4.

Though assays show that this ore carries considerable gold, very little could be detected, even under

[1] E. E. Campbell, Mineral Occurrences in the Stewart District, Monthly Bulletin of The Canadian Mining Institute, March 1920.

[2] W. H. Emmons, The Enrichment of Ore Deposits, Publications of the United States Geological Survey, Bulletin 625, page 261.

PLATE I
Stephanite (St.) and tetrahedrite (T) replaced by veinlets of native silver (S) from Stephanite-Native silver ore. Mag. 300 diameters.

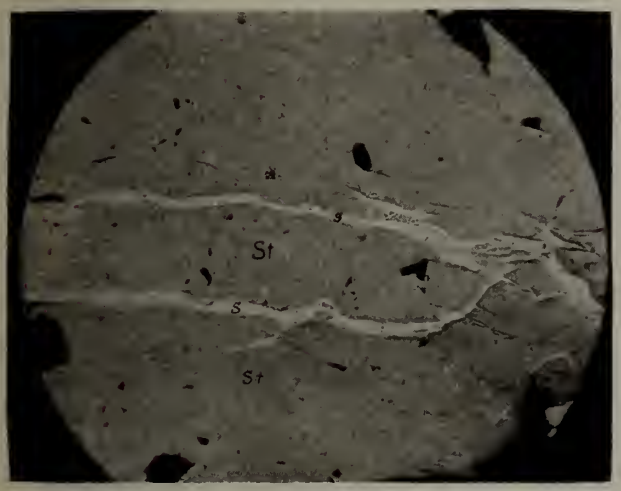


PLATE II
Stephanite (St) replaced by native silver (S). Mag. 300 diameters.

PLATE III
Stephanite (St.) cut by silver veinlet (S) and etched by the action of light. Mag. 300 diameters.

the highest magnification. It was, however, observed as minute particles, both in the pyrite grains and in the gangue minerals free from other metallic minerals. Plate 6 shows a grain of pyrite including a small bleb of gold.

The second class of ore, known in the district as black sulphide ore, is the usual type of ore encountered in the workings. In hand specimens it is seen to consist of a dark-gray fine-grained mixture of gangue minerals, zincblende, galena tetrahedrite, and pyrite. It is slightly porous, and the vugs are usually found to be lined with crystals of galena and drusy quartz.

Under the microscope it was seen to contain the following minerals which were deposited roughly in the order in which they are named:

1. Gangue (chiefly quartz)
2. Pyrite
3. Quartz
4. Zincblende
5. Chalcopyrite
6. Tetrahedrite
7. Galena
8. Argentite
9. Native silver
10. Gold.

PLATE IV
Stephanite (St.) replaced by veinlets and dessiminations of silver (S). Mag. 300 diameters.

The similarity of this list to that of the stephanite ore is striking, the only difference being in the absence of polybasite and stephanite. The great difference in appearance is due to the much larger proportion of zincblende, galena, pyrite and gangue and a smaller proportion of native silver. Plate 7 illustrates this class of ore.

The pyrite of this ore is precisely the same as the pyrite of the stephanite ore, being replaced in a similar manner by the same minerals, as is shown by Plate 8.

The zincblende is the most abundant mineral of the sulphide ore and, as usual, is impregnated with minute specks of chalcopyrite. It is also replaced by tetrahedrite, galena and native silver.

The chalcopyrite, which was confined to the zincblende in the stephanite ore, is in this ore freely distributed through the gangue and other minerals, but only as very small particles.

Tetrahedrite and galena are both abundant in this ore, and though no silver minerals could be detected in them other than an occasional grain of silver, there can be little doubt that they are both argentiferous.

The native silver of this ore, though not as abundant as that in the stephanite ore, is nevertheless quite

PLATE V
Pyrite (P) grain replaced by silver (S) galena (G) zincblende (Z) and quartz (Q). Mag. 330 diameters.

plentiful. In this ore it never occurs in veinlets, such as those of the stephanite ore, but is always found in the form of small rounded grains in the galena, zincblende, tetrahedrite and pyrite, usually showing a preference for pyrite and tetrahedrite. This mode of occurrence is well shown in Plate 9 and seems to strongly indicate that it was deposited in the same general period as the other sulphides and is therefore a primary mineral in this ore.

Argentite is a rare mineral in this ore and is associated with the other sulphides in a manner indicating that it also is a primary constituent.

PLATE VI
Pyrite (P) replaced by gold. Mag. 500 diameters.

The third class of ore is a strongly silicious type, consisting of white granular quartz with small scattered particles of pyrite, tetrahedrite, polybasite, stephanite(?), galena, argentite, ruby silver and native silver. It is low grade in comparison with the other ores, but is very abundant in the district. All of the minerals are replaced to a marked degree by native silver, but the other minerals were not associated with one another, being distributed through the quartz as isolated grains, and their paragenesis therefore not indicated.

Of the minerals which have been identified in this deposit, the only ones that might be used as criteria for secondary enrichment are stephanite, pyrargyrite, and native silver. Stephanite has been proven to occur as a secondary mineral in a great many enriched deposits, and is generally regarded as a mineral characteristic of the enriched zone, but a possibly primary origin is admitted by many of the closest students of this subject. Its presence therefore may be regarded as a strong indication of secondary action, but not

PLATE VII
Black Sulphide ore, P = pyrite, T = tetrahedrite, G = galena. Mag. 75 diameters.

as conclusive proof. Pyrargyrite is a much more common constituent of secondarily enriched ores than stephanite, but it, too, according to Emmons[3], has been found in mines at depths greater than those reached by surface solutions.

Native silver was at one time thought to be invariably of secondary origin in sulphide ores, but it is not now regarded as such. In a recent paper on the "Veins of Cobalt, Ontario," W. L. Whitehead[4] has given excellent proof of the primary nature of the native silver of these deposits. In the ore under discussion the native silver occupying rounded pockets in the pyrite, tetrahedrite, and galena (such as is shown in Plates 5, 8, and 9) is almost certainly of primary origin, while that forming veinlets in the stephanite as shown in Plates 1, 2, 3, and 4 may be of secondary origin.

The impossibility of definitely determining the origin of this ore without an examination of the conditions obtaining in the field and without a study of the

[3] W. H. Emmons, Principles of Economic Geology, page 445.
[4] W. L. Whitehead, The Veins of Cobalt, Ontario, Economic Geology, March 1920.

enclosing rocks and gangue is evident. Nevertheless, the above observations furnish evidence capable of supporting the following conclusions.

(1) The black sulphide ore is at the same time a very plentiful ore of the district, one of the highest grade ores of the district, and one composed of essentially primary minerals. This establishes the important and interesting fact that much of the high grade ore of the Stewart District is of primary origin, and has therefore a much better chance of persisting to relatively great depths than if it were of secondary origin, a fact of considerable significance in a camp so highly promising on the surface and as yet so slightly developed.

(2) The stephanite-native-silver ore may have been enriched by the replacement of primary minerals by stephanite and native silver, and the silicious ore by the addition of ruby silver, stephanite and native silver, but in neither case is it definitely proven.

(3) The small amount of stephanite ore to be found in the district, the comparative low grade character of the silicious ore, and the great preponderance of primary minerals over secondary minerals in all the ore excepting the stephanite ore, indicate that the processes of secondary enrichment may have played only a very subordinate role, if any, in the formation of these rich silver deposits.

PLATE VIII

Pyrite grain (P) from black sulphide ore replaced by silver (S) tetrahedrite (T) and galena (G). Mag. 250 diameters

Silver Minerals Etched by Light.

An interesting phenomenon observed in connection with the microscopic examination of these specimens, and one which served as an aid in determining the minerals, is the etching of the stephanite and native silver by the action of light. This peculiar property of silver minerals was first described by W. L. Whitehead[5], who made observations on all the common silver minerals and recorded his results in tabular form, so that they could be used for purposes of identification. The Stephanite of the Stewart District was found to be very susceptible to light, and on an exposure of from 10 to 30 seconds it would become covered with minute specks similar to those shown in Plate 3. Areas in the vicinity of silver veinlets and along scratches were found to be the most sensitive. Plate 10 shows some of these spots of unusually large size developed in two sets of parallel rows intersecting one another at a small angle, which are thought to be related to scratches produced during the process of polishing.

It is a well known fact in polishing that when a scratch is made on the surface of any material there

[5] W. L. Whitehead, Notes on the Technique of Mineralography, Economic Geology, xii, 1917, page 707.

PLATE IX

Primary minerals of black sulphide ore. S=silver G=galena T= tetrahedrite P=pyrite, G=quatz. Mag. 200, diameters.

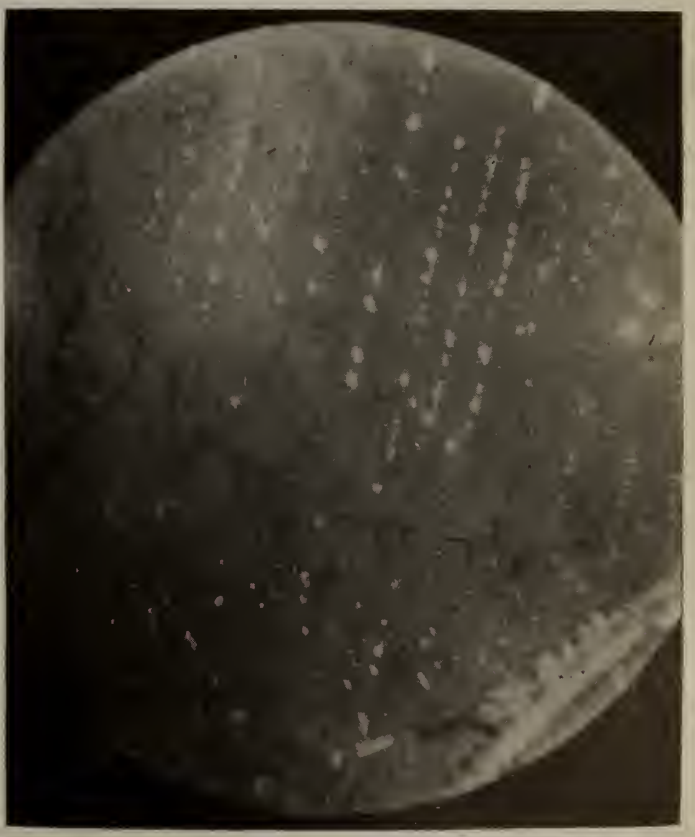


PLATE X

Stephanite etched along polishing scratches. Mag. 600 diameters.

is developed in the material below the visible scratch a zone which though not apparently affected, is nevertheless considerably modified so that it behaves differently under etching reagents. These modified zones vary in size and degree of modification with the size of the scratch which has produced them, and it is for this reason that the spots etched on the surface of a polished mineral are sometimes found to be arranged in lines such as those shown in plate 11.

These spots were of such a large size that an attempt was made to determine their character by the usual methods employed in mineralography. They were found to react with nitric acid and *aqua regia* in a manner similar to that of native silver, and their color also resembled native silver. It is therefore probable that they are to some extent at least composed of this metal and that the effect of the light on the mineral is to dissociate it into its elements. This is, however, only a suggestion and far from being proven.

The silver occupying the veinlets in stephanite was also in many instances found to be altered to a brownish red color by the action of light, a peculiar feature I think not previously mentioned in the literature. The coloration was found to be confined to the smaller veinlets, to the margins of the larger veinlets and was most strongly marked in the fine disseminations of silver in the stephanite, such as are shown in Plate 4. The phenomenon is thought to be the result of impurities in the silver, though this appears to be homogeneous under the highest powers of magnification.

These facts show that the minerals stephanite and polybasite are very unstable, and it is therefore not surprising to find them so extensively replaced by native silver.

Note.—Since the above article was written, the attention of the author has been drawn to Professional Paper 104 of the U.S. Geological Survey on "The Genesis of The Ores of Tonopah, Nevada," by Edson S. Bastin and Francis B. Laney, in which these authors find the minerals stephanite, polybasite, pyrargyrite, argentite, electrum, etc., occurring as primary minerals as well as secondary minerals in the ores of that camp.

THIRD ANNUAL MEETING OF THE CANADIAN INSTITUTE OF CHEMISTRY, TORONTO, MAY 27th and 28th, 1920.

The third Annual Meeting of Canadian chemists was held in Toronto on May 27th and 28th, and was well attended by members from all parts of Canada, and by visitors from the United States.

Among the papers read was one by Messrs. Roast and Pascoe, given before the Montreal Branch of the Society of Chemical Industry in February last, on the "Inner Life and Habits of Metals." This paper was fully illustrated by a series of microphotographic slides, prepared by the authors. Mr. Roast is the Secretary-Treasurer of the Canadian Institute of Chemistry, and an ardent worker in the interests of the profession.

A much appreciated feature of the meeting, which was held in Chemistry and Mining Building of the University of Toronto, was the public display of chemical apparatus and instruments.

Dr. Charles H. Herty, Editor of the "Journal of Industrial and Engineering Chemistry," and a past-president of the American Chemical Society, addressed the meeting on "Chemistry under a Constitutional Government," and pointed out convincingly how great a part the chemist played in the industrial life and in the military defence of a democratic state.

Prof. Matthew A. Parker, of the University of Manitoba, was appointed a delegate to the inter-Allied Chemical Congress in Rome during July. This is the second meeting of the Congress, which was organized last year in Brussels to pool chemical progress and research in the interest of the countries that were allies during the war.

The Toronto Meeting was the first annual meeting of the newly formed Canadian Institute of Chemistry, a full description of which, with a list of the original officers was published in our issue of 23rd April (see page 341).

The members of the Institute now number 140 qualified chemists.

Prof. Neish, of Queen's University, Kingston, who returned to Canada last August after nineteen years absence in New York, gave to the meeting his impressions of Canada upon returning home. Speaking at the dinner with which the proceedings were concluded, Prof. Neish said Canadians were ultra-conservative, and did not take advantage of their opportunities as they should do.

PROSPECTING IN BEATTY TOWNSHIP.

Some years ago many discoveries of gold were made in Beatty township, east of Matheson. Development was started on several properties in the vicinity of Painkiller lake. The great fire of 1916 destroyed the plant and buildings over a wide area and prospecting was discontinued for some time.

There is now again some activity in this district. At the Hill mine about 20 men are working and drifting is in progress at the 200 and 250 ft. levels. At the Cartwright Goldfields property camp buildings have been recently erected on the northern claims and surface prospecting is being systematically carried on. This company lost mining and milling plants in the fire of 1916.

It is said that development work is to be resumed this week at the Hattie property.

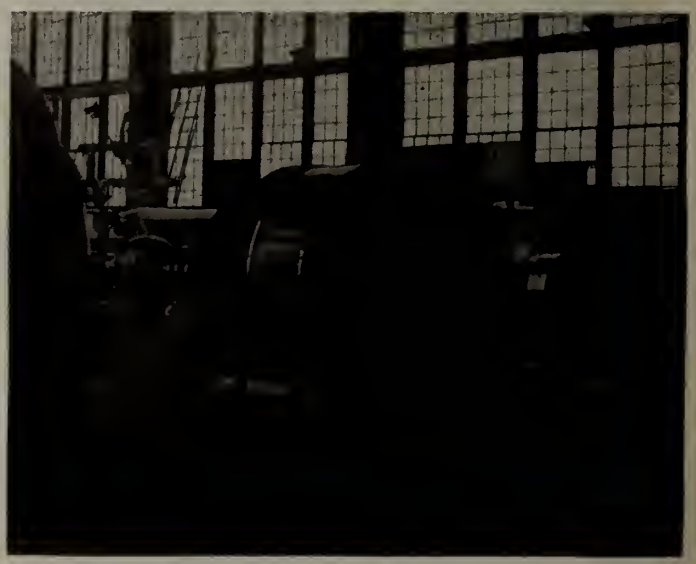


Fig. 6 (see page 460). 400 K.W. Alternator, built by Dominion Bridge Co.

The Turbo-Blower Installation at the Blast Furnaces of the British-America Nickel Corporation, Sudbury, Ont.

The following sketch Fig. 1 shows the arrangement of an interesting turbo-installation built in its entirety by the Dominion Bridge Company at Lachine, Que. to deliver air for the blast of the furnaces in which the nickel ore mined by the British-America Nickel Company at Sudbury is reduced to a matte for further treatment at the Refinery at Deschênes, Ottawa.

The extent to which the Dominion Bridge Company has engaged in the manufacture of steam-driven turbine machinery is not widely known, and it will probably be a surprise to many Canadian readers to know that this very compact and workmanlike unit was built, including the alternator, in the Bridge shops at Lachine. This department of the Bridge Company's activities is entirely distinct, and is in addition to the manufacture of water-driven turbines and paper-making machinery in which the Dominion Engineering Works engaged at the Rockfield shops.

In the British-America Nickel Company's blower unit, the five machines in continuous alignment consist of two groups.

At the left, a high-pressure steam turbine drives a 500 k.w., 60-cycle, 3-phase generator in tandem with a 30,000 cu. ft. blower, delivering air at about 36 ozs. per sq. inch.

The two remaining machines consist of a steam turbine connected to another blower of the same capacity as the first-named.

Under normal operating conditions, the blast is supplied by the last-named blower, but in the event of trouble on the outside transmission line, the other turbine and generator and the blower connected to them are put into operation, and the other blower is shut down.

By taking out the coupling bolts between the turbine and generator, the generator can be run as a synchronous motor at 3,600 r.p.m. to drive the blower next to it.

Each turbine is equipped with its own surface condenser, and condensate-removal pump. The steam-jet air-evactors, however, are grouped in a battery, and withdraw air from a trunk airline with branches to each condenser. This arrangement has been found to be very convenient in practice, as it makes the evactors interchangeable, and enables some to be shut down at light loads. The evactors also discharge into a common line; the outlet from which is submerged

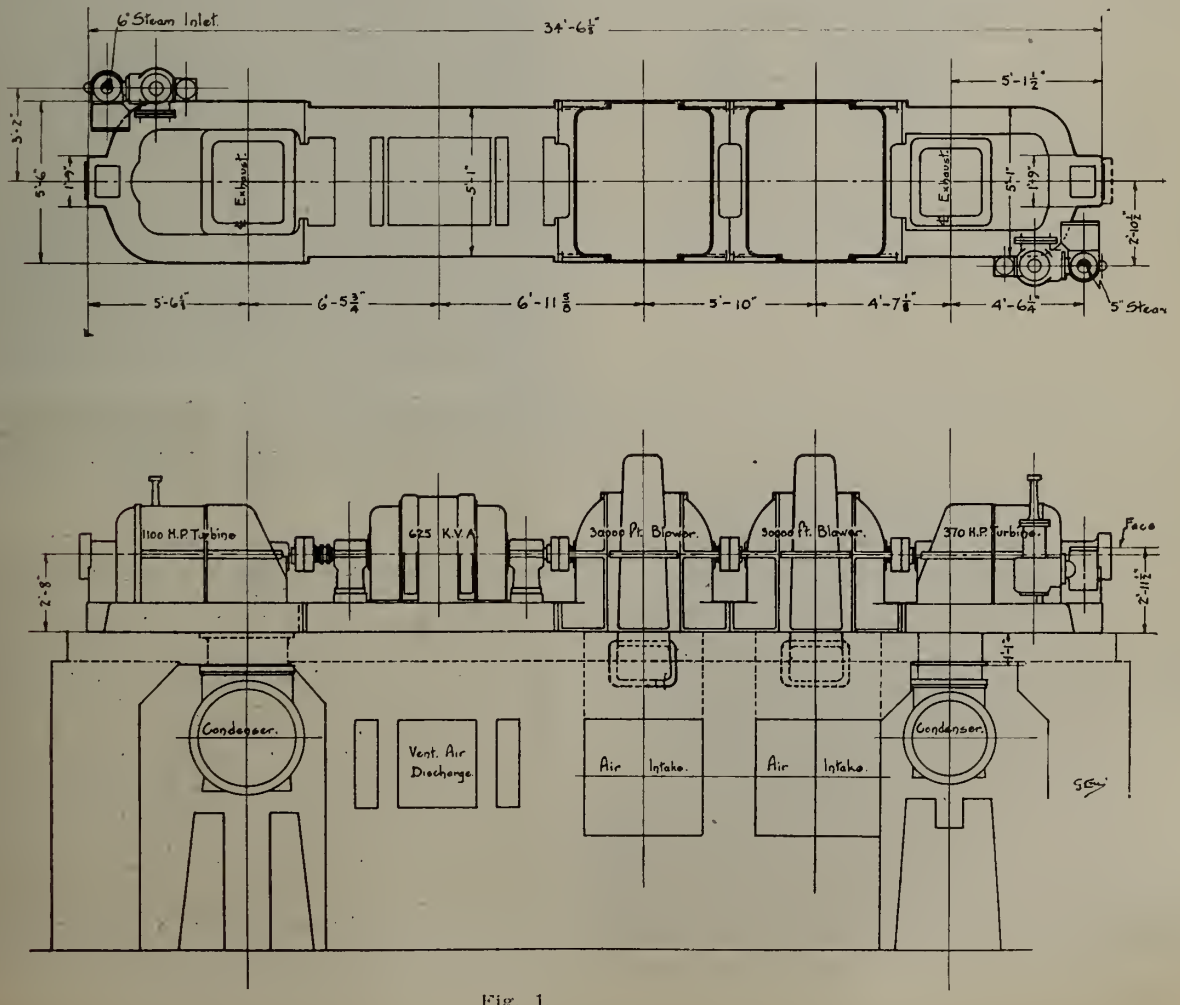


Fig. 1.

Fig. 2. Blower Installation under construction.

Fig. 3. Impeller for 30,000 c. ft. Blower.

Fig. 5. Rotor of 2,100 h.p. Condensing Steam Turbine.

in a tank through which the condensate is pumped, the water being thereby raised in temperature, and the heat units remaining in the evactor steam conserved.

The air pressure delivered by these blowers is determined with certain limits by adjustment of the pressure regulators connected with the governor valve of each turbine. When once set, the turbo-blower will continue to give air at the desired pressure without further attention.

Fig 2 shows the blower installation in course of erection in the shops. In order from the foreground may be seen the following component parts of the unit, namely, the blowers, alternator and steam turbine. Fig. 3 shows the impeller for the 30,000 cu. ft. blower. The design of this impeller, the blades of which are securely slotted into the shaft, ensures complete freedom from vibration and an absence of end-thrust. The turbine machinery is all made under the Ratean-Smoot patents.

Fig. 4 is a photograph of a low-pressure wheel for

Fig. 4. Low-pressure Wheel of 2,100 h.p. Steam-turbine on static Balancing-wheel.

a 2,100 h.p. steam turbine, (built for the British-America Nickel Corporation) on the static balancing-table.

The rotor of a condensing steam-turbine, 2,100 h.p. is shown in Fig. 5. This is also for the British-America Nickel Corporation.

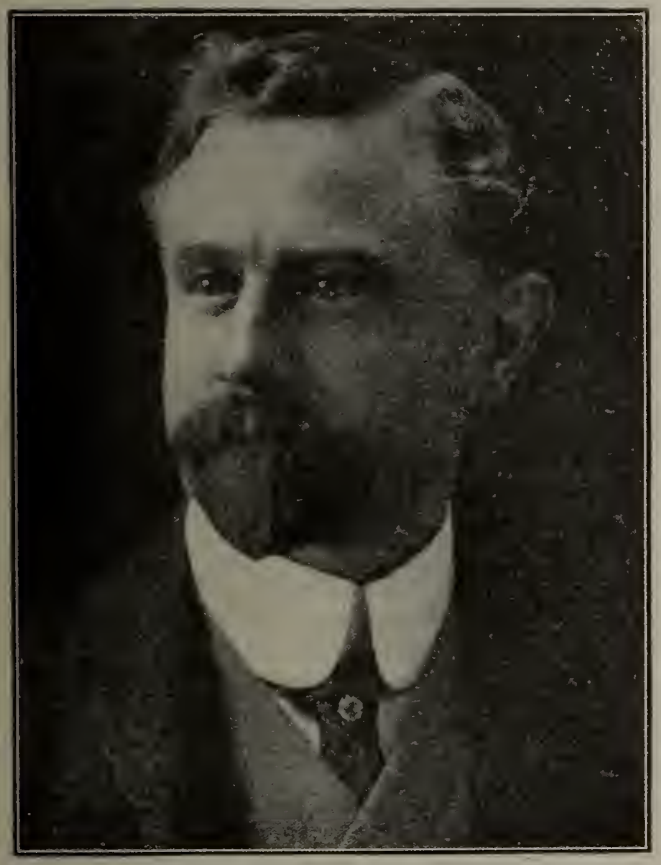
In Fig. 6 is shown a 400 k.w. alternator, designed to be driven by a non-condensing steam-turbine, that was built by the Dominion Bridge Co. for the Imperial Tobacco Company of Canada. It is direct-connected with the exciter.

The supercession of reciprocating-motion engines by the rotary engine for the furnishing of compressed-air as a motive-power, and for the furnishing of air-blast, is almost complete in all new construction, and it is not only interesting, but a matter for congratulation that Canadian machine-shops are in a position to supply machinery so modern in type, and so well adapted for the purpose, as the turbo-blower installation hereinbefore described.

G. G. S. LINDSEY

Mr. G. G. S. Lindsey died at his home in Toronto on Thursday, May 27. He was well known among mining men, not only in Canada, but also in other parts of the world, and it is with great regret that they will learn of his decease. He was also prominent as one of Toronto's leading lawyers and had a wide acquaintance among members of that profession. By many others he was known as one of the shining lights of the Liberal party for he was a strong supporter of that party until the conscription issue came up and he left the old party to campaign for the Union Government and conscription. In his younger days Mr. Lindsey was known to many as an enthusiastic sportsman and as a cricketer especially.

As a student at the University he found time not only for studies and athletics, but also for journalism and he founded the publication "Varsity," which has from that time been the organ of the Varsity students.



THE LATE G. G. S. LINDSEY.

Mr. Lindsey had long been interested in mining affairs. Though by profession a lawyer he had experience as mine operator, and was for some years general manager of the Crow's Nest Pass Coal Co., one of the largest coal mining enterprises of Western Canada. His experience as a lawyer and miner made him practically well informed on mining law and he was a recognized authority. He always did his part to further any effort made to improve laws and regulations governing mining in various parts of Canada.

Mr. Lindsey was one of the best known and best liked members of the Canadian Mining Institute. He took an active part in Institute affairs and served on the Council for several years. He also gave his services to the Institute in legal matters at all times. In 1915 he was President of the Mining Institute. In 1915 his business took him to China where he carried on negotiations with the Chinese Government for English mine operators. He found there a difficult situation owing to the fact that the Chinese Republic had no mining code. He was delayed much longer than he expected owing to the fact that he was recognized by the Chinese Government as a man who might draft a suitable mining code. He undertook the work and when he returned to Canada he had framed the mining code of the Chinese Republic.

Mr. Lindsey took an active part in the campaign for conscription, and in other war work during recent years. Latterly he had been physically unfit for great activity and he had been unable to take his usual active part in mining affairs during the past two or three years.

Mr. Lindsey's life was an active one and he crowded into it more work and more experiences than come to most men. He leaves behind him a host of old friends.

R. E. H.

NOVA SCOTIA NOTES.

Dominion Coal Company.

An official announcement is made that Mr. E. P. Merrill is appointed General Manager of the Dominion Coal Company and the Dominion Iron and Steel Company and subsidiaries, and will reside in Sydney.

The new shaft, situated between Collieries Nos. 1 and 2, has reached the Phalen Seam. The sinking has been done under contract by the Foundation Company, whose work is now completed. The completion of this shaft will save much underground travel, and will assist in the ventilation and pumping of the Phalen workings in this district.

The unwatering of the Morien Colliery is approaching completion, and construction men are at work on a re-arrangement of the surface plant.

The Surface plant of the Hub Colliery has been dismantled, much of the equipment having been utilized at No. 17 Colliery (New Waterford.) Other portions of the Hub Plant, including the boilers, will be removed to Morien Colliery.

Much underground work has been done at No. 17 Colliery. The proportion of undersea coal now drawn upon by the Cape Breton Collieries of the Dominion Coal Company is striking. Counting the newly operated mines No. 24 (Emery Seam), No. 17 (Victoria Seam) and the Morien Colliery, the Company now has eleven submarine collieries and six land collieries in the Sydney Field.

A number of scattered stoppages of work arising from local dissatisfaction with rates and mining conditions have recently taken place in the Dominion Collieries. The men appear disinclined to allow their union officials to act for them, and, upon very slight occasion, cease work. Difficulties of this kind have taken place over the rates of landing tenders, over the question of new pit-boxes at the Springfield Collieries, and in other instances.

Discomfort and danger has been experienced at various mining centres in the Maritime Provinces through forest fires. At New Waterford, in Cape Breton, and in the vicinity of the collieries at Springhill, Joggins, Maccan and River Hebert, in Cumberland Co., much damage has been done.

An impression appear to have been general, and certainly a despatch appeared in the newspapers purporting to come from Ottawa, that the Industrial Disputes Act was being amended to allow of collective

adjustment by a Conciliation Board of wage questions affecting more than one company and its employees. It was rather difficult to understand how such an arrangement was possible, in view of the spirit and intent of the Industrial Disputes Act, but, under the impression that such an arrangement was possible, the Executive of the U. M. W. in Nova Scotia requested of the Minister of Labour that collective adjustment of their common demand upon the Nova Scotia coal operators for a 27 per cent increase at May 1st should be attempted by a Conciliation Board having wide powers. The Minister of Labour has replied stating that such a proceeding is not possible under existing legislation.

The U. M. W. officials state they will press the new demand, and it is stated, by a Cape Breton newspaper, that the Secretary has advised the miners to reduce their output by one-half if the new wage demands are not conceded.

The Wage Scale Committee of the U. M. W. is in session at Halifax, and it is probable that the new demand will result in another series of Conciliation Boards.

In view of the recommendation to reduce output it may be noted that coal production in Nova Scotia is even yet thirty per cent below pre-war outputs, and the statement was recently made by the General Superintendent of the Dominion Coal Company, that "We cannot mine enough coal to handle the St. Lawrence trade." In June 1914 the output of the Dominion collieries in the Sydney Field was 452,000 tons. It is unlikely to exceed 300,000 tons in June 1920.

PROPERLY DOMICILED

There is considerable press comment over the fact that the British Empire Steel Corporation has been incorporated under the Nova Scotia Joint Stock Companies Act, and that its head office is to be at Sydney. There should be nothing surprising in the circumstance that the big Corporation is to be domiciled here. "Where a man's treasure is, there his heart is also."—Sydney "Post."

MANITOBA LETTER.

By C. A. MILLICAN.

A Mining Syndicate has recently been formed to acquire the Falcon Mineral Claims at Turtle Lake in the Rice Lake District.

The interested parties are chiefly Winnipeg, Dauphin, and Gilbert Plains men. Mr. R. R. Pattenson, of Winnipeg is the Trustee.

These claims to the north and north-east of Turtle Lake were first staked by William Walton.

Two engineers, it is stated, have favorably reported on these properties, and a further report is to be obtained from a Professor of the University. If his report is equally favorable, a company will be formed to carry out active mining operations.

Work will commence on the Gabrielle Mine early in June. A party is being made up to proceed to the property via Riverton and Hole River—taking advantage of the water route, which will bring the men and supplies to within two miles of the mine. As soon as the shafts and drifts are de-watered, an inspection will be made by Mr. J. B. Tyrrell, of Toronto, who will advise the lines for future operations.

Active work on the Gold Pan Extension commenced on the first of May, employing two shifts. The Company is engaged in sinking and at last reports the shaft was down 80 feet. The vein measures about 4½ feet in width, with quartz over 3 feet showing high mineralization carrying sulphides and galena and some free gold. The work is being done on the vein, which has a slight dip to the north, but stands almost perpendicular. It is the intention of the Company to continue sinking, without doing much lateral work, to the 200 foot level. Good progress is being made and the directors are well satisfied with the showings so far.

Work on the government road from the Lower Bellevue Landing on Hole River is making slow progress. Word from the camp states that there are several log jams in the river between this point and Hole River Lake—which will have to be removed before this route can be used freely.

For the time being work on the Gold Pan Mine has practically been suspended. The drift is in 285 feet from the shaft following the vein, but the showings are not of a very encouraging nature, and there is not likely to be any more work done until a close inspection of the property has been made.

This will likely be done by Mr. Tyrell, when he is in the Rice River Lake region in June.

It is the intention of the Directors to have a very thorough examination made into the situation, and much will depend on the result of the pending inspection and report.

Word from the Commonwealth mine, received within the last week, is very encouraging. Test pits have been made on the main vein, which is 7 feet wide, and carries a well distributed showing of free gold across the entire width. Mr. Porter, the managing director has gone in to the mine, and expects to return with some nice samples of free gold ore. From present appearances this should develop into a really good proposition. In addition to sinking the test pits, considerable attention is being paid to stripping.

There is a prospect of much movement in the Rice Lake area this season.

Engineers are going in for the purpose of making examinations for interested parties and some further prospecting is being undertaken.

The fine weather of the last ten days has caused a more interested feeling in mining matters, and some very promising samples of ore are coming out. The writer looks for a healthy movement during the present year, and for some really good prospects to be brought to public notice.

Activity at Herb Lake is concentrated upon the Bingo, where a gang of miners are sinking a shaft to the 200-ft. level, and then to drift for 200 ft. Ten additional miners were sent up on yesterday's "Muskeg," ("Muskeg, Ltd." is the name given to the train that runs over the Hudson's Bay Line out of Le Pas.) and the machinery will be taken in at the end of the month, when the lake is expected to be free of ice. There is ample equipment on the ground to carry on with in the meanwhile.

The results of the sinking will be watched with interest. The strong gold showing on the surface in a promising series of veins has caused the owners to regard the property as a sure producer—(Pas Herald.)

COMMISSIONER WALLACE RECOMMENDS SINKING TEST SHAFT FOR OIL IN DAUPHIN DISTRICT

In a report of the possibilies of the presence of oil in the Lake Dauphin district, made public today at the Parliament Buildings, R. C. Wallace, commissioner of Northern Manitoba, and former professor in geology in Manitoba university, recommended to the government that a drilling outfit be sent to that district, capable of sinking a shaft 1,000 feet in order to settle the question once and for all and make speculating impossible. Prof. Wallace's report covers several typewritten pages in which he goes into the arguments for and against the presence of oil in the district very thoroughly.

In concluding his report he states:

"The limestones of our province are not considered to be favorable for the collecting and retaining of oil pools. Sufficient work has been done in the southern part of the province to establish the fact that discoveries of oil are unlikely. In the north part of the province, from Dauphin northward, however, little work has been done. It must not be forgotten that it is now generally agreed that the last possibility for oil in the Canadian west is in the limestones of a similar age in the Mackenzie basin."

"Two points must be definitely established and it is impossible at the present stage to establish anything further: (a) That the oil is a natural oil and had not in anyway been faked. From enquiries made rather carefully in Dauphin and from the result of analysis made by Milton-Hersey company—my opinion is that the well has not been salted.

(b) The oil must be found to issue vertically through the four feet of limestone which was opened up at the bottom of the claim and not laterally from the surface of the limestone. If the oil is coming in from the bottom of the four feet of limestone the probabilities are small that it is connected in any way with the shale deposits of the Riding Mountains, part of which is oil bearing."

Prof Wallace in his accompanying letter recommends that the government clear up the two points definitely before commencing operations. He recommends that the Hugh McNair, of the Public Utilities Commission who was named by the legislature as the other expert to co-operate with Prof. Wallace in making a report on the oil deposits, be asked to do this work. So far the government has not received any report from Mr. McNair.

Prof. Wallace, together with Hugh McNair, engineer of the Public Utilities commission, was appointed by the legislature to make a thorough survey of the Dauphin district with regard to oil.

This action was taken as a result of the many conflicting reports given publicity concerning large oil deposits there. In digging a well, it is reported, oil was found and this is the well which is referred to by Prof. Wallace. It went to a depth of four feet in the limestone. The legislature ordered that if the report of the commissioner and his assistant was favorable, the department of public works should purchase a drilling apparatus capable of sinking a shaft 1,000 feet in order to permanently establish the presence or absence of oil.

Prof. Wallace in concluding his report continues: "If conclusive evidence is obtained on both these points I am of the opinion that the government should entertain the expense of putting down a test hole at the well itself. While no one who knows the situation well can feel enthusiastic at the present moment in regard to the possibilities of oil reservoirs in this district, yet the importance of oil is so very great that its possibilities even if merely possibilities should not be overlooked. There is another reason which is in itself important. Direct action by the government will go far to prevent unlimited speculation which is at any time possible where evidences of oil are reported.—"Free Press," Winnipeg.

..R. C. WALLACE TO CONTINUE AS COMMIS.. MISSIONER OF NORTHERN MANITOBA UNTIL SEPTEMBER, 1921.

It was officially announced by a member of the provincial cabinet today that Commissioner R. C. Wallace, of Northern Manitoba will continue to hold the post despite former announcement as to resignation. The government has completed arrangements to retain his services until Sept. 1, 1921.

Commissioner Wallace was loaned to the provincial government by the University of Manitoba, where he filled the post of professor in geology. As commissioner of northern Manitoba he is the administrator of law in a vast unopened tract of country. As a professor of geology his knowledge has been of inestimable value in connection with the mining industry which is opening up the northland.

Mr. ANGUS W. MACDONALD,
Welfare Supt. and Employment Agent, Dominion Steel Corporation, Sydney, N.S.

OUR NORTHERN ONTARIO LETTER.

THE SILVER MINES.

Announcement is made in Cobalt that despite the decline in quotations for silver, the mining companies will continue to pay their employees the bonus of $1.25 a day, just as though the price of silver had remained at over $1.20 an ounce. This brings the schedule to a level with that of the International Nickel Company and is likely to stop the exodus of miners which has been going on for the past few weeks. The agreement made last Autumn with the men was that the wage should be from $3.50 to $4.00 a day, plus a bonus of 25 cents a day when silver averaged 80 cents an ounce or over, plus an extra 25 cents a day for each ten point advance in silver above 80 cents an ounce. On this basis, the bonus amounted to $1.25 a day when silver averaged over $1.20 an ounce as during March and April. At the same time, the May rate would be only 75 cents a day bonus on account of silver having declined to below $1.10 an ounce. Not only has it been announced officially to the "Journal" that the full $1.25 bonus will be paid for May, but this rate is definitely promised for at least six months.

During the closing week of May, therefore, with the labor question stabilized by the timely action of the companies, and the price of silver strengthened, a prosperous period seems likely. It is to be noted, also, that selling silver in New York and receiving payment in New York funds, receipts are increased by some 12 or 13 per cent. by the premium on New York funds, making the price $1.15 an ounce for silver produced in Canada.

The McKinley-Darragh has declared a regular quarterly dividend of 3 per cent., payable July 1st. The disbursement will amount to $67,428, and make a total of $5,821,591 paid to date by this company. This is equal to 262 per cent. on the company's issued capital. It is expected the financial statement which will accompany the dividend cheques will show a surplus of around $450,000 to $475,000 as compared with $474,864 as of the previous quarter.

On May 24th the Beaver Consolidated disbursed a 3 per cent. dividend, the first in some three years. It is believed probable that disbursements will now be made at reasonably short intervals, owing to the company having been relieved of the financial burden of paying the way of the Kirkland Lake Mine which the Beaver controls. In the past three years the Beaver paid out over $750,000 in developing and equipping the Kirkland property, which only within recent months has paid its own way.

The Coniagas Company has a force of men engaged in erecting camps and clearing a road to the Gamble-Thompson property in the Gowganda district. The claims are held under a working option agreement, with a certain amount of work to be done monthly.

It is noted that bonds which the Northern Light Railway are to issue will bear interest from June 1st., which is pointed to as an indication that it is proposed to carry out the construction work immediately. The work of surveying the route from Elk Lake to Gowganda is being continued, and it is stated that a very suitable grade will be established.

Harry Stewart, manager of the Crown Reserve Mine has been appointed a director of the Canadian-Kirkland Gold Mines. This property is held under option to the Crown Reserve Company, and the new appointment was made to fill the vacancy caused by the resignation of R. W. Brigstock. The annual meeting of the Canadian-Kirkland is to be held within the next few weeks, notice of which will be sent out in due course.

As regards the question of arrangements to treat the large dumps on the Kerr Lake mine, nothing of an official nature has so far been announced, although it is believed that suitable terms will eventually be agreed upon. The dumps are estimated to contain something like 75,000 tons of material of low silver-content, but believed as likely to be workable at a fair margin of profit.

The Coniagas Company has made arrangements to treat approximately 40,000 tons of tailings by cyanidation in the Buffalo mill of the Mining Corporation. The lease covers only the cyanide equipment of the Buffalo mill and does not include the flotation.

Ore and Bullion Shipments.

During the week ended May 28th, three Cobalt companies shipped an aggregate of eight cars containing approximately 646,251 pounds of ore. The Nipissing alone sent out five cars. Following is a summary:—

Shipper	Cars	Pounds
Nipissing	5	434,390
Mining Corporation	2	129,659
McKinley-Darragh	1	82,204
Totals	8	646,251

During the week, the Nipissing and the Mining Corporation were both heavy bullion shippers, and sent out a total of 299 bars containing 351,570.03 fine ounces.

Following is a summary:—

Shipper	Bars	Ounces
Nipissing	149	201,156.53
Mining Corporation	150	150,413.50
Totals	299	351,570.03

THE GOLD MINES.

Higher wages at the gold mines is perhaps the chief announcement during the week in connection with the industry. While this announcement comes only from the Hollinger Consolidated, yet with the requirements of this one mine being almost as great as all the other gold mines of the Province combined, it indicates that other companies must also meet a similar schedule. Loaders are offered $4.72 and machine runners $5.28 for 8 hours work. The new scale compares with $4.75 and $5.25 at Cobalt and is also about equal to that being paid by the International Nickel Company at Sudbury.

It is believed that with gold mining likely to prove one of the steadiest industries in the country during the period of reconstruction, and probably destined to flourish most when other industries are confronted with depression, they may now be a tendency for men to find their way in greater numbers to the gold-mining camps of the North. The present appears to be an opportune time to establish themselves in the gold-mining centres, and to thus be freed from the uncertainty of conditions in other centres where a break in present wages appears likely due to effort being directed toward the manufacture of luxuries instead of the provision of necessities, such as we consider gold to be.

Advance information to the correspondent of the "Canadian Mining Journal" would suggest the belief that the coming annual report of the Dome Mines Company will be exceedingly favorable. It is known that the company commenced its fiscal year on April 1st., 1919, with a surplus of only $56,000 and that about two months later this had been reduced to almost nothing. However, at that time the mill was put into service, and it is learned that the annual report will show a net profit of around $650,000 during the last ten months of the year ended March 31st., 1920. In addition to this large net profit, the company is stated to have written off close to $250,000 for deferred development, plus about $200,000 for depreciation. The fact, therefore, is, that despite the adverse economic conditions, and being forced to operate at only two-thirds capacity, the Dome realized net profits amounting to about twenty per cent on its issued capital in the ten months during which the mill operated. Mill heads are stated to have averaged over $6.50 a ton, while the total costs, inclusive of the large amount written off for depreciation and deferred development amounted to only between $3.50 and $3.60 to the ton. The achievement is believed to be one of the best recorded in the history of mining in Canada.

At the annual meeting of the Porcupine V.N.T. held May 27th, it was decided not to resume work until such time as workmen are plentiful. It was stated, however, that all is in readiness to commence work just as soon as the labor supply becomes satisfactory. This is taken as an indication that harmonious conditions have been established among the directors and that the course to be adopted will be governed by conditions other than lack of inside cohesion.

The Hollinger Consolidated has declared a dividend of one per cent payable June 16th to shareholders of record June 14th. The disbursement will amount to $246,000.

Announcement is made by the Ontario-Kirkland Gold Mines that lateral work at the 450-ft. level has opened up the downward continuation of ore bodies developed at the 300-ft. level. It is stated that ore will average about $16 to the ton at the point where encountered. Further work is proceeding, and it is planned to reach a decision during the next month as to the size of the mill required so as to proceed with the work of installation at as early a date as possible.

A delay has occurred in connection with the reopening of the Tough-Oakes, and work may not actually resume for another week or so, according to official advice. It is felt that the process of resuming work will be gradual on account of the difficulty to secure men.

The Crown Reserve Mining Company, holders of an option on the Candian-Kirkland has commenced to dewater the shaft on the latter property. This is considered as particularly significant owing to the fact that underground work was discontinued some weeks ago, and that effort has since that time been concentrated on diamond drilling. It is believed that drilling results has encouraged further underground work.

It is reported at Boston Creek that the Ontario Government has decided to build a bridge over the Blanche River to accommodate the prospectors and mining companies engaged in exploration and development work in the Skead township gold area. This will encourage traffic to Skead by way of Boston Creek and will reduce the distance from the railway by fifty per cent.

Dan Smith has been granted a contract to sink two 50-ft. shafts on the property of the Better 'Ole Syndicate, near Bourke's Siding. The syndicate is composed chiefly of returned men, some of whom are disabled. It is their aim to put forward an earnest effort to develop a mine, for which purpose the syndicate was formed. The work is already well under way.

The suggestion in Washington that Canada could be compelled to export pulp wood to the United States by threatening to cut off her coal and sulphur supply has aroused considerable interest in Northern Ontario. The question of a solution of the coal problem is believed to lie with Eastern as well as Western Canada, but sulphur is a matter of much local interest in this district where large iron-sulphide dykes await development. These dykes occur in Porcupine, Swastika, Skead and other parts of the district of Temiskaming, and in many cases the percentage of sulphur is said to exceed forty per cent. The importance of the chemical is realized when it is pointed out that it takes from 250 to 300 pounds of sulphur to make a ton of sulphite, and paper consists of about 20 per cent. sulphite. Light thrown upon the subject may reasonably lead to lively interest in the large sulphide deposits awaiting development.

BRITISH COLUMBIA LETTER.

The Metal Mines.

Vancouver, B.C.

By the staking of mineral claims within the municipality of Point Grey and demanding that he be given title under the Mineral Act, James Adair, a prospector, has presented the Provincial Government with a problem that promises to be difficult of solution. Mr. Adair asserts that he has a good showing of ore in a section the residential property of which has given property considerable value. The terms of the Act, it is said, have been fully complied with but Mr. Adair's application for the completion of the record has not yet been approved. He declares that it is his intention to press the matter so that it is possible that the courts may have an interesting point to settle.

Oscar Lachmund, consulting mining engineer of Spokane, Wn., and formerly general manager of the Canada Copper Company, announces his intention to leaving for the Orient next month on professional business.

Stewart, B.C.

There seems to be some foundation for the report that the line of Railway up Bear River in the Portland Canal district, is to be repaired and operated this summer. The Algunican Development Co., Ltd., is reported to have made an arrangement with the Canadian Northeastern Railway Company under the terms of which the long deserted line will be put in shape and used for the transportation of supplies and equipment during the season. The work involved reconstruction of the Bitter Creek and Bear River bridges, clearing a right of way etc. Tenders are being called for.

The Northern Light property is actively under development diamond drilling is to be undertaken as soon as weather conditions render it feasible. Five thousand feet in this work is contemplated.

There has been much activity in the transport of supplies to the Spider property, Salmon River. Hauling was done on Yukon sleighs. A temporary camp

has been established and a compressor-House is under construction. A three-drill compressor and engine is being installed, it is expected, will commence in a few weeks.

Alice Arm, B.C.

It is altogether probable that at the time of writing (May 25th) work will have been resumed on the Dolly Varden Mine and Railroad. Some weeks ago the miners and employees on the railroad went on strike, their demands being of such a character that the management felt they were beyond reason. A statement was made that the walk-out was engineered by the O. B. U. Since then, successful efforts have been made to obtain members of the International Union at lower coasts points, for employment on the plant and at the mine. These men have gone north and no doubt now are at work.

Trail, B.C.

Receipts of ore and concentrates at the Trail smelter have passed the hundred thousand ton mark. During the week ending May 14th, 5,345 tons of ore and concentrates were received. This brings the total for the year up to 104,086 tons.

Three returned soldiers, who took the special Soldiers' Civil Re-Establishment Assayers' Course in connection with the B. C. University, passed the B. C. Board's examination recently at Victoria. They are M. J. Bajus, Vancouver; S. E. Okell, New Westminster; and C. S. Gardner, Victoria.

The Collieries.

While definite figures cannot be given as to the coal production of British Columbia for the month of April because of the lack of returns from the Crow's Nest Pass Field it would appear, from statistics available, that the output of the collieries has fallen off slightly. Companies which show a decline in comparison with March are the Fleming Coal Co., of the Nicola-Princeton District; the Canadian Western Fuel Co., the Canadian Collieries (D) Ltd., at Extension and South Wellington, and the Pacific Coast Coal Mines. Those which have increased production are the Princeton Coal and Coke Co., of the Nicola-Princeton District; the Canadian Collieries (D) Ltd., at Comox; Wellington-Nanoose Collieries, and the Granby Consolidated Mining and Smelting Co. at Cassidy, Vancouver Island. The growth of the latter's output is one of the features of the trade. For some months it has been steadily mounting, an indication of the adoption of a policy of the development to the fullest extent of the Island fields recently opened up by the Company.

The returns in detail follow:—

NICOLA-PRINCETON FIELD.

	Tons
Fleming Coal Company	2,352
Princeton Coal and Coke Co.	1,267
Total	3,619

VANCOUVER ISLAND FIELD.

	Tons
Canadian Western Fuel Co., Limited	54,019
Canadian Collieries (D) Ltd., Comox	35,139
Canadian Collieries (D) Ltd., Extension	15,853
Canadian Collieries (D) Ltd., S. Wellington.	7,076
Pacific Coast Coal Mines	9,332
Wellington-Nanoose Collieries	2,015
Granby Consolidated Mng. & Smelting Co., Cassidy	18,421
Total	141,855

Pacific Coast Coal Mines, Ltd., to Enlarge Production

On assuming the position of General Superintendent of the Pacific Coast Coal Mines, Ltd., George Wilkinson, late Chief Inspector of Mines for British Columbia, announces that his Company has adopted a plan for the development of its Vancouver Island coal properties that will mean the expenditure immediately of some $500,000. Already the Company has invested over $2,000,000 in the opening up of its Morden Mine which is fed by 1,600 acres of coal bearing land, there being three seams known as the Douglas, Newcastle and Wellington. The plant is thoroughly modern, the pit head and screening plant being constructed of steel and reinforced concrete. It is about five miles from the mine to the shipping point at Boat Harbor, transportation being furnished by a standard guage railway. At Boat Harbor bunkers have been erected with a capacity of 5,000 tons and washing plants also have been installed. The loading is done by a conveyor of a capacity of 750 tons an hour. The Morden Mine now is producing about 400 tons of coal a day and it is expected that the daily output will reach 1,000 tons by the end of the year. It is estimated that the area held by the Company at this point will yield a quarter of a million tons a year for ninety years. The first work in connection with the Morden property will be the construction of officials and workmen's houses, sixteen acres of land having been purchased on which will be constructed excellent living quarters. The Suquash holdings of the Pacific Coast Coal Mines, Limited, are situated on the east coast of the Island, on Broughton Straits opposite Alert Bay and at the entrance to Queen Charlotte Sound, about 200 miles north of Nanaimo. The coal field there is one of the largest undeveloped proved areas on the Pacific Coast and the company owns some 10,000 acres of it. Three workable seams have been located at a moderate depth. The mine workings on the second seam now are developed to a point where from 300 to 400 tons daily can be produced when a second opening is made and permanent shipping facilities are provided. Mr. Wilkinson is of the opinion that Suquash is to become one of the largest coal centres of the Pacific Coast from the standpoint of production and estimates that employment ultimately will be given 2,000 men. If the coal seams run evenly and consistently over the whole area, as appears to be indicated by drilling and other development, the company will have sufficient coal here to yield half a million tons a year for two hundred and sixty-four years. The Suquash Mine was closed down with the beginning of the war but Mr. Wilkinson states that it is the intention to resume operations there without delay. Some 200 men will be employed without delay. As development proceeds modern plant will be installed, and it is believed that, as the coal is comparatively

hard and well adapted to domestic use, it will not be long before the product wins popularity among the consumers of the northwest.

The coal product of the Nicola-Princeton Field of British Columbia has been attracting some attention of late and, if reports from responsible quarters are to be credited, there is to be considerable new development in that section. The Harvard Coal Co., of Princeton, recently sold some of its product in Spokane, Wn. and it is said to have given satisfaction and to have been marketed at a price that proves it can be shipped across the line and successfully compete with the output of Washington State Mines. The property of the Coalmont Collieries, Ltd. also is to be extensively developed, a bond issue of $600,000 having been floated among Vancouver City and Calgary citizens to supply the needed finances. A tramway is to be constructed for a distance of two and a half miles between the Kettle Valley Ry. to the mine shaft, and quarters will be provided for officials and men at the mine. This work will be prosecuted with vigor during the summer to the end that transportation facilities may be available to permit a much larger production than the present to be placed on the market at Vancouver and elsewhere next winter.

A determined counter-offensive is being waged by the United Mine Workers of America against the O. B. U. in the Crow's Nest Pass coal field. The Miner's Hall at Fernie has been seized by the U. M. W. of A., so that that organization again is in possession of its old headquarters. Locals are being re-organized at Fernie, Michel, Natal and other centres with, it is stated, considerable success.

In order to better co-ordinate the coal mining industry in the Province of Alberta from the viewpoint of the operators an amalgamation has been effected which will bring under the jurisdiction of the Western Coal Operators' Association six sub-district organizations, including the Red Deer Valley Coal Operators' Association. While each sub-district will deal with questions inside its own association, all matters of policy will be referred to the Western Coal Operators' Association. The officials of the new organization are: President, O. S. Whiteside; first vice-president, Jesse Gouge; second vice-president, John Shanks; secretary-treasurer, W. R. McNeill.

In an effort to meet the situation caused by the attitude of American coal operators, and in response to an appeal from the Manufacturers' Association of Toronto, Ont., the Boards of Trade of Western Canada at a recent conference passed the following resolution:

"That every effort possible be made to increase the area of use of Western Canada's Coal, and that this conference favours the investigation of freight rates on coal from Western Canada to the manufacturing centres of western Canada to the manufacturing centres of Ontario, with a view to making Canada independent of any other country in its fuel supply.

"And that the Canadian Pacific and the Canadian National Railways be asked to give special rates for the summer haulage of coal from Western Canada.

"And further that the coal operators be requested if they have not already done so, to make special summer prices for the sale of this fuel."

BRITISH COLUMBIA HAS DEFINITE POLICY TO ENCOURAGE IRON AND STEEL INDUSTRY.

Ore Acreas to be Examined and Reservations Effected

(By Our Victoria Correspondent)

F. J. Crossland, mining engineer of Vancouver, B.C., has been appointed to make a thorough inspection of the hematite and limonite deposits of the Whitewater River section of the Clinton Mining Division. Hon Wm. Sloan, Minister of Mines, has commissioned him to ascertain, as far as possible in one season's work, the tonnage of this mineral available.

In an address before the last session of the Legislative Assembly Mr. Sloan spoke of a report received from Wm. M. Brewer, Government Mining Engineer, on these deposits which estimated that they afford a possible 50,000,000 ton reserve of limonite of good quality, eminently suitable for fluxing with the magnetic ores of the coast in the production of pig iron by blast furnace, and so situated as to be easily recovered. The Minister then stated that it was his intention to have the district well explored and Mr. Crossland's engagemen is in line with that undertaking.

This Provincial Government work is to be supplemented by the Geological Survey Branch, Ottawa, which will have two parties in the field. One, under J. D. McKenzie will make a geological survey of the Taseko (Whitewater) Lake area and the other, under C. H. Freeman, will conduct a topographical survey.

Notice has been given, also, that a reserve, as authorized by a recent amendment to the Mineral Act, has been placed on the drainage area of the Taseko (Whitewater) Lake, Chilko Lake, Tauniah, Chilquoit and the Chilko River and Big Creek, Clinton Mining Division. This reserve takes effect on the 1st of June. Claims already recorded will not be interfered with but all open iron showings within the limits defined will be held by the Crown until it is determined how far they may be needed for the encouragement of the industry.

BRITISH COLUMBIA COPPER OUTPUT PROMISES IMPORTANT INCREASE

(By Our Victoria Correspondent)

The announcement that the Consolidated Mining and Smelting Company, proposes becoming one of the large copper producers of the Province of British Columbia has occasioned much interest and speculation. The Company it is found, has been laying the foundations to this end for some time. It has two large copper deposits in Vancouver Island under development, one being the Old Sport, situated on Elk Lake near the southeast arm of Quatsino Sound, and the other the Sunloch, at Jordan River not far from Victoria. Through surface work, diamond drilling, etc., some 1,500,000 tons of copper ore approximateing 1.8 per cent, have been proved on the former property and it is authentically reported that reconnaisance surveys have been made of a number of railroad routes to tidewater. The Company recently acquired control of the Sunloch where it is estimated that 2,500,000 tons of proven ore, averaging between 1 and 2 per cent copper per ton, have been blocked out. The big Interior group also has been bonded. It is situated at the head of the Great Central Lake at an altitude of 6,200 feet. This season's work will consist of the securing of all possible information regarding its possibilities, the topography and geology of the area being investigated with a view, it is understood, of es-

tablishing the practicability of attacking the deposit from about the 1,500 foot level. If this can be done the problem of making the mine will be much simplified. As to transportation, the E. & N. Railway is to be extended from the town of Alberni to the south end of the Great Central Lake so that it will be a matter of running the ore down the mountain side to the water, loading it in scows for transport over water for 22 miles and dumping it in railway freight cars for removal to the point selected for treatment.

While on the subject of Vancouver Island mineral development it may be said that the Tidewater Copper Company at Sydney Inlet is proceeding with the opening up of its deposits with satisfactory results. There are at least 500,000 tons of 1½ to 2 per cent of copper ore proven in reserve with good prospects of larger quantities being shown as work continues.

Neither the Cranby Consolidated Mining and Smelting Co., Hidden Creek, nor the Britannia Mining Company are working up to capacity at present. In the old workings of the Britannia, Howe Sound, it is roughly estimated that there are 9,000,000 tons of ore in reserve and on the Victoria Claim, newly under development, it is figured that there are a possible 5,000,000 tons.

British Columbia, there is no doubt, is ready to take a more prominent place than heretofore as a copper producer as soon as labor and other costs decline or the price of the metal advances.

FORT RUPERT, VANCOUVER ISLAND. WAS FOUNDED AS A COAL DEPOT.

Few people are aware that Russians loaned to the Company their brig "Constantine" and crew to build a fort and established the mines at Fort Rupert. As a better idea of this operation may be had from the opening entry in the Fort Rupert Journal, dated Friday, May 11, 1849, as follows:

At 8 a.m. the H.H.B. Company's steam vessel, having the Russian American Company's brig "Constantine" in tow entered Beaver Harbor, Mr. Chief Factor Work, having with him Mr. Chief Trader MacNeil and clerks Blenkinsop, Beadmore and Simpson' also a party of 28 men, being on board the two vessels to establish a fort for the trading of coal and furs. Shortly after anchoring, the above-named gentleman and a few men landed to search for a site which was found towards evening on the southeast side of the harbour rather a rugged spot but conveniently situated for a good supply of water, this article being of paramount importance. The Indians appear friendly and well pleased at our coming to establish amongst them, and have so far done all in their power to assist us, and there is every reason to believe that we shall be free from molestation; one thing, however, is certain, that they are second to none in the art of stealing. We commence to-morrow morning in earnest clearing a place for the Fort with rather a motley set for such an undertaking."

The fort was finished and the Russians sent back. Coal was not at first mined, but brought from the Indians who picked it up from a small exposed seam only 18 inches wide. In a short time there had been delivered according to the amount paid one thousand tons, but when sold and loaded on ships it was found that only about seven hundred tons were on hand. The Indians were living up to their reputation by stealing what they had already sold, then reselling it.

In order to mine in an economical and up-to-date manner necessary machinery was ordered from England, but before its arrival the Company were convinced that Fort Rupert as a coal field was a failure. Quatsino Inlet was examined with the idea of making that a great coaling port for the immense fleet of ships that these far-seeing men knew would soon swarm to the Pacific Ocean.

Before anything further was done, coal was found at Colville town, but now known as Nanaimo.

Robert Dunsmuir was soon an outstanding figure at these mines. So much were his capabilities relied on that a separate agreement was entered into with him in which he received a higher rate of remuneration than the others.

At the commencement of the operations there was an ample market but later, when the output became greater, it was a problem what to do with the stock on hand, and in spite of the numerous British warships requiring coal during the Crimea war the supply on hand reached nine thousand tons. The greatest market, San Francisco, could only pay $8 per ton, and the freight rate was $10 per ton so that the outlook did not appear bright.

The London management were not satisfied and sent out a new man, Mr. A. G. Dallas, to take over the full management of their affairs.

A new broom sweeps clean, and this new broom lived strictly up to that reputation. All the old hands were let out, and a Mr. C. S. Nicol, in 1860 was given full charge. He, it was, who was instrumental in forming a company to take over the whole interests of the Hudson's Bay Company, at Nanaimo, which subsequently found its way into the hands of Mr. Robert Dunsmuir. The immense fortune accumulated by him, together with the high place he reached in the affiars of the country generally, are worthy of special note in British Columbia history.—From the "Victoria Times."

WASIPIKA CUTS OREBODY AT 200 FT.

Development work at the Wasapika Gold Mine has recently been confined to sinking to the 200 ft. level. This level has now been reached and the orebody broken into by crosscutting. The first round in the quartz exposed good ore. Crosscutting is now being continued.

When sinking the shaft, the orebody was encountered at the 160 ft. level and for forty-four feet below that depth a large part of the drilling was in quartz. The vein dips to the west at about 65° and as the shaft is a vertical one it cuts diagonally through the vein.

Systematic sampling of the quartz in the shaft and crosscut is not yet completed. Preliminary sampling, however, gives assurance that the values are holding well with depth.

The numerous channel samples taken at the Wasapika indicate that the values are almost entirely in the quartz. The adjacent schist nearly always shows some gold when assayed; but the values in it are low. There is unfortunately a large tonnage of quartz in the orebody and the schist can advantageously be discarded.

Ore from the 200 ft. level is similar to that at the 100 ft. level; but somewhat higher in pyrites content. It has the same minute black stains as noted in the ore from the 100 ft. crosscut and which may possibly be a silver mineral. It has been noted that high gold

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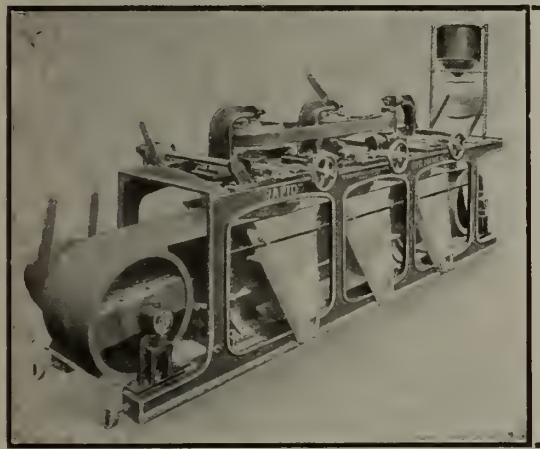

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values are frequently present in quartz showing these small black areas.

It was noted in the quartz from the 100 ft. crosscut that the silver values are quite important at the Wasapika. The many surface samples were assayed only for gold and the silver values there are not known. Samples from the 100 and 200 ft. levels that have been assayed for silver as well as gold show important quantities of the former. One sample from the first round in the quartz at the 200 ft. level showed three and a half ounces of silver per ton as well as $20.18 gold per ton. This would mean about $3.50 in silver. Another sample from the quartz near the bottom of the shaft showed one half ounce of silver per ton as well as $7 in gold per ton.

At the 100 ft. level a sample cut across the 40 inch rich shoot at the footwall assayed $26.84 gold per ton and showed also four ounces silver per ton. Several samples showing about $12 gold per ton for a width of 5 ft. in the 100 ft. crosscut all show silver present in important quantity. There seems good reason to believe that silver can be counted upon as an important asset in addition to the gold.—R.E.H.

It is reported that Cobalt bloom has been discovered four miles east of the Mandy Mine on Schist Lake, Northern Manitoba. Commissioner Wallace states that a sample submitted to him contained smalite.

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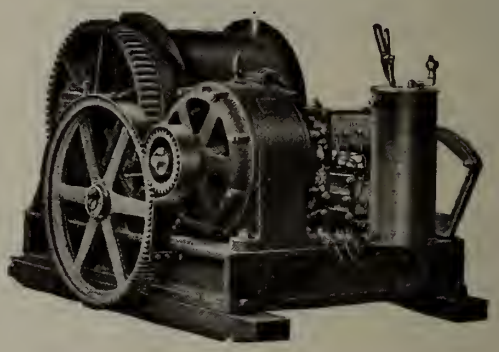

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EDITORIAL

The Training of Mining Engineers

In our issue of May 21st, Professor Haultain of Toronto University, asked for criticism of the regulations applying to students in the Department of Mining Engineering in that University. Candidates for the degree are required to present satisfactory evidence of having had at least six months' practical experience in work connected with mining, metallurgy or geology, for which they must have received regular wages. It is not often that those who sit in the chairs of learning at our universities ask criticism from the layman. Perhaps it is a stray eddy of the wind from Russia?

The question raised by Prof. Haultain has almost as many possibilities for discussion as the tariff, and it is one that very largely occupied the proceedings of mining societies in Britain during the past year. In Britain the difficulty was not so much to give theoretically trained men acquaintance with the actual practice of mining, but to give some theoretical knowledge to men fully acquainted with the practice of mining. Here it may be remarked that the college-trained mining engineer is somewhat of a rarity in Britain, more particularly in coal mining. The practice has been to article young men to reputable mining engineers for a term of years, during which period the aspirant is given an opportunity to learn every branch of coal mines direction, including the commercial side of the business and such by-ways as the work of the warehouse, the time-office and the traffic office. Concurrently with his daily work at the mine, the student is required to study and to take his certificates of competency for the various grades of official mine positions. Briefly, the training of the mining engineer at British collieries is theory super-imposed upon practice, and, while university training is by no means under-rated, it is given a secondary place in the training of the mining engineer, or at least, in that most responsible man, the certificated colliery manager. In Canada, this course of training sometimes places the old-country mining engineer at a disadvantage, as he is not the possessor of a university degree, nor, in British mining circles is he expected to be.

We believe that the regulation of the University ask the very minimum of practical knowledge from the aspirant for a mining degree, but we do not quite understand why it should be necessary to stipulate that during the required probationary period of practical work the student should have received "regular wages." In some instances this would pre-suppose a philanthropic spirit on the part of the employer. It is the work, and not the remuneration, that is of practical value to the student. If he needs the money the student himself will see to it that he receives "regular wages." There have been budding financiers among students before now.

Also we suggest that instead of ruling out mine-office work as a qualification, students should be encouraged, in adition to the practical work, to spend some time in the commercial side of mining. Many mining engineers sadly need education in the economic side of their profession. It is not less essential that the fully educated mining engineer should be able to intelligently analyse a cost-sheet or interpret a financial statement than that he shall be able to read a blueprint. In his actual lifework it will probably advantage the mining engineer more to be able to calculate the ultimate cost of the material he is mining than to know how to make an ultimate analysis of its chemical composition, or to be able to specify its exact stratigraphical occurrence.

We suggest that our readers should follow Prof. Haultain's suggestion and discuss this many-sided question in the columns of the "Journal."

Dominion Coal Company Offers Scholarships to Employees

It is announced from Glace Bay that the Dominion Coal Company will offer annually two scholarships at McGill University to employees. In this connection the Dominion Coal Company follows the example of the International Nickel Company and the Granby Consolidated Mining & Smelting Company. We hope that the adoption of the granting of scholarships by such a representative group of Canadian mining companies will lead to an even more widespread and general acceptance of the principle.

In the issue of the "Journal" for 24th December last there was noted in this column a plan adopted by fourteen of the largest mining companies in Australia by which bursaries at the Universities of Mel-

boure and Adelaide were provided for students in mining and metallurgy. Provided the students selected respond to their opportunity, the associated companies undertake to provide him with a suitable position with an initial salary of not less than £250 per annum.

The employees, and the children of the employees of the mining companies in Canada, have been placed at a disadvantage in educational opportunities by the remoteness of the mining centres from seats of learning, which to some extent explains the tendency for the more ambitious men to move to metropolitan centres. The paucity of suitable applicants for official positions, and the lack of understudies to officials in responsible charge of important departments is a matter that concerns the mining companies very intimately and is reflected in their balance-sheets. While the provision of bursaries for selected students is a proper and commendable thing, which the "Journal" would be the last to appear to disparage, we do not think it will solve the real problem of mining education, which is to extend the scope and the influence of the universities to the sons of the miner, the minor official, and the clerical employees of the mining companies. For this reason we cannot agree with the present campaigns for the augmentation of the endowments of denominational universities in Nova Scotia, so far as the training of technical workers is concerned. If the people of the Maritime Provinces could agree among themselves upon one centre of technical training, would concentrate their energies upon equipping such a centre as it should be equipped, then something might be done to bring the staff and equipment of such a centre into close and permanent touch with the technical workers of the Province. The denominal colleges could then proceed to develop as schools of ethical culture, freed from the hopeless endeavour to maintain engineering laboratories and faculties entirely beyond their means, and the Maritime Provinces might under such circumstances redeem itself from the shame and consequences of such inadequate provision for the technical training of its workers as has hitherto distinguished it. The Nova Scotia Government has done much by its mining schools but its revenues are inadequate to allow of the extension of the mining schools to suit present-day standards and requirements. Technical education is costing enough in Nova Scotia, but the money and energy spent is being dissipated to little purpose. and, from the point of the mining companies is money and energy lost, as it does not reach the homes of their workmen. For example, there is as yet no means by which a promising student of the provincial mining school can take a short course at any of the places where engineering science is taught in Nova Scotia, and in the whole Island of Cape Breton, which has 100,000 inhabitants and produces eighty per cent of the coal output of Nova Scotia, there is no technical school, nor any institution of learning containing scientific equipment superior to that of the average town high-school. The circles of university instruction and the life of the mining population of Nova Scotia do not anywhere intersect, which fact we believe to be a drawback, and a condition calling urgently for a remedy.

THE FINE ARTS VERSUS STYRACOSAURUS ALBERTENSIS.

In order to make room for specimens of the fine arts in the Victoria Museum at Ottawa the members of the Geological Survey have been asked to clear out the fossils in the Hall of Vertebrate Paleontology, at the Museum, which contains, among other unique fossil remains, the complete skeleton of the great horned dinosaur from the Cretaceous of Alberta, of which the Geological Survey is justly proud. The suggestion is made to the Paleontological Branch that if the dinosaur is allowed to remain where it is, as is very desirable in order to avoid damage in removing it, it should be boxed up. As the Ottawa "Journal" remarks, "the value of a boxed-up dinosaur for museum purposes is apparent."

We would not care to comment upon the incident, except it is just another of those little indications of non-appreciation of the work of the Geological Survey that we have noted in these columns from time to time. The work of the Survey is not understood, therefore it is despised. Possibly some itinerant scientist will come across the "boxed-up" dinosaur and express himself as Samuel Butler did about the pantless Discobolus in Montreal. If the right of the Paleontological Branch to continue its exhibits in the Victoria Museum is to be taken away, then it were a pity to have disturbed the dinosaur from its age-long rest in Alberta, and in justice, the bust of Logan and the boulder on which it is placed should be removed from the entrance to the Museum. Perhaps, if Ottawa does not want the dinosaur, the Province of Alberta, or the United States, might welcome it. That is where most of the geologists have gone anyway. If the Styracosaurus could use his frontal horn and his bony mane there might be another kind of clearance in the Museum.

"ALL LEAVE IS STOPPED."

Rudyard Kipling was some time ago described in the "Atlantic Monthly" as a seer of "remarkable rightness," and we believe him to be happier in his interpretation of the British mind than in his analysis of the Canadian mind, if recent cabled reports of a late work are true—which they probably are not.

Some recent remarks of Mr. Kipling in the "Times" upon the national evolution of the Englishman (the word is Kipling's) have such general application, and

ring so true, that we believe they should be widely quoted. "What will he do in the future?" asks Mr. Kipling, and answers: "We are too close to the dust "of the main battle to see clearly. We know that "England is crippled by the loss or wastage of a "whole generation. Her position from the civil point "of view is that of our armies in the worst days of "the war—that is to say, *all leave is stopped for every "man who can stand up to his job,* no matter how sick "or stale he may be, and there is undreamed of pro- "motion for untried men, who, merely because they "are not dead, will have to face heavier responsibility, "longer hours, and criticism that will certainly not "grow milder as the years pass."

Mr. Kipling's tonic sentences are equally applicable to all the British peoples, and it is a singular tribute to his acknowledged position as a seer and poet of the Empire, that, even when he descants upon the characteristics of the Englishman, and thereby deliberately limits his pen, we feel a secret umbrage at the limitation. Not since Mr. Kipling penned, "Stand up and meet your fate" has he written anything so true as this call to hard work and the acceptance of responsibility.

OIL PROPAGANDA.

In this issue are published editorials from the "Mining Journal" and "Petroleum Times," of London, which express fairly the attitude of British mining men towards the restrictive policy of the various governments of the Empire in connection with oil concessions. The "Mining Journal" expresses its belief that propaganda—by the oil interests presumably —is being directed at the present time towards inducing a modification of present restrictive policies, and states that if the big oil interests reached an agreement "it is impossible to suppose that the policy would not be modified." Which is to say that if the oil interests remain dissatisified the widespread propaganda we have previously deprecated in these columns will continue in an aggravated form. This is indeed a pleasant prospect for international amity.

An example of this particular irritant is the editorial of the "Engineering & Mining Journal," of May 29th on the "Petroleum Drama," which, while it may be unexceptional reading for citizens of the United States, is not acceptable to Canadian readers.

The Canadian point of view, if we are able to interpret it, is that we do not desire to see the friendship between this country and the United States endangered by a propaganda that is based on untruths and issues from the offices of commercial rivals. At the same time, we would suggest to the editors of United States periodicals catering to Canadian circulation, remembrance of the fact that Canada is an important factor in the British Empire.

AMERICA AND GREAT BRITAIN'S OIL POLICY.

The report which has during the present week been transmitted by President Wilson to the American Senate in response to an enquiry by the Senate as to what restrictions were placed upon American enterprise in developing the oil resources of the world, has not unnaturally caused considerable stir in international oil circles. We might even go further and say that by reason of several of the statements which are contained therein, and which have been prepared by the Secretary of State, the report is viewed in a seriousness which only reveals itself when it is closely studied. For the first time, in regard to Great Britain's oil policy, we see the writing on the wall, and even as Belshazzar at his feast in scriptural times saw the solemn warning which those mystic letters foretold, so let us hope Great Britain will exercise due care in the moulding of its Imperial oil policy lest, as Mr. Francis E. Powell put it last week, it should antagonise too greatly irritate too much those sources which have served her so well in the past.

This is not the time to deal in detail with the very important negotiations which have been in progress (despite Mr. Bonar Law's denial) for a long time past between the Government and our friends, the Shell-Royal Dutch group by which this Empire will be in the position of having inalienable supplies of oil for its future needs. Such a consummation will have far-reaching results, and if it achieves the ends in view, then there is ample justification for its adoption. But there are two methods by which this can be secured, and we venture to suggest that in regard to the Mesopotamia oil regions which are admittedly vast in extent, the absolute exclusion of all American interest is not a policy of wisdom. Our great organizations in the oil industry to-day have risen to their present proud positions not solely by reason of grasping opportunity when it presented itself, but rather by managerial control and far-sightedness in appreciating the force of and meeting strong competition. Thus, then the presence of American interests in the new oilfields of Mesopotamia cannot be a source of weakness to our own Imperial oil policy, but will be a factor of strength and one which will have a most beneficial effect upon our relations with the United States.

That the United States takes somewhat of a distorted view of Great Britain's world hold on oil, is not to be wondered at seeing the misleading statements that have freely been circulated through the press of late by certain writers, who, in order to clothe their own speculative oil propositions with some degree of importance, have glibly written of the not distant time when the United States would have to come cap in hand to this country for its oil supplies.

Such statements are not opinions based upon optimism, for there is nothing in Great Britain's oil policy as at present moulded to even suggest this; they are made obviously, as we say, to bring importance to an enterprise which, registered not in this country but in Canada, is out to make at least a show for the millions which are already sunk in it.

While there are feelings that Great Britain is out to capture all the great oilfields of the world, the serious fact prominently stands out that to-day there is produced in regions under the British flag only about one-fiftieth of the crude oil production of the world. If only this fact is fully appreciated, it will be seen what a very long way we have to go before there can be any suggestion of our even controlling sufficient supplies of oil to meet our own demands.

And even with the development of the great fields in Mesopotamia it must take several years before any appreciable amount of oil is available for our home needs; therefore, it behooves us as a Nation to so mould our Imperial oil policy that it shall not create discord among those interests upon which we so greatly depend to-day—"Petroleum Times."

OIL ECONOMICS AND POLITICS.

We have insisted for a long time past on the immense seriousness of some of the issues which underlie the fuel industry. Hitherto these have been viewed mainly in relation to coal and its derivatives, but there is also a wide range of anxieties connected with the other branch—petroleum. In certain directions these problems meet and overlap, apart altogether from the question of competition and substitution of one source of power for the other. On this occasion it is some of the questions connected with the oil industry which claim attention. It is obvious from the activity of the cables that the forces of oil are mobilizing. What exactly that means very few persons can entirely perceive, though the consumer has a shrewd idea that in the long run it is he who will pay the cost of the campaign. Experience of, and participation in, the oil industry has come to this country comparatively late, and we have not, therefore, the experience in traditions which exist in regard to it, such as have long existed in the United States, and to a lesser extent perhaps in the Caucasus. A centralised oil control has so long been recognized in America that, rightly or wrongly, the Oil Trust in popular imagination represents the most brilliant achievement in trustification and the practice of the arts of monopoly and its satellite, business politics or "lobbying." It is possible that the reputation of the Standard in these respects has achieved an eminence which does less than justice to other industrial organizations, but it undoubtedly exists, and imparts an atmosphere into the domain of oil which is an important factor in considering the world's situation and the position of the other competitors or participants in international business. Some appreciation of the atmosphere which exists in the oil world, combined with a recognition of the intense concentration subsisting, is a necessary preliminary to any serious study of the subject, and it largely explains whey even those who have a close acquaintance with the matter find it most difficult at the present time to align the protagonists and penetrate their designs. A moment's reflection will convince any of our readers that, as all commercial struggles are designed for the benefit of the participating interests, where these are individually powerful, at any moment competition may give way to agreement, and the foes of yesterday may be allies—nay, even the master combination—of to-morrow.

At the present time there appear to be three leading groups in the oil world: the Standard, the Shell-Dutch, and the Anglo-Persian. The relations between these cannot be known. Obviously they must touch at many points, and as co-operation, where possible, is a general desideratum, they must have understandings on many subsidiary points, such for instance, as common interests affecting transport and marketing. Beyond this we know that the Anglo-Persian Oil is bound by marketing contracts with the Shell which do not expire until 1922, while it is a matter of common report that a price agreement between the Standard and the Shell also exists, coupled possibly with the usual agreements as to spheres of interest. Such understandings do not necessarily preclude extreme antagonisms on the main fronts, but they always offer the prospect of compromise and agreement on big issues, based on the recognition of the fact that combination is economic and competition is wasteful. In the magnitude of resources these three groups vary greatly, the Anglo-Persian Oil being only able to claim any place in the sun through the fact that the British Government is the chief proprietor, and on the assumption that the Cabinet consider it to our interest to maintain an independent producer in consonance with the principles enunciated by Mr. Winston Churchill at various times, and on the view that independent State enterprise of this kind is the matter of settled policy to which the resources of the British Empire should be directed. Such an assumption is, however, by no means unquestionable. During the war we had the remarkable arrangements come to by the Petroleum Committee designed to give a monopoly of oil production in this country to the Pearson interests which have since been absorbed into the Shell, and all kinds of rumours have been circulated in the Press and Parliament recently of "patriotic" offers by the Shell group to place their great organization at the disposal or combination which has had experience of bureaucor combination which has had experience of bureaucracy during the war can be conceived to desire to thrust themselves under departmental control with any conviction that the industry or business which they have created is going to benefit thereby, and we may be pretty certain that if such propositions have been made the active control would be in the hands of the Shell and not of the Admiralty, or whatever department is selected for the responsibility. As we read the situation, therefore, any such negotiations would be along the lines of an extension of the policy already adopted in regard to the monopolization of any possible oilfields in this country.

Thus far we have glanced at the problem from the internal point of view of organization within the industry itself, but the aspects of the problems which are offering themselves at the moment are perhaps rather national than international, and though very possibly the national movements are merely a move in the game of the big operators, it would be presumptuous to regard them as nothing more than that. During the last two or three weeks we have witnessed the beginning of a political agitation in America, which is almost certainly the precursor of further action, and which was clearly foreshadowed in a leading article in the Journal of February 7, commenting upon an official demand from the head of the United States Geological Survey for action by the United States Government. Recent issues of the Journal have recorded various alarmist statements by leading oil authorities of the United States as to the exhaustion of crude stocks, and these have been emphasized by advances in prices, despite the protests of Federal Commissions and State authorities, to say nothing of the general public. The facts as regards the increasing seriousness of the growing excess of consumption over production in the United States admit of no doubt. Following the statistics of the world's production in 1918, given in our issue of February 14, when the United States' output was approximately 356,000,000 barrels

it is stated that the production last year was 376,000,000 barrels, but the consumption was 413,000,000 barrels. The result is that whereas the crude stocks in California four years ago were over 60,000,000 barrels, at the beginning of March last they were rather less than 29,000,000 barrels, and at the present rate of consumption the stocks should be completely cleared out in another year. Moreover, the consumption is growing monthly. In 1918 the average rate of consumption of Californian crude was 279,576 barrels, in the second half of 1919 it was 292,278 barrels, in January last 301,100 barrels, and in February 304,120 barrels. The Standard Oil Co. are now installing new processes, which will provide for the cracking of about 30 per cent of their current fuel oil production, so that while the immense demand for petrol may to some extent be met, fuel for ordinary power plants will be to that extent diminished. Such being the state of affairs in the United States one of two things —or possibly both—will happen. Exports will be partly embargoed or the price will be sharply raised.

It is just at this point that the more strictly national aspect of the business asserts itself. Mr. Otis Smith, in the paper which we printed on February 7 last, emphasized the fact that the United States must either restrict her domestic supply to home requirements or must secure large sources of supply abroad. He pointed out that the British Government had adopted a restrictive policy in regard to foreign undertakings in territories under the British flag, and suggested that the American Government should make up its mind whether it would insist on the open door or the export embargo. In speaking thus Mr. Otis Smith was voicing protests and opinions which have been current in American oil and business circles for a considerable time past, and the British Government certainly cannot be surprised at their making their appearance. Free trade and equal opportunities for foreign capital has been a cardinal principle of British commercial policy for nearly a century past. With the growing interference, however, of various departments in commercial matters—especially in mining—a distinct change of attitude has presented itself to foreign observers. The Indian service, which is peculiarly subject to reactionary influences, was perhaps the first to exhibit this policy in restrictions upon the alienation of mining land to foreigners. The idea, however, was speedily extended to oil, where the Trinidad leases formed a precedent upon which American attention quickly fastened. Since then these tendencies have had a further advertisement through Mr. Hughes' policy in Australia, while that peculiarly futile piece of legislation, the Non-Ferrous Metals Industry Act, impressed American opinion connected with the mineral industry most vividly. We are not concerned here to argue the preponderating advantages of a general policy of free trade or of protection. Undoubtedly, however, protection begets countervailing measures, and ultimately impairs international relations, and this effect must be weighed up aming the disadvantages of a change in our traditional commercial policy, in view particularly of our dependence on foreign nations for so much of our raw products. No doubt much of the rising tide of protests in America, which appears to be directed against this country to the exclusion of others like France, which has developed a promising petroleum supply in North Africa (which is closed down for eventualities), is unreasonable. We may naturally point out that America was offered the mandate for the Turkish Dominions, and refused, it, although, as American papers then pointed out, they were denying themselves the development of mineral interests in those regions. We are on even stronger ground, perhaps, in refusing to permit indiscriminate exploitation of national territory in a country so unstable as Persia at the present time, but these considerations will not avail to prevent America considering her own interests first, and the possibility of steps to restrict free imports of some essential commodities, especially lubricants, must be considered. At the same time, as the Petrol Profiteering Committee pointed out recently, it is not to the interests of the big American concerns to restrict their business here. They have large sums of money locked up in distributing media—trucks, reservoirs and tanks—and restrictions on supply would in the long run tend to diminish their preponderant influence in the control of our markets. It is, therefore, intelligible that propaganda should be directed at the present time towards inducing the Home and Dominion Governments to modify their restrictive policy as regards participation in the exploitation of the oil resources of the Empire, and it is impossible to suppose that the policy would not be modified if the big oil interests reached an agreement.—The "Mining Journal," London.

OBITUARY.

Hon. James Dunsmuir.

With the death of James Dunsmuir there passes a dominant figure in British Columbia development, and a man whose life, together with that of his father Robert Dunsmuir, covers the story of the growth of mining, finance and railway building in British Columbia from their beginnings. James Dunsmuir and his father were representatives of that band of forceful Scots whose names are linked with the Hudson's Bay Company, the Canadian Pacific Railway and the Bank of Montreal.

James Dunsmuir was born in Fort Vancouver, in 1851, two years later than the first attempt of the Hudson's Bay Company to open coal mines on Vancouver Island. Robert Dunsmuir was soon an outstanding figure in the young coal trade of the Island, and became eventually the largest owner of coal-lands there. Young Dunsmuir entered his father's business at the age of 17 years, eventually succeeding him as president and chief stockholder of the Union and Wellington collieries and of the Esquimalt and Nanaimo Railway, which properties he later sold to MacKenzie and Mann and the Canadian Pacific Railway.

From 1900 to 1902, Mr. Dunsmuir was Premier of British Columbia, and was Lieutenant-Governor from 1906 to 1909. Like other men of the dominant Scotch-Canadian type to which he belonged, Mr. Dunsmuir was a generous, but discriminating donor to hospitals and educational institutions.

BRITISH COLUMBIA MINE INSPECTOR KILLED.

William Lancaster, Inspector of Mines for the Kootenay District of British Columbia was killed on May 29th by an automobile accident. He had been Inspector of Mines for three years, being previously Assistant Manager of the Coal Creek Mine of the Crow's Nest Pass Coal Co.

"Longwall" Mining and Coal Conservation

J. H. CUNNINGHAM.*

A prominent mining man has remarked that when a coal miner is once inoculated with "Longwall" he is forever after immune against future attacks of 'Room and Pillar.' While this statement is perhaps slightly overdrawn, since its author was evidently a "Longwall" enthusiast, yet the fact remains that a "Longwall" miner when selecting a method of working will generally view the situation first from the "Longwall standpoint and then resort to some other method only after finding that conditions are totally unsuited to his particular system. This point of view may not be as prejudiced as it at first appears. For a person who has actually found a superior way of doing a thing, is undoubtedly the best judge of whether his new method is better than the old; and for this reason a miner who has once experienced the numerous advantages of "Longwall" when worked under suitable conditions, is very loath to change to any other system, unless the conditions make the use of "Longwall" prohibitive. The remarks which follow are not intended however to introduce a controversy between "Longwall" and "Room and Pillar," for both systems have their own advantages under certain conditions, but they are designed merely to point out the considerations which should govern the use of the former and to emphasize the connection existing between the use of "Longwall" and the conservation of the coal resources of the country.

The application of "Longwall" mining is of course governed by certain natural conditions existing in the coal seam itself, and in the overlying strata. Any seam of a hard or medium hard nature, varying in thickness from 30 inches to 6 feet, with a good roof and floor lying from 300 to 3000 feet below the surface, is capable of being worked "Longwall" provided it is not badly faulted; and the success of the operation depends entirely upon how these conditions are made use of. Some operators prefer to add that the seam should also have a low inclination, but there are so many examples of "Longwall" worked successfully in seams of high inclination that this does not appear to be essential.

A good roof for "Longwall" is the same as for any other method of mining, but in addition it should be of a material that shoots well and is suitable for building rock walls. The floor also should be fairly hard so that it will not "creep" readily when the pressure comes on it. Above the working roof the most suitable measures consist of alternate strata of sandstone and shale. If they are all sandstone it makes a good enough roof, but after a break once occurs the fissures extend too far and there is too much opportunity for them to gather water. With shale piles intervening fissues are kept from spreading, and with any subsidence of the measures the shale strata open out and help to cushion the weight so that the effects of the subsidence are not felt at any great distance above the coal seam.

The preliminary development in connection with the seam need not be discussed here since the shaft sinking, opening out of pit bottom and arrangement of shaft pillar will be attended to in the same way, irrespective of whether it is to be worked "Longwall" or by some other method. "Longwall" proper therefore may be started as soon as the main roads have reached the boundary of the shaft pillar, and there should be sufficient information available at that time to indicate how the work should be opened out. While the shaft was being sunk the thickness and nature of the overlying strata have been ascertained, and while driving the various roads from the pit bottom to the boundary of the shaft pillar there has been an opportunity to find out the nature and thickness of the seam and the direction of the cleat. If the seam is hard, the direction of the face which is to be laid out should run nearly parallel with the cleat and if it is medium hard, the face may proceed "half on". In some instances, it has been found feasible even to work "Longwall" in a fairly soft seam by keeping the face going "end on". Another feature which helps determine the direction of the face, is the direction of the joints in the roof strata. These of course, should not run parallel with the face.

In continuing main roads after the shaft pillar is passed, two methods are followed. One is to protect these roads by pillars of a suitable size for the purpose of maintaining a tight air-course and insuring height for the roadways. The other is to begin extracting all the coal as soon as the shaft pillar is left behind and carry the main roads forward through the waste and depend upon the excellence of the roadside packs to insure having a proper air-course. The latter method certainly entails more brushing for height than the former, but it is contended that the advantage of having all pillars removed from the area of the "Longwall" operations will in time more than offset the temporary disadvantage of higher cost for brushing. And it is also true that the first cost of the pure "Longwall" roadway may not be any greater than the cost of driving in the solid, in spite of the brushing entailed, since where the complete extraction method is followed, the main road is also a part of the working face and carries the same mining rate as the regular face does. In this way the high yardage rate for level and headway driving is done away with.

One of the most frequent mistakes made in "Longwall" come from not giving proper attention to the contact zone existing between the solid coal and the "Longwall" waste. And here is probably the best place to consider this phase of the question, because the whole system of "Longwall" has often been condemned as unsuitable, simply because proper precautions were not taken in starting off the work. As soon as "waste" is opened beyond solid coal, there is bound to be a subsidence of the roof. How much there will be depends upon how tightly the waste is stowed in the area included within the contact zone. If the method of complete extraction of pillars on main roads is followed, special care is necessary in building the pack walls next to the shaft pillar and the waste should be stowed as near solid as possible. This will reduce the breakage of the roof measures to a minimum and will also prevent air leakage which would otherwise occur at this point. In continuing the perman-

*A paper read before the Mining Society of Nova Scotia, May 1920, Glace Bay Meeting.

ent roads a greater thickness of packwall should be used than on the secondary roads for the double purpose of making it tight from an air course and also for maintaining its height for both haulage way and air course for some time to come. What the thickness of the roadside packs should be will depend largely upon the depth of the seam from the surface, and the roadways as first laid off should be a little wider than required for a finished roadway, since the roof weight is bound to push the walls out a few inches into the road. When a double-track road is necessary, it is sometimes well to consider if two narrow roads had better not be built than a single wide one, and allow the outgoing traffic to travel on one road, and the incoming traffic on the other. The upkeep of two single roads will in many cases be less than on one wide double road.

In the case of a "Longwall" road running alongside of a pillar, the coal rib should never be used for one side of the road. Immediately against the pillar there should be a well-built packwall from 10 to 20 feet thick, so that the road will be formed with packwalls on each side of it. This will cushion the weight on the road and throw the loose end of the broken roof in the waste, rather than directly over the roadway.

In turning off secondary roads care should be taken to strengthen the turns. This may be done by using a timber packwall in the case building, stone is not of the best and in case there is any doubt about the roof. If thes roads are also to be used for haulage purposes, the same precautions should be taken with them as with main roads, only to a lesser degree.

In breaking off the "gateways" or short roads leading directly to the face, the distance between centres will depend largely upon the thickness of the seam and on the amount of building available and also upon the method of dealing with the coal at the face. A glance at the origin of this system will throw light upon the practice to be followed.

"Longwall" originated in the north of England, and was devised as a measure of necessity. Many of the thick seams in that part of the country had been worked out and it became necessary to operate the thinner seams in order to hold up the production. No particular difficulty was met with in operating these thin seams by the "Room and Pillar" method, although it was found in order to do so a considerable increase in both the mining and day-paid labor was necessary and during a portion of the day rock had to be hoisted instead of coal, all of which made it very difficult for the thin seams to compete with the thicker seams still operating. The "Longwall" system was therefore devised to increase the daily production of the miners and also to provide stowage for the rock instead of sending to the surface, and it was found in addition that the stored rock could be used to support the roof and to assist in making the coal face work properly.

Gateways therefore came to be broken off at such distances so that the waste would absorb all the rock brushed down in providing the necessary height for the gateways. In seams varying from 4 to 6 feet in thickness it has sometimes been found advantageous to lay a temporary track for the mine cars along the face and lead out the coal directly and thus reduce shovelling to a minimum. In order to do this a good roof is necessary so that the roof supports can be kept back some distance from the face. If this system can be followed, gateways can be placed further apart and a considerable saving made in brushing. In a thinner seem the same result is sometimes attained by the use of face conveyors travelling between two consecutive gateways.

But the system most commonly used is to load the mine cars as they stand at the face in the gateway. In applying this system it is evident that the gateway must be kept sufficiently close so that excessive shovelling will be eliminated. Where the direction of the face is on the "level" it is customary to divide the face equally on both sides of the gateway for loading the coal. Or if the direction of face is inclined it is divided so that the long shovel is on the rise side of the gateway and the short level on the low side.

With these preliminary considerations disposed of, we now come to the actual working of the "Longwall" face. The method of mining employed may be either by hand or by machine, but owing to the comparative scarcity of skilled "Longwall" hand-miners in this country, it is probable that any development of the "Longwall" method will be by the use of continuous cutting-machines. The "post" or other types of reciprocating machines are useful for some of the auxiliary work, but they are not suitable for steady cutting along the face. The selection of the motive power used for the machines depends upon whether the seam is gassy or not. If it is gassy, compressed air should be used, but if not, electric power is more efficient and satisfactory. The type of cutter used on the machine depends upon the hardness of the material to be cut. If the coal is very hard the disc type will be found strongest. In some workings this type is even used for mining iron-stone. If the coal is medium hard, the chain type will probably give the best satisfaction. In a soft seam or one in which the coal is apt to settle, and jam the cutter, the best type is the bar machine. This latter type has also been found very satisfactory in seams where the floor is uneven since the bar is more flexible than the other cutters and will ride more easily over the irregularities in the pavement.

The length of cutter-bar used, or in other words the depth of the undercut, depends upon the hardness of the coal. This may very from 4 to 6 feet and should be graduated so as to prevent the coal from falling and clogging the machine before the cut is properly made. When used properly, the depth of undercut can be made of great assistance in working the coal so that very little explosive need be used. In many instances the coal will fall in large blocks without the use of any explosive, although in such cases light shots have to be put in the coal after it is down to break it up so that it can be loaded out.

In undercutting a hard seam, especially where the roof is also hard, very little spragging of the coal after the machine will be necessary, whereas in a medium or soft seam sprags or breakers should be set fairly close to the cutter as it moves along the face. The purpose of this is twofold; first it prevents the coal from settling on the machine and secondly it assists in breaking the coal so that it does not come down in blocks too large to be handled.

The ease with which coal comes down after it is "mined" depends also upon the nature of the roof. A hard roof does not "give" immediately after the coal is undercut and the face therefore needs to stand awhile before it is worked, so that it will get the benefit of the roof pressure. On the other hand, a flexible

roof will begin to bend and exert pressure almost as soon as the undercutting is completed.

For these reasons, under a hard roof the face should not be advanced as rapidly as under a soft roof, otherwise a part of the advantage gained from roof pressure will be lost. The main idea is to advance the face rapidly enough to keep the roof stratum bending and still prevent it from breaking. "Breaks" will occur from time to time but they should be controlled so that they will ease themselves in the waste rather than over the working places. When excessive weighting shows in the roof on the gateways, it is sometimes beneficial to stiffen up the roadside packs and leave a waste space between the packs without any support. This has a tendency to throw the "break" in the waste and thus relieve the weight on the road. For this reason standing timber should never be left in the waste, since it prevents regular subsidence and throws additional weight on the roadways and face instead of allowing it to come where it will not do any damage. It might be noted here that the distance between the packs and the face has a great influence on how the coal will work. If the roof bends easily and breaks the coal down freely after it is undercut, the packs should be kept close up to the face, whereas if the roof is stiff and is slow in exerting pressure on the face, the packs should be kept farther back so as to give the roof a better chance to work.

It will be seen from the forgoing remarks that a a considerable amount of skill is neccesary in handling a "Longwall" face properly, and each face must be made a subject of study in itself. It is probable that this reason accounts largely for the backwardness in undertaking "Longwall" operations.

Having sketched the main points to be considered in "Longwall" mining, let us briefly point out its application to coal conservation. In the first place it provides for complete extraction of the seam as compared with a system of partial extraction under the "Room and Pillar" method. Under the last-named system as a rule more coal is left standing in pillars than is taken out in the first working, and it is only in rare instances that these pillars are completely recovered. Even if they are ultimately recovered, here has been a continued loss in them year after year,, due to a certain amount of crushing and spalling of the coal. Also when they are finally worked there is a larger percentage of slack produced than there was in the first working. With "Longwall" there has been no chance at all for deterioration since the face is kept fresh continually.

"Longwall" will produce a larger percentage of round coal than any other system, since there is always a loose end to work on, thus permitting a smaller quantity of explosive to be used, and being able to make use of the roof weight the quantity of explosive required is still further reduced. A reduction of explosive means a lower mining rate and also a conservation of materials used in explosives.

With a continuous face producing coal, rather than a number of separate faces separated by pillars, it is possible to have a greater concentration of work. This feature reduces the cost of supervision as well as the haulage costs. For example, a "Longwall" headway with gateways broken off on the level need only be half the length of a room and pillar headway producing the same tonnage, provided that in the last-named case half the coal is left in pillars. This will permit the use of less rope, fewer rails, smaller haulage engines and less rolling stock.

Ventilation of the mine is also much simplified, and can be carried on more efficiently and with a smaller quantity of air. The nature of the face permits it to be swept continuously with a stream of fresh air reaching all parts of the face equally instead of having it travel up one side of a room and then back the other side and then passing through a crosscut and travelling up one side of the next room before it reaches the face again. In other systems, for seams of the same thickness, there is a greater frictional loss in ventilation than in "Longwall" and in the case of deep seams, the additional heat generated from the crushing of pillars occasions an increased temperature which must be met by increasing the volume of air. All of these losses lead us back to the economic use of power. A saving in power means a reduction in steam consumption, which also means a saving in the quantity of coal used. Additional power saving also is possible in the operation of the mining machines, especially where the heavier types are used. These machines require power to load and unload them and power to transport them to the next place, whereas in "Longwall" practically all the power they consume is for productive work. The removal of machines from one place to another entails other losses as well. If half the time in the shift is used in moving and setting up the machine, both men and machines are engaged in unproductive work during half their time.

Besides saving coal and explosives and haulage material, and all other materials incident to power production, "Longwall" leads to a considerable saving of timber. With a good roof practically no timber at all is required overhead in the gateways, especially if the roof can be arched, and the only timber necessary on the sides is at the turns of the road and perhaps on occasional timber pack in case it is necessary to stiffen up the rock wall. At the face a certain amount if timber is necessary to protect it while working, but as fast as the pack walls are built up this timber should be withdrawn. It can generally be used several times over and when no longer fit for face timber, it will do for building packs. With the rapid depletion of our forests, the mine-timber problem will become increasingly difficult each year. Up to the present there has not been a great demand in Nova Scotia for the smaller sizes of timber, such as are commonly used for mine timber, but with the advent of pulp mills at both ends of the Province, consuming hundreds of cord of this sie of timber every day, the situation will be different and the cost of mine timber will in a short time go much higher than it is today. Therefore, the necessity for adopting a mining system wherever possible which requires a smaller quantity of timber is apparent.

In a locality where there is a large and cheap supply of timber available, it is sometimes possible to work "Longwall" under rather unusual conditions, The writer has in mind an operation in Western Canada where the thickness of the seam varied from two to ten feet and which would ordinarily not be considered suitable for "Longwall", because, in addition to the variation in thickness, the roof was not particularly good and the seam in many places contained several thick layers of soft dirt, which was not suitable for packs. but because of a plentiful supply of timber, the packs were built entirely of timber set skin to skin alongside the roadside and the dirt from the

seam was stowed behind the timber packs.

Another set of conditions permitting the use of "Longwall", but a little out of the ordinary, may be noted. In a seam where the roof is only fair but where the floor contains good building material, it is feasible to leave the roof unbroken and support it on timber resting on top of the pack walls and then brush the pavement in order to secure the necessary height and to provide sufficient material for building the walls.

There are also a number of other special conditions apart from the standard conditions required which will permit the working of the seam by "Longwall," but space does not permit of them being referred to at this time. It may be noted however, that there are two main varieties of "Longwall" which differ only in general principles, but not in detail. These are "Longwall Advancing" and "Longwall Retreating." We have been considering the former since it is in most common use. In "Longwall Retreating" the main roads are driven through the solid to the boundary as quickly as possible, and the face is opened out first at the boundary instead of near the shaft bottom. This system will probably pay even better than the other in the long run, but it requires a much longer time, to get up a large output than by the other method. To compensate for this loss however, the cost of production will be less, because the roadways are easier to maintain and the wastes as they are formed are forever being left behind. In "Longwall Advancing" when the workings open up clear of the shaft pillar, a large output can be produced in a comparatively short time. Sometimes a balance is struck between the two systems, and one side of the pit is opened up for "advancing" and the other for "retreating." Or a further variation is sometimes introduced by laying off the pit in large panels, each of which is surrounded by its own pillars, and then each panel is worked out individually by "Longwall." A very successful example of this system is found in Lancashire. The seam is from 6 to 7 feet in height and contains a rock band one foot in thickness in the centre of the seam. A section of the mine was laid off in panels, and the main roads and gateways were "driven in" the full height of the seam. The bottom half of the seam between the gateways was worked "Longwall" and the bottom bench of coal and the rock band were taken out in the first working, and the top bench of coal left for the roof. After the boundary of the panel has been reached, the top bench of coal was bought back by "Longwall Retreating." In the second part of the work, one of the principal advantages was the ease with which the coal could be loaded out. When retreating the tops of the mine cars as they stood in the gateways were on a level with the floor from which the coal was loaded.

In the excellent paper which was presented by Mr. Herd yesterday, the subject of Hydraulic Stowing was discussed. This expedient is feasible of course for either "Room and pillar" or "Longwall" mining but even without it, "Longwall" can be practiced in undersea workings with very little danger, provided there is sufficient cover and the roof measures are suitable What is probably the most successful "Longwall" operation in the Dominion today is carried on as a sub-sea operation. I refer to the workings in the Newcastle seam in No. 1 shaft at Nanaimo. "Longwall" was started in the bottom seam of this colliery in the year 1904, and to date the "Longwall" production has totalled about 3,000,000 tons. This is in addition to the output from the Douglas seam which lies above it and is much thicker. Practictlly all of the "Longwall" operations have been submarine with a covering varying in thickness from 400 to 600 feet. The subsidence noted to date is only from a foot to 18 inches and the seam has an average thickness of three feet six inches.

Within the limits of a paper it is impossible to give an adequate idea of either the advantages or the problems of "Longwall" operation, and for anyone who is particularly interested in the subject, the only way to become satisfied is to visit an actual operation. So far as the writer is aware, the best demonstration of a seam that contains all the elements of successful "Longwall" operation in this district is found at Sydney mines, in the bottom seam or Jubilee Colliery. Practically all the ideal conditions noted in this paper are there present, and although the development is not yet very extensive, the preliminary work already done has been carried on in a very thorough and careful manner, and it will probably before long take its place as one of the principal "Longwall" operations in the country.

When this is accomplished, the introduction of "Longwall" operations in other seams of similar nature in the Cape Breton field will soon follow, and a development take place in some of the submarine areas which will result in the saving of thousands of tons of coal a year, that would otherwise be left standing in pillars and probably lost, not only to this, but to all futnre generations.

THE McGILL SUMMER SCHOOL OF MINES AT TRAIL, B.C.

The mining class of McGill University, which arrived here last week-end in their private car were not idlers while here, but on the contrary were a most industrious class.

All during their stay they took advantage of the opportunity of seeing how practical mining was done in the big gold-copper producers of the Consolidated Mining and Smelting Company of Canada, Limited and the Le Roi No. 2, "Josie" mine.

Officials of these companies took great interest in giving the young fellows who will devote their future lifework to the development of the mining industry, in showing them every in-an-out of the game.

The students remained here until Monday when they went to Trail where they have been studying the smelting industry which is conducted on a large scale at the Sister City.

Last Saturday evening they were guests of the members of the Rossland club at a smoker arranged in their honor and a most enjoyable time was had.

Today the party will disband at Trail, some returning East, while others will take positions with the Consolidated Company of Kimberley and at Trail, several going to the McGillivray Creek Coal and Coke Co., at Coleman, Alberta, where they will remain during the summer vacation.

Sunday the Rossland Tennis Club was host to the visitors, and some good tennis was enjoyed. Monday evening, the young men were guests of the Great War Veterans, many of them being returned men, at the Victoria Day dance given by the veterans.

Friday evening at Trail a dance was given in their honor by the school staff, which was largely attended, a number being present from this city.

Quite a number of informal dinner parties were also

tendered Prof. Bell and members of his class while they were here.

Altogether the young men found their visit most instructive and enjoyable and are loud in their praise of the hospitality extended them while here and at Trail.—"Rossland Miner."

THE MEASUREMENT OF GEOLOGICAL TIME.

The new sixpenny English monthly "Discovery," founded by a Committee of distinguished scientists, and edited by Dr. A. S. Russell as a medium for the dissemination of new scientific knowledge in non-technical and understandable form, contains in the April issue an interesting article on the measurement of geological time by Dr. Arthur Holmes, Lecturer in Geology at the Imperial College of Science and Technology, South Kensington.

Dr. Holmes states that earlier attempts to deduce the duration of geological time from the temperature gradient of the earth's crust, on the presumption that it represented a simple cooling from a molten state, were made in ignorance of the existence of radio-activity, and of the fact that the earth contains within itself supplies of potential energy, which, liberated as heat, counterbalance the external loss by radiation. The discovery of radio-activity not only revealed with dramatic suddenness the unjustified restrictions which had been placed upon geologists, states Mr. Holmes, but it led directly to the elaboration of the most elegant and refined method of measuring geological intervals of time that has yet been devised. Each fresh uranium-bearing mineral is now regarded as a natural chronometer registering time by the atoms of helium and lead that are produced unceasingly within it year after year. Lead is taken as representing the stable end-product of the uranium family, and, when series of minerals of different geological ages are compared, it is found that the ratio of lead to uranium increases with the geological age. The interesting suggestion is made that the lead-ratio may be used to determine the geological age of rocks the stratigraphical position of which is not accurately determined. The oldest mineral hitherto analysed appears to be a zircon from the lower Pre-Cambrian of Canada. This gives an age of 1,580 million years, but as it is based on a single analysis, it can only be considered to give an approximate estimate of the time that has elapsed. Mention is made of a zircon from Mozambique, the lead-ratio of which is calculated indicates an age of 1,430 million years. This zircon is assigned to Middle or Lower Pre-Cambrian age solely on the ground of the lead-ratio shown by analysis.

The article states that correlation of the Pre-Cambrian formations in different parts of the world has long been one of the most difficult problems with which the geologist has been faced. The methods of lead-ratios, however, "has already done good service in leading the way towards a world-wide solution."

The concluding paragraph of the article may be quoted in full, as follows:

"In conclusion it may be pointed out that the age "of the earth is likely to be greater than, say, 1,600 "million years, for the oldest known igneous rocks are "themselves intrusive into sedimentary formations "which in turn must have been derived from still "older rocks. The latter may possibly have been the "original crust of the earth, but of this no certain "trade has ever been detected. Now, is in Hutton's "day, geologists can still find 'no vestige of a be-"ginning.' Astronomical considerations have shown "however, in recent years that the new demands on "geological time are not too high. The movement of "the solar system across the void of space from its sup-"posed birthplace in the Milky Way is a journey for "which something approaching 3,000 million years is "a dynamical necessity. Supporting this figure is "an estimate by Dr. Harold Jeffreys of the age of the "solar system. From a consideration of the present "orbital elements of Mercury and their evolution, he "finds that the requisite order of time is roughly 3,-"000 million years. Thus the earth recedes into an "inconceivable remotness far beyond the bounds of "geological investigation, and there we must forsake "her, and invite the astronomer, whose laboratory is "the universe, to carry the story back still further." —F.W.G.

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PROSPECTING FOR RADIUM ORES IN BUTT TOWNSHIP

Mr. W. J. Lennox, of Toronto, who is interested in claims in Butt township where radium ore was found last year reports that a few men are at work on different claims. At the original discovery, Mr. Wm. Elliott did some work during the winter. Mr. Albert Trafford of Sundridge is working steadily on his claims which lie a short distance west of the Elliott. Mr. James Elliott did some work on his claim in the winter. Mr. Charles Bullock of Chicago, has three men at work. Ryan and Mann are working their claims. Mr. Lahay of Kearney, has opened a deposit on his claim near the village. Others are doing some assessment work. The Mining Corporation which was reported to have taken over the property north of the Elliott is not yet doing any exploration.

The discovery of radium ore in Butt township aroused considerable interest last fall, for such ore is very valuable. It occurs in the form of pitchblende, a black, lustrous heavy mineral, in pegmatite dykes. Mr. Lennox says that during the past few months numerous samples from several claims have been tested and found to be radio active.

R. E. H.

GRANBY CONSOLIDATED.

Reorganizing Its Western Management.

Boston—A reorganization of its western operating management has been started by the Granby Consolidated Mining, Smelting and Power Co. F. M. Sylvester has been succeeded in general charge by H. S. Monroe, who had been in the Nevada copper fields prior to his new appointment Mr. Sylvester has been a vice - president with the title of managing director. This position has been abolished and Mr. Monroe will be known as the general manager. It is understood that Mr. Sylvester will resign as vice-president.

E. P. Mathewson has been appointed consulting engineer. He has seen service with the American Smelting & Refining Co. and the Anaconda Copper Mining Co. During his regime the Anaconda Co. did extensive work in readjusting and enlarging its smelting capacity.

An inspection of Granby was first made by Mr. Mathewson last February. He made recommendations following that trip which will now be carried out.

Within the past dozen years Granby has made two complete changes in its mine management. Several years ago J. P. Graves, one of the pioneers in the company, who was also a large stockholder, was relieved as general manger and later resigned as director.

THE WASAPIKA GOLD MINE,

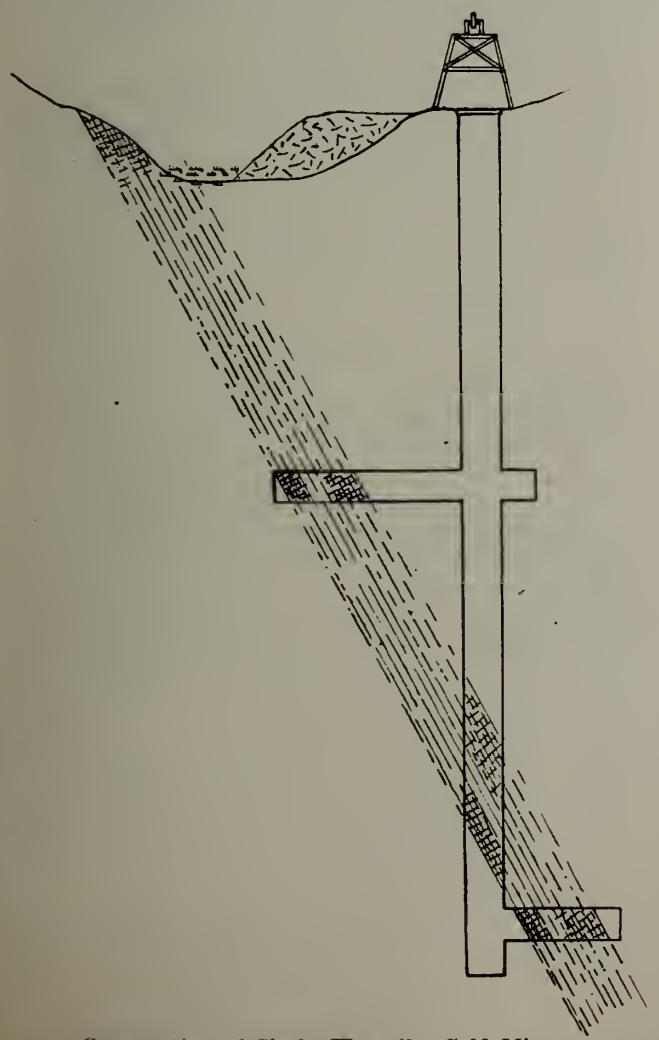
By R. E. HORE

The accompanying diagram illustrates the method of development of the Wasapika ore deposit.

There was exposed on surface a strong gold bearing quartz vein striking north across one of the company's claims, and extending on to others north and south. The exposure is on the face of a rock outcrop which dips into low wet ground. The footwall portion of the deposit is well exposed for several hundred feet, but the hanging wall portion is hidden under the wet ground.

After careful channel sampling of several hundred feet of the surface exposures, the manager, Mr. G. R. Rogers, decided to sink a vertical shaft to test the deposit at depth. This shaft was started on high ground west of the depressiion.

At 100 ft a cross cut was run east from the shaft and through the deposit. It was here found that there is a large hanging wall quartz portion in addition to the footwall quartz portion which is exposed on surface. A sericitic, carbonate bearing gray schist forms part of the deposit.



Cross-section of Shaft, Wasapika Gold Mine

Sampling in the 100 ft. crosscut showed that the footwall quartz portion, with some schist, carries about $12. gold per ton for a width of 5 feet. The schist in the deposit generally shows only $1 or $2 in gold. Quartz stringers in the schist carry good values, but the schist itself is of no value. Samples from the hanging wall quartz gave varying results, running from $3 to $11. It may prove an important additional source of ore; but comparatively little is yet known about it as there is no opportunity for sampling it at surface. The footwall quartz here showed high values in silver as well as in gold and it is worth mentioning that there appears to be more silver than gold in the Wasapika ore. Assayed samples carrying an ounce of gold per ton carry about three ounces of silver per ton.

After the completion of the 100 ft crosscut, shaft sinking was resumed and the ore deposit was recently encountered in the shaft at about 160 ft. and crossed diagonally. About one half of the material hoisted from this depth down to 204 ft. was quartz. Preliminary sampling indicates good values in both hanging wall and footwall quartz, but again little in the schist.

At 204 ft. a crosscut has been run west through the deposit. Preliminary sampling indicates good values here also. It is interesting to note that the presence of silver in larger amount than the gold has again been determined. A sample of quartz from the first round at the 204 ft. level carrying a little under one ounce of gold per ton carries three and a half ounces silver per ton.

The company proposes to proceed with development by drifting along the footwall quartz portion of the deposit. This will give further desired information and make the openings needed for mining the ore and will at the same time give easy access to the hanging wall quartz, which can be tested by short crosscuts.

The Wasapika Consolidated Mines, Ltd., is a recently organized company which took over, a few months ago, the property of Wasapika Gold Mines, Ltd. and also three adjoining claims lying along the strike of the deposit. The new company has continued the work begun by the old company. Mr. Geo. R. Rogers, a mining engineer with long experience in gold mining, is president and general manager.

IMPERIAL OIL COMPANY'S PROGRAM.

The Imperial Oil Company has planned a programme of oil exploration in Western Canada of considerable dimensions, and larger than was projected at the beginning of the season. There are now nine drilling rigs in different parts of Saskatchewan and Alberta, ranging from the vicinity of the 49th parallel of latitude to close to the Arctic Circle. It is understood that no very definite results have beeen attained as yet, but early information on the subject is looked for soon. The party that wintered on the Mackenzie River is being relieved by others who were expected to leave Peace River crossing during the latter part of May. Besides the well that is being sunk in the far North, there is a drilling rig near the Great Slave Lake: three drilling parties are operating in southwestern Alberta, near the foothills, one of which is not far from the international boundary: one well is being drilled in Southwestern Saskatchewan, near Consul: another is located in Eastern Alberta, near Czar, and there are two others in central America.

Northern Ontario Letter

THE SILVER MINES.

Cobalt mining interests evince considerable concern over a new Bill which has just been presented to the United States Senate by Senator Henderson, which has for its purpose the establishment of a government fund for the assistance of the silver-producing mines of the United States, the plan being to loan money to the producers so as to enable them to hold their bullion for sale at such times at the demand is strong.

It is quite common knowledge that a large proportion of the world's silver comes from low-grade mines, and that the bear raid on the price serves only to cause curtailment of this source of supply. As a consequence, only such high-grade silver mines as those in Cobalt are able to operate profitably. The situation is one which promises to still further reduce the visible supply of the metal until there is required another upward movement in price to encourage the low-grade mines to operate. Either this, or the cost of material and labor going into silver production will have to decline. In any event, the conditions necessary to cause the low-grade silver mines to operate steadily are bound to bring added prosperity to the mines of Cobalt, where even now the margin of net profit being realized is large.

Announcement is made to your correspondent that the Bailey Silver Mines will join the shipping list within one month, and this will mark the commencement of regular shipments. It is officially stated that the amount of silver ore in sight is such as to assure steady and comparatively large production for some months. Also, that with a number of veins awaiting development, together with considerable undeveloped territory, the indications are that a big future lies ahead of the mine.

The Mining Corporation of Canada has declared a dividend of 12½ cents a share, payable June 15th, and amounting to $207,455. This makes a total of $6,943,220 paid by the Mining Corporation and component companies. The company is also reported to be negotiating for control of the West Dome Mine at Porcupine, which lies adjacent to the Dome Mines on the West. It is also unofficially reported that a bid is being made for an option on the Ritchie Veteran claim which adjoins the West Dome on the South.

The lease on the cyanide equipment in the Buffalo mill secured by the Coniagas Company is to be made use of as quickly as possible. It is proposed to retreat some 40,000 tons of Coniagas tailings by cyanidation. The lease does not include the flotation equipment in the mill on the Buffalo mine.

Officials of the Peterson Lake declare that a shipment of high grade ore is now being assembled, it being estimated that close to $50,000 can be taken out, which amount should finance operations for the balance of the year. It is also stated that the arrangements to have the old tailings pile re-treated by oil flotation by the Dominion Reduction Company having been completed, this work should commence by about the end of July. At the anual meeting of the company held last week, the following board of directors was elected:—W. A. Lamport, president, Toronto; J. E. Carter, Vice-president, Guelph; E. Barelman, Guelph, W. H. G. Browne, Toronto; A. G. Cumming, Toronto; D. E. Kennedy, Teeswater; C. A. McLean, Toronto; A. H. B. Moore, Niagara Falls, N. Y.; C. M. Nickel, Toronto. P. M. Goff was re-appointed secretary-treasurer.

Good headway continues on the Oxford-Cobalt. The shaft has now reached a depth of about 100 feet, and will be continued to a depth of 150 feet at which point lateral work will be carried out. It is also proposed to continue the shaft to the underlying diabase-keewatin contact, and to cut stations at regular intervals of each 75 feet.

The Crown Reserve Mining Company is stated to have acquired an option on the Hylands-Offer group of claims, situated in the township of Whitney, and lying adjacent to the Porcupine-Keora. It is the plan of the company to explore the claims by diamond drill.

The Lafayette Silver Mines, Limited, has been incorporated for the purpose of taking over mining claims G.G.-4101, and 4102, situated in the Gowganda silver area. The company is composed of business men of Buffalo who propose to carry on an aggressive program of development work, and who announce that they have engaged the services of Newton Bigbee to manage the work, and that camp building is to commence this month. The head office of the company is at 130 Franklin Street, Buffalo, N. Y.

The first carload of steel for the construction of the light narrow-gauge railway from Elk Lake to Gowganda has arrived on the ground, and the indications are that work is to be carried on aggressively.

Announcement is made that work has been resumed on the White Reserve property in the Maple Mountain section of the Elk Lake district. For the time being only a small force of men will be worked, pending a more plentiful supply.

Ore and Bullion Shipments.

During the week ended June 4th, three Cobalt companies shipped an aggregate of nine cars containing close to three quarters of a million pounds of ore, the Nipissing being the heaviest shipper as shown in the following summary:—

Shipper	Cars	Pounds
Nipissing	5	442,880
Mining Corporation	3	240,215
Hudson Bay	1	60,034
Totals	9	743,129

No bullion shipments were reported during the corresponding period.

THE GOLD MINES.

A feature in connection with the labor situation in the gold mining districts of Northern Ontario is the increase in the number of applications for naturalization by former citizens of countries in middle and Eastern Europe, now seeking Canadian citizenship. In recent months, the exodus of foreigners to the countries above mentioned attained quite large proportions, and actually left the mines very short of men. This trek to the east appears to have about run its course, the favorable feature being that many of those who were discontented or restless have gone, and a steadier element remains. General opinion appears to be that even those who departed will before many months be clamoring to get back to Canada to resume the prosperity they enjoyed in this country. Not only that, but each one will probably persuade others to seek admittance into the Dominion.

It is noted in Porcupine and Kirkland Lake, as well as in Cobalt that the percentage of British and

American born citizens is on the increase, and that immigrants from the British Isles are already finding their way to the mine in encouraging numbers. This is particularly true of Cobalt.

Mining men and prospectors have expressed considerable disappointment over the fact that the draft bill to establish "The Mining Court of Ontario" has been shelved until the next session of the Ontario Legislature. The Bill had for its object the creation of a Mining Court, with a duly appointed Judge instead of a Commissioner as at present. It would give such a Judge the power to try all mining disputes whether having to do with either patented on unpatented mine claims, instead of dealing only with unpatented claims as at present. It is stated that the Minister of Mines, Hon. H. Mills, will pay a visit to the mining districts at an early date and will endeavor to secure the consensus of mining men and prospectors as well as of members of the legal profession, so as to be enabled to deal intelligently with the bill at the next session.

During the month of April, according to the regular monthly report by manager R. C. Coffey, the Lake Shore mine produced $35,388. During the period 1,860 tons of ore were treated, the average gold recovery being a little over $19 to the ton, and an average of 62 tons of ore being treated daily. This is the highest tonnage record so far in any one month in the company's history. The Lake Shore has declared a dividend of 2 p. c., payable June 18th. The disbursement will amount to $40,000. A feature of this announcement is the fact that former dividends amounted to 2½ p. c. The company pays interim dividends, and the reduction as above shown is of no special significance unless it should indicate a decision to go on a regular dividend paying basis of 2 p. c. quarterly.

A small force of men is at work on the Granby-Kirkland property in the township of Lebel and surface exploration is showing up a number of promising veins.

On the K. Ayonb group of six claims, situated in Bernhardt township, adjacent to the north boundary of Teck township, free gold has been found in encouraging quantities in a vein several feet in width and traced for about three hundred feet.

The Ontario Government is proceeding with the construction of a bridge over the Blanch River, following the completion of the wagon road from Boston Creek to Skead. It is believed the large proportion of traffic to Skead will not go by way of Boston Creek instead of from Englehart as was formerly the case.

The Ontario Bureau of Mines continues to be aggressive in connection with field work. A report has just been issued by Cyril Knight, assistant provincial geologist, covering the Ben Nevis Gold Area, lying between Larder Lake and Lake Abitibi, which holds out encouraging prospects.

A report on the geology of the Fort Matachewan Gold Area has been issued by the Geological Survey, Ottawa, the work having been prepared by Dr. H. C. Cooke.

At the Bidgood property, at Kirkland Lake, the main shaft has reached a depth of 160 feet and is being driven at the rate of over three feet per day. It is expected to have it completed and timbered to the 300-ft. level before the end of July.

At the 100-ft. level about 28 feet of cross-cutting was required to tap the vein which showed a width of from 12 to 15 feet and with considerable visible gold.

Diamond drilling is being discontinued on the Fort Matachewan Gold Mines, pending the completion of arrangements for electric power from a plant to be installed on the Montreal River.

A load of supplies, containing among other things about one ton of dynamite which was being transported to the Thesauris property by Jim Nelson, was caught in a bush fire and was destroyed by fire and explosion. The loss will be over $5,000.

THE NIPISSING MINING COMPANY.

By J. A. McRAE

A review of the position of the Nipissing Mine may be of interest at this time. Its reduction plant represents the most advanced stage of existing practice, and annually produces not much less than one-third of the total silver production of the entire province of Ontario. Also, it is rated as being one of the leading, if not the actual leader among the silver producing mines in the British Empire.

Since its discovery in 1904, the Nipissing has produced approximately 58,000,000 ounces of silver up to the opening week of June, 1920. The value of the production amounts to over $39,150,000.

To illustrate how stable is the physical condition of the mine, it is interesting to note that production first reached $2,000,000 a year in 1909, and for the eight years ended with 1916 averaged a little over $2,500,000 each year. In 1917 the production increased to $3,338,682.41, and, in 1918 actually amounted to $4,040,446.10. In 1919, despite the labor strike which caused a loss of over two months, the gross production amounted to $3,752,083.60, or at a rate actually the best in the company's history.

As regards the present physical condition of the mine, the official reports issued each month show an output of $1,501,521 for the first four months of 1920, or at the rate of $4,504,563 annually.

The company owns 840 acres right in the heart of the Cobalt camp, and, although no doubt the most highly mineralized areas have been drawn upon, yet so large is the area and so great the possibilities as to assure a further long life to the mine. The increasing value of the production from year to year seems to constitute genuine evidence in this respect.

Wtih an authorized capital of 1,200,000 shares, the company actually has upwards of 12,000 shareholders, showing that the average holding of each shareholder is around 100 shares, and offering reasonable indication that the net profits realized are being widely distributed. The company has disbursed a total of $21,240,000 in dividends, an amount equal to $17.70 a share, or equal to 354 per cent on the company issued capital, which has a par value of $5 a share. In addition to this was a net surplus of $4,372,952.33 at the beginning of 1920.

The jewellers protest that the fifty per cent luxury tax will kill their business. Is not that the intention of the tax?

NOVA SCOTIA NOTES.

Coal Production.

May was a short month, there being five Sundays and two idle days, making a month of only 24 working days. The 1st of May was declared a protest "strike" by the U.M.W. against the action of the courts in the trials of the Winnipeg strikers. This particular action caused much local condemnation, but it did not have much real effect on production, as the first of May was a Saturday—a short day—a fact that doubtless entered into the calculations of the U.M.W. leaders, who have shown themselves to be adepts at obtaining effective publicity very cheaply, being well assisted in this regard by the local newspapers and their metropolitan correspondents.

The Wage Schedule Committee of the U.M.W. has been in session in Halifax considering ways and means of enforcing their newest demand for a 25 per cent increase in wages. The U.M.W. leaders are steadily reaching their goal, which is the acceptance by the Nova Scotia operators of a wage scale convention, representative of the miners and the operators in the Nova Scotia district as a whole, modelled on the practice of the bituminous coal districts in unionized fields in the United States. To this end the U.M.W. are suggesting the appointment of a Royal Commission, charged with settlement of the wage question as a whole, which it is stated the leaders consider preferable to Conciliation Boards sitting consecutively upon the cases of the several companies and their employees. The suggestion that has been made, and duly reported to and commented upon in the newspapers, that the coal-cutters should reduce their production by half in case the coal operators prove disinclined to concede the request for a further increase in wages, is of course merely a *ballon d'essai*, being a rather belated example of the "Ca canny" policy so well-known and so thoroughly discredited by experienced trade unionists.

The output of the Cape Breton Mines of the Dominion Coal Company during May totalled 256,874 tons, which compares with 261,338 tons in April, and with 244,718 tons in May, 1919.

The production of the individual collieries was as follows:

Colliery	Tonnage.	
1	25,780	
2	46,271	
4	27,002	
5	8,162	
6	18,281	
9	22,318	
10	9,904	
11	13,853	
12	14,272	
14	15,254	
15	10,970	
16	11,688	
17	2,370	
21	11,785	
22	14,528	
24	2,885	
	———	256,874

The feature of these figures is the increasing production from No. 11 Colliery and No. 24, both Emery Seam collieries, the excellent output from No. 22, and the increase shown by No. 17 Colliery. The production of June, 1919, was very small, being only 224,000 tons, and the outputs for the current month should exceed this figure by 50,000 tons. In this event, the production for the half-year will approximate 1,608,000 tons, against 1,538,000 tons in the first six months of 1919.

NEW ENGLAND'S COAL PLIGHT.

New England at the beginning of summer faces a coal outlook so disturbing that Gov. Coolidge urges appointment of a fuel administrator in Massachusetts Apparently Mr. Storrow returns from abroad just in time to resume his war time post of that nature. He comes back with gloomy opinions on the coal prospect.

This situation is in nowise the result of underproduction, it being possible for the bituminous mine perators to expand their production from the 550,000,000 to 600,000,000 tons yearly they now output to a billion tons, if necessary. This, however, pre-supposes adequate transportation facilities, so that the coal can be loaded as fast as it is mined, for none of the bituminous companies has storage facilities at the mine.

The primary stricture, therefore, which is cutting off the coal supply, and thus forcing up the price, is the tie-up of the roads which serve the bituminous regions. In addition, the railroads which serve New England have brought in practically no bituminous coal for months. They have, to be sure, handled considerable bituminous, but practically all of it has been for their own use.

Coal dealers declare that they have had hundreds of cars shipped to them, which have been confiscated by the railroads for their own use, almost without exception. It takes more than six months, in some cases, to determine who has seized a car of coal. Sometimes a road will commandeer coal for the account of another, necessitating long delays to find the final recipient. It is oftentimes a matter of months to find who will pay and what the price will be. As a consequence, local coal dealers declare that their books are in an absolute tangle.

Being thus deprived of its possible coal supplies by rail from Pennsylvannia district, there was brought in the supplies from Hampton Roads by water freight. Hampton Roads, it is pointed out, was originally nothing but a shipping point for New England coal by water. There was practically no coal sent abroad from there, although something like 4,000,000 or 5,000 tons was sent in one of the war years. With the suspension of English and Continental mine production in quantity, however, foreign buyers have invaded the American market, willing to pay any price for the coal to keep their factories going.

The result of this bidding is that it is now impossible to buy bituminous at Hampton Roads for $13.00 or $13.50. It is going overseas at the rate of 1,200,000 to 1,500,000 tons a month, and coal men say we are heading for $20 or $25 a ton bituminous coal unless the export is restricted.

In addition to that, congestion at Hampton Roads is so bad and the railroad tie-up so severe that coal coming from there carries a demurrage charge of $3 and sometimes $6 and $8 a ton, due to the time the vessel has to wait for its load; this is in addition to a water freight rate of $2.75 per ton (it was in the neighborhood of 55 cents a ton a few years ago) and a tax of 3 per cent on the demurrage.—"Boston News Bureau."

BRITISH COLUMBIA LETTER.

Alice Arm, B. C.

A syndicate has been formed to explore and, if investigation proves satisfactory, to develop the Royal Group of Mineral Claims adjoining the Dolly Varden Mine. This property consists of seven claims held under a $100,000 bond. It is conveniently situated as to transportation, a short aerial tramway being all that would be necessary to connect it with the Dolly Varden Railway.

A settlement of the strike of employees of the Dolly Varden Mine has been effected. It is stated that practicaly all the demands of the men were granted. Mines will be paid at the rate of $6.25 a day; muckers, $5.75; and trackmen $5.75. The union scale will apply to cooks, mechanics, etc.

Queen Charlotte Islands.

George Clothier, government mining engineer, has returned after an examination of some prospects of the Queen Charlotte Islands. He went over a free milling gold property situated near Skidegate on the west coast of Moresby Island and states that it possesses some fair quartz but that further development is necessary. The Ikeda Mine near Jedway is to be opened up this season and it is reported that a concentrator is to be installed. Quantities of high grade copper ore have been shipped at various times and there now is a good deal of comparatively low grade ore on the dump which, if facilities were available at the mine for treatment, might be handled at a profit. Surface work is being done on the Southeastern Mine in the same section and another property near Jedway is being inspected and reported upon by representatives of the American Smelting and Refining Co.

Nelson, B. C.

The McAllister Mine at Three Forks is under active development with promising prospects. R. A. Grimes, manager, states that the Slocan strike did not close down the work he has underway. This mine may be expected to join the shippers of the silver zone of British Columbia at an early date. Some first-class ore has been uncovered and those interested are so well satisfied with the outlook as to be considering the installation of further plant.

It is proposed by the British Columbia Prospectors' Association that delegates to the International Mining Convention to be held at Nelson shall be taken on a tour of the mining sections of East Kootenay. The suggestion is that the trip be divided into two or three sections, one travelling up the St. Mary's valley to the Sullivan Mine, the Stemwinder, North Star and a number of other properties and another setting off for the Windermere district.

Princeton, B. C.

Preparations for the commencement of operations at Copper Mountain by the Canada Copper Corporation are well advanced. Trains already are running between Princeton and Allenby on the Copper Mountain Branch of the Kettle Valley Ry. The concentrator has been completed and but waits the power which is being brought over a high power line from Bonnington Falls by the East Kootenay Power and Light Co. A large brick power station has been constructed. H. R. Van Wagenen, the Company's general manager, has returned from Denver Colo., and it is expected that the mine and mill will start work either next Septembr or October.

Rossland, B. C.

The Velvet Mine, situated near Rossland, is being re-opened by H. E. Innes, of Sandon, B. C. Some months ago it was taken over by the Granby Consolidated Mining and Smelting Co., and the mine was unwatered and worked for a short time. The Company, however, then ceased operations. It is well equipped and, if Mr. Innes is successful in making it a producer, it should become a valuable addition to the shippers of the camp.

Vancouver, B. C.

The Eureka Mine, near Hope B. C., is to be put under development by Messrs. Foley, Welch and Stewart. The property is situated in Silver Creek and machinery and supplies are being shipped now in order that work may commence as soon as weather permits.

Before the expiry of official business hours on the 31st of May of each year all miners' licences granted under the Mineral Act of the Province of British Columbia must be renewed. To hold mineral claims, or to operate in mineral in any form, all individuals, groups of individuals, or joint-stock companies must be possessed of such a licence. It is at the basis of the mining laws of the Province Section 12 of the Mineral Act reading "Subject to the provision hereinafter stated no person or joint-stock company shall be recognized as having any right or interest in or to any mining property unless he or it shall have a free miner's certificate unexpired." For this reason it is of first importance that the renewal is obtained within the time limit which explains the rush facing the mining recorders throughout the Province every year during the month of May. This year has been no exception to the rule and, although the official figures are not yet available, it is probable that the number of licences issued will equal the best twelve months on record.

Princess Royal Island.

Announcement has been made of the purchase by the Tonopah Belmont Development Co. of the Princess Royal Property, situated near the company's mines. Plans have been completed for the carrying out of comprehensive development during the summer.

MR. W. R. WILSON APPOINTED PRESIDENT OF CROW'S NEST PASS COAL CO.

Succeeding the late Elias Rogers, Mr. W. R. Wilson has been appointed President of the Crow's Nest Pass Coal Company. Mr. Wilson has been General Manager of the Company for a number of years, and has been 2nd vice-President and a director of the Company for about a year.

Mr. Wilson's family record covers the period of coal-mining activity in Canada. His father sunk the shafts of the General Mining Association at Sydney Mines in 1867, and his son is in charge of one of the newest and certainly the finest colliery in Canada, that of the Granby Consolidated Company at Cassidy's, Vancouver Island. Mr. Wilson's own ability in his profession is evidenced by his new appointment. He is much valued member and a Councillor of the Canadian Mining Institute.

Mr. Wilson's headquarters will be at Fernie.

MANITOBA LETTER.

By C. A. Millican, Winnipeg.

The first crew to go into the Rice Lake District since the break-up on Lake Winipeg left on the 1st. of June for the Gabrielle property. The crew which includes five geological students from the University of Manitoba will commence active exploration work on this property at once. The Gabrielle will not install any heavy machinery until next winter, but a great amount of surface stripping will be done as well as the existing drifts on both shafts being extended. The management of this property have decided to confine all their energies this summer to exploration work on a large scale, and it is expected that Mr. J. B. Tyrrell will make a very comprehensive report on all surface and underground showings about the end of June.

For the information of those who may be visiting the Rice Lake gold fields this summer, we might mention that the summer route now being established is via. the Hole River, and from Winnipeg the easiest way to reach this territory is as follows:—

Winnipeg to Riverton, C.P.R. Ry. (practically all supplies can be procured at the latter point).

Riverton to Lower Rapids on Hole River, Tug or Launch. (5 hour journey). Guides may be arranged for at the Hole River settlement, but canoes are scarce.

Hole River settlement to Mining District, by canoe. (1 to 2 days trip). Very good hotel accomodation is now available at Riverton, and by leaving Winnipeg in the afternoon an early start can be made from Riverton the following morning, reaching the canoe route on the Hole River by early afternoon. By July or August the new road being built by the Provincial Government should be quite passable for wagons as for as Clearwater and Caribou Lakes. As pointed out before canoes should, if possible, be arranged for before leaving Winnipeg.

For general information we are publishing herewith a list of Mining Companies with headquarters at Winnipeg. These Companies are, or will be, carrying on active operations this year.

Gabrielle Mines Ltd., 207 Scott Block, Winnipeg.

Gold King Mines Ltd., 846 Somerset Blk., Winnipeg.

Marigold Mining Co., Ltd., 618 Mc. Intyre Blk., Winnipeg.

Bellevue Mining Co., Ltd., 806 Union Bank Bldg., Winnipeg.

Commonwealth Gold Mines Ltd., 236 Curry Bldg., Winnipeg.

Pan Extension Gold Mine Co., Ltd., 220 Curry Bldg., Winnipeg.

Gold Pan Mines Ltd., 200 Trust and Loan Bldg., Winnipeg.

Golden Vein Mines Ltd., 315 Paris Bldg., Winnipeg.

Brooklyn Mines Ltd., 509 Paris Bldg., Winnipeg.

Boulder Gold Mines Ltd., 1203 McArthur Bldg., Winnipeg.

Bruce Consolidated Gold Mines Ltd., 101 Tribune Bldg., Winnipeg.

Northern Copper and Nickel Mines Ltd., 704 Merchants Bank Bldg., Winnipeg.

Laura Mines Ltd., 502 Mc. Intyre Blk., Winnipeg.

Pas Consolidated Mines Ltd., 220 Curry Bldg., Winnipeg.

Reahill Gold Mines Co., Ltd., 220 Curry Bldg., Winnipeg.

Angus McDonald Mines Ltd., 200 Trust and Loan Bldg., Winnipeg.

Adanac Collieries Ltd., 315 Paris Bldg., Winnipeg.

Western Dominion Collieries Ltd., 807 Paris Bldg., Winnipeg.

It is expected that several new Companies will be incorporated this summer, especially in connection with operations in the Rice Lake District. It is expected that an information bureau will shortly be established by the Overseas Development Corporation, Ltd., Scott Blk., Winnipeg.

It now looks as though considerable interest will be taken in the Lac. du Bonnet district where several experienced prospectors are now busy exploring the copper deposits. Excellent showings have been uncovered along the Winnipeg River but just to what extent copper values exist is still an unknown quantity. On two of the properties diamond drilling will be continued this summer.

Further tests are being made in connection with the recent oil discoveries in the Dauphin District. Whether oil exists in commercial quantities has not yet been ascertained, although samples analyzed have shown the traces to be of good quality.

In view of the coming Provincial elections, it is interesting to note that the Norris Government have given an unqualified promise to assist in opening up Manitoba's hinterland and assist in every possible way in furthering the development of her unknown resources as well as those now being prospected and explored. In this connection it is to be keenly regretted that Eastern interests have continued to baulk any real effort to rush the Hudson Bay Ry. to an early completion. Apart from giving Western Canada a near-by ocean port the completion of this line will hasten to a remarkable degree in the opening up of several thousand square miles of country which, from present indications, may yet produce enormous values in minerals, pulp and water power.

SAFETY NET UNDER CONCRETE DISTRIBUTING CHUTE REDUCES FALLING STONE ACCIDENTS

To catch large stones jumping out of chutes used for distributing concrete and so avert injury to men below, a safety net has been used successfully on a large construction job under way at one of the plants of E. I. du Pont de Nemours & Co. At four-foot intervals a ¾-inch angle iron is fastened across the chute, extending outward a foot on each side. Through holes at the ends of each angle iron a wire is run parallel with the chute and one foot distant on each side. A chicken wire screen, ¾-inch mesh, is fastened to these wires and thus supended below the chute. This interesting information is contributed by Mr. F. L. Hurlbutt of the Du Pont Company.

Not a single fatal accident occurred among the industries of Worcester, Mass., during 1919 as compared with an average of five fatalities yearly during the preceding three years. In commenting on this, the press of Massachusetts says: "One of the most potent influences in bringing about this new condition is the National Safety Council, a thriving branch of which in Worcester has been actively engaged in furthering the good work."

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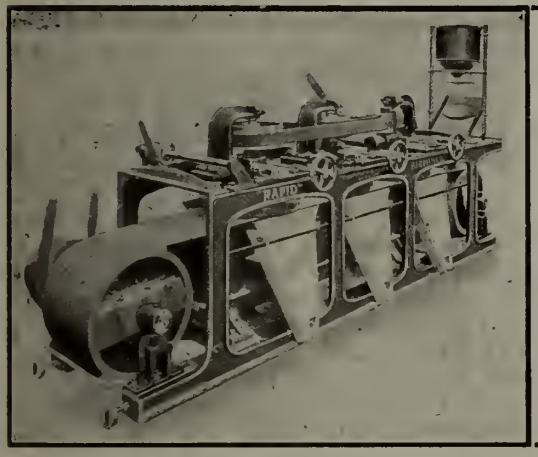

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TORONTO NOTES

Mr. A. D. McMillan, C. P. R. Toronto, has returned from a ten days visit to the Hughes-McElroy and Mondeau mines. On the latter property cross-cutting at the 250 foot level, and drifting operations are in progress with promising results. Mr. McMillan states that he observed signs of increasing activity in the Gowganda area.

Shareholders of the Black Lake Asbestos Corporation met in Toronto on May 26th when there was considerable manoeuvering on the part of the buyers of Black Lake securities, for position. When the meeting adjourned practically nothing had been done towards deciding the control of the company. The President, R. F. Massie, declared for the present directors: "Our position is that we are practically trustees for the shareholders and bondholders and we want to do the best we can for them. If either Mr. Jacobs or the Corporation makes a proposition, we will consider which is the more favorable." President Ross of the Corporation defended the legal proceedings to upset the previous offer of purchase by saying that it was the right of the shareholders to receive due notice of such an offer, which had not been given in that case until the meeting came together. He said that the Corporation's experience in the asbestos mining industry should enable it to operate the Black Lake property to advantage. During the meeting Mr. R. S. Cassels announced the resignation of himself and Mr. A. L. Malone from the directorate. Mr. John D. Kay was appointed to fill one of the vacancies.

GEOLOGICAL SURVEY PARTIES ENGAGED ON MAPPING PORT ARTHUR SHEET.

(By J. J. O'CONNOR.)

Dr. T. L. Tanton, of the Geological Survey, Ottawa, is out with a party of five men, engaged in mapping the Port Arthur sheet, which ties on to the Shebandowan sheet. Dr. Tanton expects to be in the Field during the months of June, July, August, September and October.

Percy E. Hopkins, M.E., of the Ontario Bureau of Mines, has gone to the Big Duck area, north of Schreiber, with a party of four, for the purpose of making an examination of the gold claims located in the Autumn of 1919, about six miles north of Schreiber. He will map in detail the whole area, including the Big Duck Lake field. Mr. Hopkins expects to be engaged there from June to August.

Prof. A. L. Parsons, of the University of Toronto, has gone to the Kaministiquia iron belt, with a party, for the purpose of his investigations, for the Ontario Bureau of Mines.

Strong representations were made to the Hon. Harry Mills, Minister of Mines, by a Port Arthur deputation in December last, urging him to cause these surveys to be carried out this summer. The Hon. Mr. Mills, was found to be in hearty accord with the suggestions made, and is now implementing them. He is at present in the district, and is evincing the keenest interest in the work of placing this necessary information in the hands of prospectors and investors.

The work of unwatering the Silver Islet Mine, began this morning. At six o'clock, the water had been lowered to a depth of fifty feet.

RESEARCH FELLOWSHIPS OFFERED BY THE SCHOOL OF MINES, UNIVERSITY OF IDAHO.

In co-operation with the United States Bureau of Mines and the Idaho Bureau of Mines and Geology, the University of Idaho offers in the School of Mines a number of fellowships. These fellowships are open college graduates who have had good training in mining, metallurgy, or chemistry, and who are qualified to undertake research work. The income of each fellowship is $900 a year for the twelve months beginning July 1st., 1919.

Fellows will register as students in the University of Idaho and become candidates for the degree of Master of Science in Mining or Metallurgy (unless this or an equivalent degree has been earned.) Their class work will be directed by the heads of the departments of construction, but the greater portion of their time will be spent in research work under the direction of the Bureau of Mines staff resident at the University. The purpose of this work is to undertake the solution of definite problems confronting the mining and metallurgical industries of the state of Idaho. For 1920-21 the following subjects are being considered:

(1) Flotation—with especial reference to differential separation of various minerals.

(2) Treatment of the complex gold-silver ores of the state.

(3) Ore Dressing problems.

(4) Mining problems.

Applications, with copy of college record, statement of professional experience, and names and address of three references will be received up to June 15, 1920. The applications should be addressed to Francis A. Thomson, Dean, School of Mines, Moscow, Idaho.

PERSONALS

Mr. A. R. Whitman of New York, who was for some years at Porcupine and Cobalt is in Toronto this week on his way to Alaska. Mr. Whitman was at one time geologist for the McIntyre Company and later for several Cobalt silver mining companies.

Mr. W. E. Simpson, manager of the Miller-Independence mine at Boston Creek is in Toronto.

Several application for the position of secretary of the Canadian Mining Institute are said to have been made. Two or three come from Ottawa and some from the west are expected.

Mr. C. G. Daimpre has organized a company to carry on prospecting work in Northern Ontario.

Mr. F. L. Sutherland has returned to Toronto after visiting the Herrick mine.

B. Neilly, Secretary of the Ontario Mining Association, is now permanently located in his new office, 55 Trusts and Guarantee Building, Bay St., Toronto.

H. J. McCann is appointed Assistant General Manager of the Dominion Coal Company. Mr. McCann has been in the Coal Company's service approaching twenty years, having successively been Chief Clerk of Company, Assistant Sales Agent and Superintendent of Retail Stores. In 1910 he was transferred to the Sydney offices of the Dominion Steel Corporation and appointed Purchasing Agent of the Steel Company, Recently he was appointed Assistant to the President, which position he held until his present promotion. Mr. McCann's long service with the Coal Company has included experience in every branch of executive direction.

Peter Christianson is transferred from the management of the Jubilee Colliery of the Nova Scotia Steel and Coal Company to the Engineering Department of the Company, and is succeeded at the Jubilee by John Murphy, whose official experience was chiefly gained in the collieries of the Dominion Company.

NEW GEOLOGICAL SURVEY MAPS.

The following new maps are issued by the Geological Survey.

Map 185A Sandon, Slocan and Ainsworth Mining Divisions, Kootenay District, British Columbia. A topographical map on scale of 4,000 ft. to the inch. Includes district between Slocan Lake and Kootenay Lake, and towns of New Denver, Silverton, Sandon and Kaslo. Publication No. 1641.

New Glasgow, Pictou County, Nova Scotia. A topographical map on a scale of 2,000 ft. to an inch. Shows valley of the East River, and towns of Westville, Stellarton, New Glasgow and Thorburn. Publication No. 1707.

Matachewan District, in Temiskaming area of Northern Ontario. To accompany Memoir by H. C. Cooke. Scale of one mile to the inch. Publication No. 1793. Coloured geologically.

METAL QUOTATIONS.

Fair prices for Ingot Metals, Montreal, 10th June, 1920.

	Cents per lb.
Copper, Electro	24
Copper Castings	23½
Zinc	10½
Lead	10¼
Aluminum	38
Antimony	12½
Tin	61

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BENEFICIATION OF LOW-GRADE ORES ON THE MINNESOTA RANGES SUGGESTS SIMILAR UTILISATION OF ONTARIO ORES.

(By J. J. O'CONNOR.)

The prophetic vision of iron-ore operators of the Minnesota ranges, in meeting and mastering the problems of beneficiating the immense quantities of low-grade ores, will enable these ranges to hold out a supply of iron ore, far into the future, after the present known high-grade ores are exhausted.

All over the central portion of the Mesabi, are almost unlimited quantities of low-grade ore, a few points in iron below what the furnaces today can handle at a profit.

The washable ores are in great quantity, and are already being washed up to commercial grades by millions of tons per year.

The eastern end of the Mesabi has great low grade deposits of magnetic ore, for the handling of which, a process has been worked out, at a cost of half a million dollars actually expended.

The Vermillion range has large deposits of banded jasper, streaks of ore, separated by bands of jasper and silica.

Minnesota's high-grade ores have enabled her to gain a commanding position in the iron-producing world. Her iron-ore operators are far sighted enough to prepare for the successful holding of the lead she now enjoys, as the greatest iron producer in the world, by lending their money and talent in devising ways for the beneficiating of her low-grade ores.

When Judge Gary of the United States Steel Corporation was in Duluth, Minn. in January 1918, he said: "Within this state are billions of tons of iron ore not now considered of any market value whatevr, which some day will be valuable and which may be used practically and profitably for conversion into iron and steel. And it will be hundreds of years before this ore is exhausted."

The conditions obtaining on the Minnesota ranges, are almost exactly duplicated on the northern Ontario ranges. Judge Gary's terms may be easily applied, and with equal truthfulness, to the Ontario ranges, where the quantity, grade and variety of ores are repeated on range after range to an almost unlimited extent, all susceptible of some form of treatment to bring them to merchantable grades.

No one process or scheme can be devised to beneficiate all kinds coming under the head of lean ores. Each variety requires separate treatment, at varying costs.

The work done by the Hayden-Stone interests (Mesabi Iron Company) upon ore already magnetic by nature, makes the problem of handling non-magnetic ores very much easier. A non-magnetic ore can be converted into a magnetic ore by giving it a magnetic roast. That is to say, if a small percentage of coal or coke, or even peat, be mixed with a non-magnetic iron ore, and the mixture then heated in a suitable furnace, to a suitable temperature, under suitable conditions, the ore become magnetic.

The muskeg and peat beds of northern Ontario, together with the enormous hydro development possible in the territory, would solve the fuel and power problem of any such undertaking on Ontario ranges. The preparation and production of peat for this purpose, has as great possibilities in it, as has any scheme for briquetting it, and selling it in competition with coal.

The day is not far distant when Canada must look to its own sources for a supply, of at least a very large percentage, of its iron ore requirements, if not for the whole tonnage charged to Ontario furnaces. Everything points to an increasing demand for iron ore throughout the continent. This demand will be lasting, and so increase the consumption of United States Lake Superior ores, that, in justice to themselves, they will be obliged to curtail the export of their high-grade ores.

It would, therefore, seem to be a fitting time for the Government to give the necessary encouragement to capital to invest in the development of our enormous deposits of iron ore and be ready for the day that they must be used, and may be our only depenence.

Everything that is being done on the Minnesota ranges in the way of beneficiating lean ores, can be repeated here in Ontario. All it needs is Government encouragement, to induce capital to invest in this greatest of all industrial enterprises. There never has been a time in the history of Canada, when the conversion of this great natural resource into an active element of progress, as the present. There never has been a time when so much interest has been shown by her public men, or such keen sympathy felt for a step of this kind. All agree, that anything that will bring about the rational development of our natural resources, must be in the general interest of Canada, and of the whole people.

It must not be forgotten, that the only chance the Government would be taking, would be the cost of the legislation. If the passing of this legislation did not bring about the industrial development of our iron ores, it would not be called upon for any outlay by way of aid. With the development it would be certain to cause, the advantage to Canada would be Canada would be immeasurable.

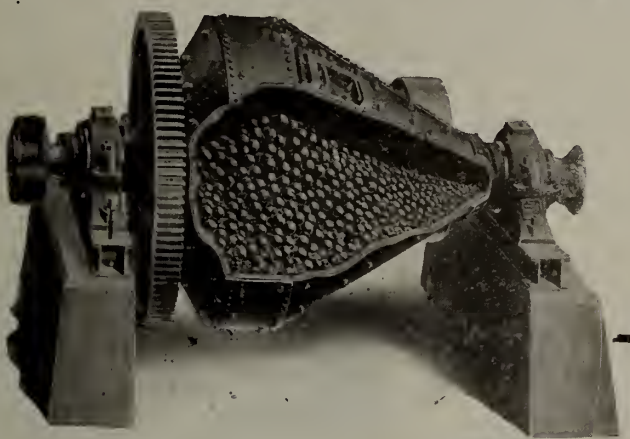
TWO CAN PLAY IT.

The report of the Foreign Relations Committee of the United States Senate in favor of a resolution authorizing the appointment of a commission to deal with the Canadian Government regarding newsprint and pulp imports from Canada contains suggestions of retaliatory measures if the Dominion does not abandon her policy of imposing embargoes upon the export of articles of this character in order to protect her domestic consumers. It hints at similar embargoes by Washington upon the export to Canada of coal, sulphur and dyes.

The Foreign Relations Committee appears to have overlooked a few possibilities in its contemplation of retaliatory measures. For example, Canada need only put an embargo on nickel, of which she controls four-fifths of the world's supply, to cripple the steel industry of the United States. We are heavy exporters of other important materials urgently required for industial purposes south of the international boundary line, an embargo upon which would be very embarrassing.

On the other hand, an embargo on American coal exports would have a serious effect upon central Canada until Canadian coal producers could meet the new demand. Retaliation would be bad business for both sides, so bad, in fact, that we are fairly certain it will not be started. In other words, the Senate Committee is bluffing—a rather stale and futile proceeding to adopt towards a neighbor as familiar with that game as Canada is, particularly one who is as capable of "calling" that kind of bluff as she is.—"Victoria Times."

THE PRINCIPLE THAT APPEALED TO ENGINEERS



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A BIG SHOT.

Boston—A recent mining operation by the New Cornelia Copper Co. in Arizona serves to show the extent to which modern mining companies of the porphyry type must go to keep costs at a minimum.

The company late last year completed the layout of powder chambers and connecting tunnels in its hill No. 3, the length of underground excavations being 661 feet. It set for explosion 80,000 pounds of Trojan nitro-starch powder and used an electric current of 110 volts to ignite it. Cost of the blast for labor and supplies was $15,305, which with the cost of drifting and excavating made a total of $17,720.

Approximately 300,000 tons of ore were displaced by the blast, the cost averaging about six cents per ton.

John D. Ryan was one of the audience who viewed this mammoth eruption.—"Boston News Bureau."

CHEMIST, with experience in usual Copper Smelter analyses. Must be accurate and rapid on routine work. Graduate Preferred.
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These Drills were Purchased for the Munitions Resources Commission to be used in prospecting for certain minerals just before the close of the War. The total value of the complete equipment, which includes clean up and assay outfits and all accessories, is upwards of $9,000.

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boring in conglomerate or gravel or material of similar nature,
drilling of oil and water wells,
testing of foundations, etc.

The drills were purchased from the New York Engineering Company, 2 Rector Street, New York City, and among their circulars there are testimonial letters from Mr. F. S. Clarke, British Columbia Drill and Dredging Company, Vancouver, and Mr. G. H. Knowlton, Vancouver.

Full Particulars and Prices on application to the Geological Survey, Department of Mines, at address given above, or to the Secretary, War Purchasing Commission, Ottawa, Ont.

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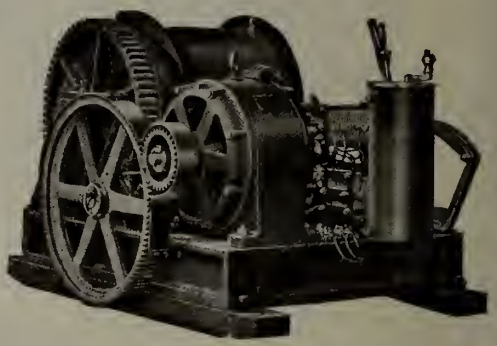

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EDITORIAL

Final Report of the Munitions Resources Commission

The Final Report of the Munitions Resources Commission is an interesting record of much hard work compressed into a short time, and performed, as is evident from the restrained wording of the record, in spite of much official apathy and with little indication of the scope of the work that it was proper for the Commission to undertake. The Mines Branch and the Geological Survey appear to have given every assistance and encouragement to the investigations of the Commission, and in particular the laboratories of the Mines Branch at Ottawa appear to have been most useful. The publication of this Final Report is to be commended, as it will not only serve to record the emergency measures of war time as a guide to the future similar emergencies that are to be anticipated, and the labours of the Commission itself, but will preserve for reference most of what is known in Canada regarding its 'war minerals,'' those strategic raw materials that are earnestly desired in war time and completely forgotten in peace days.

The Commission had as Chairman Col. Thos. Cantley, and as Secretary, Mr. G. C. Mackenzie. Messrs. Robert Hobson and the Hon. W. C. Edwards were the other two members of the original Commission, to which was later added Col. Carnegie and Mr. Geo. W. Watts. . It would have been difficult to select a more representative personnel, or one more nicely combining knowledge of business and operating technical conditions with scientific attainments

The instructions given to the Commission were as wide as they were necessarily vague, but they were in effect to cruise Canada for such minerals as aluminium, chromium, fluorite, manganese, molybdenum, platinum and tungsten. How thoroughly the work was done, and what tremendous distances and physical difficulties were overcome by the investigators is revealed in the Report, which shows that the battles of the Empire were fought at home as well as abroad. Nor were the searchings of valley and mountain for scattered and elusive deposits unaccompanied by casualties.

To those who read between the lines, the Final Report of the Munition Resources Commission is a document that, despite its official wording and character, ranks in its record of labour, adventure and patriotic purpose, with despatches from the actual fighting fronts, and it is in fact the despatch of those who stayed at home and ''minded the stuff'' while others met and overcame the Philistine.

Geological Survey Undertakes Study of Paleobotany of the Sydney Coalfield

It is announced in the Sydney, Cape Breton, newspapers that Mr. W. A. Bell, Assistant Paeleobotanist of the Geological Survey, with two assistants will make a special study of the coal horizons in Nova Scotia during the summer, with particular reference to the evidence afforded by the plant remains as to the co-relation of the separated coal basis. The Survey is to be congratulated upon the decision to take up this long-neglected and very necessary enquiry. The recent discovery of salt at Malagash, Nova Scotia, and its possible association with potash-bearing minerals; the growing importance of oil-shales, and the necessity to elucidate the geological history of the Carboniferous of Nova Scotia so as to assist in the search for hidden coalfields, are some of the reasons that make it urgently advisable that the geological maps of Nova Scotia, in particular those of Carboniferous areas, should be brought up to date. The recently issued topographical map of the Stellarton district is a welcome sheet, and it is hoped that it may be followed by a revised geological map. It is also suggested that maps are required of the topography and structural geology of the Sydney Coalfield, and that some attempt should be made to indicate the structural character of the submarine strata in this field, for which, when the paeleobotanical evidence is collated, there is ample information available. The inspection of the date upon the several sheets of the

Sydney coalfield will in itself provide a sufficient reason to ask for a revision of the existing geological ordnance maps. They are compiled from the field sheets of 1874-76, with additions and corrections to 1898. Of the collieries operated by the Dominion Coal Company in 1898 there are today only remaining three. These three are entirely exhausted—except for pillars—in the land area, and will shortly be superseded by new shafts sunk close to the shore so as to command as much submarine coal as possible. All the other operating collieries are new since 1898, to the extent of sixteen mines. When the old Reserve mine closes down, which will be before long, and when Dominion and Caledonia Collieries are superseded by new shafts at the shore, there will not remain in operation a single colliery that was working in 1898. In other words, the entire development of the existing collieries of the Dominion Coal Company has taken place since the last revision of the geological maps, and nothing of the knowledge gained by this development is shown on the existing sheets.

THE PRICE OF BITUMINOUS COAL.

Some interesting figures regarding the price of bituminous coal were divulged by the General Manager of the Montreal Light, Heat & Power Co. during the hearing of that company's application to increase the price of gas to the consumer, which we desire to comment upon without criticism of the policy of the company to which, we believe, no exception can be taken.

In 1914 this Montreal company was buying gas coal in the United States at figures as low as $1.05 at the mine, with a freight to the lake front of 83 cents and a water transportation rate to Montreal of about the same, a total of $2.71. Today, coal is costing $9.00 at the mine, plus freight charges of $3.86 per ton, a total of $12.86, and it is mentioned that the coal is inferior in quality to the obtainable in 1914.

These figures are a sufficient argument for the protective duty on coal in 1914, and they are at the same time a partial explanation of the high cost of bituminous coal today. Coal was never mined and sold at a profit in the United States at $1.05 per ton on cars at the pit mouth. It was only possible for coal mine operators to believe they were making a profit at such a figure by borrowing from posterity, and, unfortunately, this generation happens to be that posterity. The chief contemporary reasons for the high cost of coal are fairly well known, and need not be here enumerated, but one reason that is not so well known is that we are paying today for coal that was given away in previous decades. Some indication of the competition that had to be met by Canadian coal-mine operators is given by the figures above quoted, as in domestic mines $1.05 would not have covered the labour charges incurred in mining and placing coal on railway cars.

It was this unfair and unwise competition by United States coal, utilised to the fullest extent by the large Canadian consumers, that has prevented our domestic coal industry from expanding its outputs and strengthening its financial position. The competition was unfair because it consisted in the sale of a product in Canada at less than its cost in the United States. The unwisdom of the procedure is just beginning to dawn upon the United States. That country finds itself obliged to pay today for yesterday's dissipation. The analogy between coal supply and pulpwood supply is fairly exact in the United States, except that in the case of coal the ultimate resources are immense. It is the immediately available coal that has been rendered costly, for the reason that coal operators have not realized that coal is a wasting asset, and that mining costs are only accurate if they are calculated on the whole life of a coal mine.

We believe it may be accurately affirmed that if the large Canadian consumers had been willing, say between 1907 and 1914, to pay a reasonable price for bituminous coal to domestic coal operators, the production of coal in Canada during the war, and at the present time, would have been larger; the cost of production would have been cheaper; transportation costs throughout Canada would have been smaller; and the Canadian consumer would today be assured of an ample supply of domestic coal at much cheaper rates than it is purchasable for at this date in North America.

It is poor national policy to starve and throttle a domestic industry in the days of peace and plenty, and then to expect in the day of emergency and want to find this industry lusty and productive.

It was recently stated in the Commons that in Canada we had the coal, but had not the brains to utilize it. Perhaps it would be more accurate to state that no concentrated application of national thought has ever been given to the fuel problem in Canada. If this should ever happen, there can be little doubt but that the problem could be satisfactorily solved.

WORKING MINING CLAIMS WITH AXES AND SAWS.

The disclosures made during the investigation being carried on in reference to the disposal of timber on Crown Lands in Western Ontario should serve to emphasize the need for more frequent investigation of applications for mining claims. It cannot be expected that a mining recorder should know a great deal about each of the many hundreds of properties that are taken up by prospectors. When a claim holder presents a statement that a certain amount of development work has been done, as required under the Mining Act, that statement cannot be carefully investigated before filing is permitted. The recorder's business is to file the sworn statement, not to investigate it.

In the development of our mineral sources the forest plays an important part. Fuel and mine timber necessary for preliminary work are commonly found on Northern Ontario mineral lands. The removal of the timber suitable for other purposes is desirable, and should be encouraged; but it should not be possible for anyone to cut timber on mining claims for other than mining development purposes without permission from the Lands and Forest Department and without proper compensation to the province.

The disclosures indicate that it is now possible to secure large tracts of forest in Ontario by taking up mining claims and filing statements that development work has been done on them. It is obviously the duty of the Provincial Government to see whether the statements filed are in accordance with the facts. But whether the statements filed prove to be honest statements or not, there will remain an obligation to see that there is a change in the regulations concerning the removal of timber from mining claims. One of the ways in which the Government has been willing to help the prospector has been that of allowing him to obtain fuel and mine timber on easy terms. The misuse of this privilege by others is likely to result in a further burden on the prospector if care is not taken in changing the regulations.

GOLD PRODUCTION IN ONTARIO.

A Toronto newspaper in its financial columns states: "There are many indications of a rapidly "growing interest in the gold fields of Ontario. With "the near exhaustion of deposits in all other parts of "the world, northern Ontario must soon come into its "own." "The near exhaustion of deposits in all other parts of the world" is a statement having all the inaccuracy of sweeping generalizations, and is a fair example of the "journalese" of the mining sections of our newspapers. The gold fields of Ontario will stand and fall on their own merits, of which the price of mining stocks is the last and least indication, but the figures of production are sufficiently impressive not to require bolstering by ridiculous inaccuracies.

The quarterly report of the Ontario Bureau of Mines states that owing to Ontario's contribution, Canada was the only country able to report an increased output of gold for 1919, and that production for 1920 so far shows an increase of nearly 46 per cent over the first three months of 1919. This is a record of which the Province may well be proud, and it is the best possible testimony to the producing capacity of Ontario's gold mines when such a record is possible under conditions of high cost of production and shortage of workers. It is the quantity and availability of gold in Ontario that is causing it to take so important a rank among producers. This is the fact that should be stressed. The falling off in gold production elsewhere—with the exception of certain fields—is not caused by exhaustion of mineral but by the increased cost of mining and the fixed price of the product.

The concentrated character of Ontario's gold production is to be seen from the Bureau of Mines Report, which gives credit to the Porcupine District for ninety-one per cent of the gold output. The remainder came from Kirkland Lake, with the exception of the contribution of the Argonaut Mine, amounting to $11,000 for the quarter.

CONSOLIDATION OF STEEL AND COAL COMPANIES A MEASURE OF NECESSITY.

During the Budget debate, the Hon. Mr. T. A. Crerar is reported to have quoted Col. Grant Morden as stating that British Steel Corporation, if and when completed, would be able to compete with the world. "Why not then," asks Mr. Crerar, "remove the duty on coal and steel?"

We do not believe that Col. Morden ever expressed himself to this effect, and if he did, he made an inaccurate statement. What we believe Col. Morden desired to convey was that only by a consolidation of the coal and steel interests of Nova Scotia could these hope to enter the markets of the world. On a fair and square basis of competition, without regard to the desirability of possessing operating collieries and active steel works in Canada, the coal mines of Eastern Canada, and those industries which are based upon coal, namely, the manufacture of coke, the recovery of the chemical products of coal distillation, the smelting of iron, the manufacture of steel and finished steel products, and the fabrication of steel ships, none of these can hope to compete successfully against the coal industry and its offshoots in the United States; or against the coal industry of Great Britain, Belgium, Germany, Russia, and China and its offshoots, under normal peace conditions.

The acceptance of Col. Grant Morden's proposals to consolidate their interests by the directors and shareholders of the coal and steel companies in Nova Scotia will not be evidence of a desire to water the stock, but it will be evidence of a realization that these various companies cannot anticipate successful survival under independent management. As we stated in the last issue of this monthly, "the formation of British Em- "pire Steel Corporation is above everything a meas- "ure of necessity and self-defence. Its first duty will be to consolidate its position, to conserve its resour- "ces, and these tasks, rather than dreams of aggres- "sion, will occupy all the energies of those who are "chosen to manage the Corporation for many years to "come."

Mr. Crerar proceeded to express his inability to support a fiscal policy that develops mergers such as British Empire Steel, "which is practically corner- ing all the coal and iron ore in sight in the Maritime Provinces." It would not, by the way, be a great task

to corner all the iron-ores in the Maritime Provinces. The commercial occurrences are negligible, so far as known. They are probably not all known, however. "I would suggest to the Minister of Finance," continued Mr. Crerar, "that one of the most effective "ways in which he can combat this growing tendency "to combine various companies into huge combinations "is by using the weapon of the tariff." Apparently Mr. Crerar considers combination to be wrong, in itself. In this regard Mr. Crerar is not consistent. Combination for the grain-grower was brought about by precisely the same economic laws that have suggested the steel merger, and we see little intrinsic difference between the high fixed price of wheat and the protection given to coal and steel by the tariff. The coming together of the coal and steel companies in Nova Scotia has been occasioned by a much more potent weapon than the tariff. Independent and competitive operation of the coal trade in Nova Scotia has been tried for sixty years, and has proved to be a conclusive and dismal failure.

The cost of mining coal in Nova Scotia is relatively high, and the physical difficulties adding to the cost of mining are increasing and must continue to increase. The supply of labor is relatively scarce, and a review of the past record of the dispersal of emigrants to Canada would indicate that it is likely to continue so. Moreover, Nova Scotia has only 400,000 inhabitants, and whether it can be remedied or not, it is a fact that the newly arrived immigrant only rarely goes to Nova Scotia, and, after residence in Nova Scotia, shows a desire to go westwards. These are some of the permanent drawbacks to mining coal on a large scale at relatively cheap cost in Nova Scotia, and explain why it is considered necessary to get together for mutual self-help and protection.

The main feature of Col. Morden's proposals as they appeal to the coal and steel companies, is the undertaking to raise $25,000,000 of new capital from outside sources. This is not a large sum in consideration of the requirements. Much more than $25,000,000 of new capital expenditure is required to place the coal and steel production of Nova Scotia on a basis that will make it a respectable factor in the world's markets. Some sense of proportion is required in viewing these matters. The statement has been made that five billion tons of coal are at the disposal of the proposed constituent companies of a mooted merger. Such a statement does not accurately represent the facts unless it takes into account the position of the coal reserves. It would be much more accurate to state that large capital expenditures, necessitating the obtaining of outside assistance, are necessary to place the coal holdings of the companies at their own disposal.

As to the effect of the protective duty on coal, what does it amount to? There is no duty on anthracite, and a very small duty on bituminous slack coal. The duty on bituminous coal is 53 cents, and by judicious shipments of slack and screened coal and their subsequent admixture, it can be lessened to an average of 33½ cents. Can it be contended that an impost of this amount inflicts any great hardship on Canadian consumers, or that its complete removal would lower the cost of United States coal to the consumer here? The protective value of the duty has almost disappeared in the rising cost of coal production and transportation. The duty might be taken off United States coal tomorrow, and the Canadian consumer would never know it from study of his coal bill. The chief loser would be the Canadian Treasury, and the most apparent result would be the necessity for new taxes to make up the deficit occasioned by loss of this revenue. And there are a few other reasons, which the Finance Minister could doubtless mention, why it is not desirable to encourage greater importations from the United States at this time. A thirteen per cent discount on the Canadian dollar is one of them.

The coal duty today does not represent any appreciable or adequate measure of protective tariff. It is really an excise duty for the raising of inland revenue.

The value of the coal deposits of Nova Scotia consists in large measure in their being the one Canadian source of coal east of Saskatchewan. They constitute 0.7 per cent of our national coal reserves, but they are the only source of coal supply that Canada owns within a territory that contains 80 per cent of her population. It is their position and strategic value that is remarkable, not their extent. They can only be made fully available as a source of coal supply in Canada by the expenditure of very large sums of money, and any consolidation of interests that carries with it the promise of such expenditure will benefit the country as a whole. If Mr. Crerar were Minister of Finance in Canada we can conceive that he would welcome a business consolidation that promised increase of employment, increase of internal revenue, increase of provincial coal royalties, decreased public taxation, and a decrease in imports accompanied by an increase in exports. All this, and much more, will proceed from the consolidated operations of British Steel Corporation if its organization should be consummated, and if its promoters will recognize from the first the relatively high cost of mining coal in Nova Scotia.

WORKMEN'S COMPENSATION IN NOVA SCOTIA

In this issue is published a digest of the Report of the Workmen's Compensation Board of Nova Scotia for 1919. Of especial interest is the gratifying reduction in the number of fatal accidents, and the lowering of the assessment rates in the coal-mining and iron and steel trades. In commenting in these columns on the 1918 Report we suggested that it should be possible eventually to fix the coal-mining assessment at 2.5 per cent of the payroll. The rate was fixed for 1919 at 3 per cent, but the year's opera-

tions show a surplus in this class of $127,640. The rates for the iron and steel trades is placed at 1.5 per cent, and in this instance the surplus of approximately $30,000 indicates that it is probably a permanent rate. We do not believe that the hazard in coal-mining is twice that in the iron and steel trades, and with the respectable disaster reserve now accumulated, a further reduction in the rate of coal-mining assessment may be anticipated. Coal mining is not so distinctly a hazardous occupation, as it is an occupation in which a large number of simultaneous deaths may occur for well-known reasons.

WORKMEN'S COMPENSATION IN NOVA SCOTIA DURING 1919.

The Report of the Workmen's Compensation Board for 1919 in Nova Scotia records a gratifying decrease in the number of fatal accidents. The figures were abnormally high in 1917 and 1918 because of the incidence of two disastrous coal-mine explosions and a lumber camp fire in those years, but after allowing for these occurrences, the record is still very encouraging, as will be seen from the comparison following:

	1917.	1918.	1919.
Fatal Accidents	146	185	47
Deduct Disasters	65	105	..
	81	80	47

"A further analysis," states the Report, "discloses "that the greatest improvement must be credited to "the coal mining industry, in which not only were "disasters avoided but the ordinary fatal accidents "were reduced to exactly half what they were in "1918, as shown by the following statement:—

	1917.	1918.	1919.
Total Fatal Accidents	97	126	19
Deduct Disasters.	65	88	--
	32	38	19

The total number of compensable accidents has varied very litle, being 4,888 in 1919, comparing with 4,836 in 1917 and 4,931 in 1918.

Assessment rates were lowered from those of 1918 as follows:

	Assesment Rates 1918.	1919.
Coal Mining	4..	3.0
Steel and Iron Mfg.	1.9	1.5
Building	2.0	1.5
Stevedoring	4.0	3.0
Steam Railways	4.5	2.0
Lumbering, etc.	3.0	2.5

The lowering of rates is stated to have been justified, and to have resulted in substantial surpluses during 1919, except in the case of lumbering and sawmill industries, which shows a deficit. The divisions of mining, iron and steel manufacture, and railways showed quite large surpluses.

The ratio of administration expenses to the total assessment has shown a steady increase, being 5.76 in 1919, compared with 3.66 in 1918 and 2.58 in 1917, the first year of operation. This understandable, as the work of the Compensation Board will be for a certain period a cumulative condition.

The investments of the Board at the end of 1919 totalled $2,233,026, compared with $1,579,031 at the end of 1918. The whole is invested in Nova Scotia provincial bonds and Dominion Government bonds, the last-named to the extent of $1,990,000.

The Report mentions the formation of an Accident Prevention Association, previously noted in these columns.

The accounts of the Board has been audited by the Provincial Auditor.

A significant statement is that out of 4,504 cases of temporary disability during 1918 there developed sepsis in 104 cases. In 1917, by a coincidence the number of similar cases was also 4,504, but only 74 cases of sepsis developed.

The Report contains a number of interesting statistical tables, which, if continued under the same arrangement for a number of years, will permit of valuable deductions.

CORRESPONDENCE

"Fine Arts vs. Styracosaurus Albertensis."

Quebec, June 13th, 1920.

The Editor,
"Canadian Mining Journal,"
Ste. Anne de Bellevue, Que.

Dear Sir,

I read with dismay your editorial in the Journal number of June 11th, entitled **Fine Arts vs. Styracosaurus Albertensis**, and I hope that you will not let the matter rest there.

It is a disgrace on the part of the Government authorities, that they should entertain, or even think of, such a thing as boxing up the collection of Vertebrate Paleontology, to put it in the "oubliettes" of the Victoria Museum, for the sake of making room to display oil paintings and water colours by Canadian artists.

This paleontological collection was put together by the labour of love and the love of labour, representing the life-work, of many Canadian scientists. Its educational and scientific value to the nation (excepting perhaps the philistine element, which unforunately seems to be largely represented in the powers that be) is beyond all doubt, whereas the worth of the intended substitute, as an agency and means to develop and improve Canadian taste and culture is doubtful. We have good Canadian artists, but judging from the display of pictures at present exhibited in the Victoria Museum, there are also many poor ones, and the latter are liberally represented in the Art Gallery of the Museum.

Our neighbours to the south realize the value of fossil collections such as the one the fate of which now hangs in the balance. The Smithsonian Institution, the Carnegie Museum, the American Museum of Natural History, the United States Geological Survey, have collectively, spent hundred of thousands of dollars in digging out vertebrate fossil remains from our own Cretaceous and Jurassic beds in Alberta and Saskatchewan, and they have deemed the money well spent, as they have obtained many unique specimens, which would have remained in Canada, if adequate facilities had been extended in time to our own Geological Survey.

My plea may sound feeble, but I sincerely hope that personalities, more authorized to speak than I am, will take up the matter and raise such a voice of protest and deprecation that the skeletons of the denizens of our country in past geological ages will remain on view in the Victoria Museum. Otherwise, may the shades of Cuvier, Cope, Marsh, Logan, Dawson, Whiteaves, and Lambe haunt the sleepless nights of those responsible for their removal.

Yours very truly,

THEO. C. DENIS.

INSTITUTE NOTABILITIES.

Mr. Charles Camsell.

Mr. Camsell's career is one of such variety and interesting adventure that it is impossible to even summarize it within the limits usually assigned to this purpose by the Bulletin. A volume would be better devoted to the purpose. Son of Julian Stewart Camsell, Captain in the British Army and Chief Factor of the Hudson's Bay Company, Charles Camsell was born at Fort Liard, N.W.T., in 1876. At an early age he was sent to school at Winnipeg, journeying across the plains from Edmonton by ox team.

At Winnipeg he received his primary education at St. John's College, and then in due course graduated in science at the University of Manitoba, also the alma matter of Professor J. C. Gwillim, who slightly preceeded him. In college days Camsell was captain of the University football teams, both association and rugby, and seems to have been recognized as an all-round athlete.

On leaving college in 1894, he returned to the Mackenzie River country intending to spend a winter at his home. But by the trend of circumstances he actually spent the next six years in the region north of latitude 60 deg., ranging between the Coppermine river and the Pacific coast. He describes his occupation during this period as "hunter, trapper, fur trader and dog-driver." It was naturally one of incident and adventure. Amongst other experiences in this return to the 'simple-life,' he set out on snow-shoes, in 1897 to go to the Klondike, then in its early 'heyday,' by way of the Liard and Pelly rivers. This seems to have been one of the few cases in which Camsell ever failed to reach his objective. Game and supplies failing on the head waters of the Pelly, he fell on evil days and barely subsisted for three months on rabbits, squirrels, fish-hawk and wolf. Reaching the Cassier country in the fall of 1898, 'dead broke,' he, for a time, worked as boatman and cook on a freight scow plying on the Dease river. It is interesting to note that of the three other members of the crew, two were graduates of Cambridge University and the third, of Trinity College, Dublin. The captain was an Indian, and the mate, as became his intermediate position, was a halfbreed.

Disregarding the social symmetry of these surroundings, with the coming on of winter Mr. Camsell engaged as mail carrier on the Stikine river between Wrangell and Telegraph Creek, driving a dog team throughout the winter of 1898-99. In the summer of 1899 he again crossed the mountains to the Mackenzie river, this time by canoe, and met experiences in traversing the Grand Cannon of the Liard from which few others would have emerged to tell the tale.

After spending the following winter in trapping furs at Fort Wrigley, he joined a Geological Survey party under Dr. J. M. Bell in the spring. This party explored Great Bear lake and later in the season made a dash to the Coppermine river. On the return journey to Great Bear lake they barely escaped starvation and exhaustion and later being frozen in at Fort Chipewyan covered the remaining 600 miles to Edmonton on snow-shoes.

Turning from the 'wild and woolly,' Mr. Camsell then proceeded to Kingston, Ontario, and spent the remainder of the winter at Queen's University, studying geology and mineralogy under Dr. W. G. Miller and Professor Wm. Nicol. The summer of 1901 he spent exploring for the Algoma Central Railway in the Moose River basin and on James bay. On the way out from this trip, he sampled parts of the present Hollinger mine, but obtaining an assay of only $5.20 per ton, no ground was staked.

After spending the summer of 1902 in exploring the wood buffalo country between Peace river and Great Slave lake, for the Geological Survey, Mr. Camsell devoted the following winter to post-graduate study in geology at Harvard University under the instruction of Professors Wolff, Davis and others. Obtaining appointment as geologist to the Canadian Northern Railway Company he was engaged in explorations in northwestern Ontario and eastern Manitoba, until June 1904, when he was appointed to the

Mr. CAMSELL, who is appointed Deputy Minister of Mines at Ottawa.

permanent staff of the Geological Survey on which he has since accomplished much valuable and well-known work. In 1904 he traversed parts of Patricia and in 1905 from Dawson Y.T., explored the Stewart and Peel rivers and reached the mouth of the Mackenzie.

From 1906 to 1913 he was occupied largely with problems of economic geology in southwestern British Columbia. His reports on Hedley, Tulameen and other mining districts made during this time are well-known standards. During 1908, he also pursued post-graduate study at the Massachusetts Institute of Technology, under Professor Daly, Lindgren and their associates.

In 1914, Mr. Camsell was placed in charge of the exploratory work of the Geological Survey and besides directing several parties in the field also made an exploration of the country between Athabaska and Great Slave Lakes, which amongst other results made known the Taltson river for the first time.

When it was decided to establish an office of the Geological Survey in British Columbia, Mr. Camsell was selected to open and take charge of the division of the Survey with headquarters at Vancouver, where he has since resided.

Mr. Camsell is a Fellow of the Geological Society of America, of the Royal Geographical Society and of the Royal Society of Canada, and is also a charter member of the Harvard Travellers Club. He joined the Canadian Mining Institute in 1906, became Secretary of the British Columbia Division in 1919 and a Councillor for British Columbia in 1920.—From C.M.I. "Bulletin."

C. CAMSELL APPOINTED DEPUTY MINISTER OF MINES

It is anounced from Ottawa that Charles Camsell has been appointed Deputy Minister of Mines, succeeding Mr. R. G. McConnell, who is superannuated at his own request. Mr. Camsell has for some time been in charge of the British Columbia office of the Geological Survey, where his capabilities for direction of affairs have been recognized and appreciated.

THE PRODUCTION OF NICKEL OXIDE

The recently issued report of the Ontario Bureau of Mines shows the Province to be now a large producer of nickel oxide. This metal has been made here in small quantitties for some years; bu only recently has the amount been notable. The report shows that during the first three months of the present year there was produced 1,788,183 lbs. nickel oxide valued at $413,944. This doubtless came largely from the Port Colborne refinery of the International Nickel Company of Canada. This company sends a large quantity of the oxide to England. Other producers include the refineries at Deloro and Thorold where nickel oxide are recovered in treating silver ores from tthe Cobal district. It was not until refining of nickel-copper mattes was started at Port Colborne that the production of nickel and nickel oxide in Ontario assumed its present proportions.—R.E.H.

RESIGNATION OF MR. R. F. M. SYLVESTER.

(From the Victoria "Colonist.")

All those who know how Mr. R. F. M. Sylvester has been instrumental in developing the mining industry of British Columbia will regret to learn that he has resigned as managing director of the Granby Consolidated Mining and Smelting Company. That organization owes a great deal to his progressive business capacity and the vision which he brought to bear on its operations in this Province. He was agressive and keenly alive to the possibilities of the acquisition and the development of new prospects. Vancouver Island owes to him the opening of the coal mining area at Cassidy's Landing, where there is now in existence the most model coal mining town in the world and where the industry gives employment to between 400 and 500 men. Taking his administration of the affairs of the company in this Province from every standpoint, he was responsible for an era of progress which is seen today both on this Island and at Anyox, and we believe he was determined to bring about such further development as would have redounded to the advantage of both the company and British Columbia. The Granby Consolidated loses an asset by Mr. Sylvester's resignation. It is of interest to learn that he intends to make his home in Vancouver. No doubt before long he will be heard from as instrumental in mining ventures on a large scale.

Mr. R. F. M. SYLVESTER, who has resigned as Managing Director of the Granby Consolidated Mining and Smelting Company.

The Dominion Government proposes continuing the office of Director of Coal Operations in the Province of Alberta. A Bill authorizing this was before the Canadian Senate recently and Senator Robertson, Minister of Labour, answering a question, stated that the Department of Justice had ruled that the legislation was constitutional.

IV. The Graphite Industry

By CHAS. SPEARMAN*

Foreign crucible graphite vs. domestic (Canadian and American): A Comparison.

Of all the foreign graphite placed on the market that from Ceylon is probably the most important and commands the most attention on account of its reputation based upon chemical purity and physical properties. The next foreign producer of importance is probably Madagascar, which, as far as quantity is concerned, is probably equal in output to, if not greater than that of Ceylon, but the quality is said to be inferior.

Of course it is to be expected that the grades of graphite from the various producing deposits of Ceylon and Madagascar vary in quality for the different commercial standards. Uniformity in this respect could hardly be expected, but, generally speaking, although there may be just as good graphite in Madagascar as in Ceylon yet the average of the output from Ceylon appears to be of a better grade for the market requirements than that of Madagascar. In this regard there are, chemically speaking, many grades of each commercial standard on the market from both countries classed according to size of product, etc., such as the lump, chip and dust of Ceylon, which vary considerably in carbon content for products of like physical classification; and the quotation varies as the carbon content, for instance, Ceylon lump may vary in price from 5 cents to 16 cents per pound at the present time according to its graphite-carbon content, and to some extent its physical properties.

Ceylon graphite found its way into the markets of the world at an early date. The nature of the deposits* offered unparalleled opportunities to place a relatively high-grade stock on the market at a low cost as compared with the disseminated deposits of Canada and the United States.

Generally speaking, Ceylon graphite is gathered from the deposits and sorted, averages between 80—85 per cent carbon. It is for this reason put on the market for crucible trade. Domestic deposits range from 2½ per cent. to 10 per cent. carbon only. It was very difficult to recover graphite from the grade of domestic deposit and at the same time show a margin of profit in the operation. Thus foreign stock became established in most countries and was regarded as unequalled for practically all commercial purposes. Then again the output from Ceylon and other foreign producers was so large that capital hesitated to venture into the development of the relatively low-grade disseminated domestic deposits on account of the higher costs and the primitive state of the milling art, which was purely experimental and too often led to grievous financial losses; more especially where the deposits contained such impurities as mica, fibrous silicates, etc. All this experimental work and consequent losses served in a great measure to promote the interests of the foreign producers at the expense of the interests that attempted to foster the domestic industry.*

Ceylon graphite had the advantage of being sufficiently pure, commercially speaking, to market with but little sorting after being extracted from the deposits and not only this but in every instance where the domestic graphite was of equal or even greater carbon content the physical properties of the flake were such that it was vastly inferior, due to the method of milling. This feature permitted foreign graphite to meet all domestic opposition and further discouraged the local industry.

The local industry meeting with but little encouragement thus far, due primarily to the lack of efficient proceses for the recovery of the graphite, and to the decided natural and local facilities of the foreign producers, contributed but a small tonnage to the world's requirements. Spasmodically the industry would make attempt to recover by taking advantage of some unusually favorable local condition and thus contribute a small tonnage for the time being, then because of excessive costs and foreign competition would cease operation, and add another chapter to tthe history of failures.

With improved milling methods gradually introduced within the past few years which make it possible to produce flake graphite from domestic disseminated graphite ores, comparable to, and even better, physically and chemically than the so-called high-grade foreign massive stocks, the establishment of the domestic graphite industry on a permanent basis may be expected in a comparatively short time.

The demand has now a tendency to call for a relatively high-grade graphite of better than 90 per cent. graphite-carbon content. The foreign deposits capable of marketing such a product, without first milling and refining, are indeed but few in number and wholly inadequate to supply the consumption. Foreign stock 90 per cent. graphite carbon is quoted at about 16 cents per pound today, which, if added to the expense of milling and refining, would bring the price per pound somewhere around 19 and 25 cents. This would be a disadvantage to the foreign producer and would probably eliminate foreign stock to a great extent from active competition with domestic flake, which could be sold at a much lower figure and still maintain a good margin of profit.

Much has been said regarding the relative merits of Ceylon graphite as compared with domestic flake for use in the crucibles industry. By way of comparing the properties of each it would be well to mention a few points in a general way. For example, suppose at one end of a series a graphite crucible be carved

°W. Lindgren—Mineral Deposits, page 703.

*Consulting engineer and metallurgist. Room 416 Power Building, Montreal, Quebec.

*Geo. D. Dub, War Investigation Series No. 3 U. S.

*Fred. W. Moses War Investigation Series No. 8 U. S. Bureau of Mines 1918.

*F. G. Downs, E. and M. Journal, No. 6, Vol. 105, Feb. 9, 1918, P. 282.

*C. Spearman, Can. Mining Journal, Jan. 16th, 1920 —P. 32.

from a mass of pure graphite of the crystalline variety such as is used in the industry and at the other end of the series a crucible made from a very finely divided crystalline graphite. The crucible made from the pure massive graphite at the one end of the series would fail from lack of tensile strength in a direction normal to the cleavage planes, and under relatively low pressure the crucible would have a tendency to part along the cleavage planes. To overcome this weakness the graphite must be reduced to a certain mesh and the individual particles so placed in the crucible mixture so as to eliminate as far as possible the general parallelism of the cleavage planes of the mess taken as a whole. At the other end of the series where a finely powdered graphite was employed, a high percentage of clay would be required to coat or cover the particles, and thus the crucible approaches excessive impurity, lacks conductivity, is apt to brittle, and may possess drying cracks, etc. There is a degree of disintegration somewhere between the one massive piece at the one end of the series and the finely divided powder at the other end of the series, where the crucible stock will possess the maximum efficiency for its special use. Therefore, to sum up, an ideal crucible should:

(1) contain as much graphite carbon as possible without impairing its strength. It is then essential to start with a fairly high grade graphite,—the higher the grade the more suitable for the purpose,—and all impurities such as the usual non-metallic gangues, and in fact everything except graphite, constitutes an inert member to the whole. These impurities may be termed inert as they are useless in this particular art, and besides call for additional clay to coat their surfaces and thus further reduce the carbon content of the crucible. There are again other impurities which cause certain chemical reactions that are to be avoided.

(2) The flake must be of certain dimensions as to area and thickness. The size of the particles taken collectively must vary uniformly within certain limits. The area must be such that the least possible clay be used to coat the surfaces and at the same time preserve efficiency, and in this the area created must cease before the point is reached where the thickness of the flake is such that its tensile strength is endangered in a direction parallel to the cleavage planes. In practice the above points referring to dimensions are embraced in a general way by the average specifications of the consumer which are as follows:

> "All particles should pass through a standard 16-mesh screen, about 50 per cent. rest on a 50-mesh standard screen, not more than 2-4 p.c. pass through an 80-mesh standard screen and all rest on a standard 90-mesh screen, and to regulate the thickness of the flake it is specified that 100 gms. loose stock shall occupy less than 110 cu.cm."

(3) The promiscuous arrangement of the graphite in the crucible mixture is also a matter of importance. This destroys parallelism of arrangement and promotes tensile strength. It is therefore necessary to have a uniform arithmetical progression of sizes between any two limits such as the 16 and 90-mesh sizes.

With the foregoing dealing principally with physical specifications, a few comparisons between Ceylon and domestic graphite may now be made.

Some consumers believe Ceylon graphite to be the "acme of purity." This was true up to a recent date. Statistics will show that the average graphite imported for crucible manufacture ranges from 83-87 per cent. graphitic carbon while it is now possible to place domestic flake on the market ranging from 92 to 98 per cent. pure, depending upon the demand.

Some claim that the peculiar fibrous structure of Ceylon graphite acts as a stronger binding agent, and requires less clay in a crucible batch or mixture than the flake variety.* If Ceylon lump be crushed to the required size for crucible use the fibrous structure is more or less destroyed, and where it did exist the lateral axis of the fibre is so diminished as compared with its longitudinal axis that the strength of the fibre as a whole is greatly reduced. For the most part, rough angular particles predominate, which probably possesses a little more density, which in turn is more or less offset by lack of tensile strength due to the tendency to part at the cleavage planes when the density exceeds a certain degree. Then again as far as a regular balanced binding-area is concerned, the more or less disc-shaped flakes afford an interlocking medium vastly superior to the so-called fibrous stock, which range in shapes from the thin needle shaped "fibre" to the roughly shaped parallelopipe, the smaller axis of which just passes through a standard 16-mesh opening; and, when the right thickness of flake is maintained, less clay is used than with the angular variety. These shapes do not combine in a crucible mixture to give the same general afficiency as to the flake-shaped particles, and any attempt to alter the general shape of these particles so as to have them compare favorably with the flake variety, would cause abnormal losses by the creation of fines due to the more or less brittle nature of the fibrous variety as compared with the relatively tenacious domestic flake.

It has also been claimed that when flake graphite is mixed with the requisite clay for crucible making and subjected to the necessary pressure for moulding purposes, this pressure causes the flakes to orient themselves with the planes containing the longer axis normal to the direction of pressure. This argument is rather far-fetched and is not borne out in practice. In the first instance, if properly mixed so as to avoid general parallel arrangement of the flake and the more or less plastic mass then subjected to the necessary pressure, this pressure will be distributed equally in all directions upon the enclosed mass and therefore there will be no tendency to parallel arrangement of the flake. Even though all other conditions were such as to permit this law of parallel arrangement to take place, the time period, which is the important factor, is so insignificant that readjustment of the flake ould be scarcely measured and from the practical standpoint could be treated as though it did not occur at all.

A point in favor of Ceylon graphite is the greater density of a unit volume of the loose crucible stock, 100 gms. occupying approximately 90 cu. cm. while the damaged thin domestic flake* resulting from the older experimental process tested from 130 to 150 cu.cm. for an equal mass. Domestic flake made by recent processes has tested lower than 100 cu.cm. and probably makes a better-balanced crucible than Ceylon graphite

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*H. S. Spence—Can. Graphite Industry. Can. Bureau of Mines, Summary Report 1918.

*F. G. Downs, E. and M. J. No. 6, Vol. 105, Feb. 9, 1918, P. 282.

by combining tensile strength with high carbon content.

As to chemical purity, the domestic flake can now be placed on the market with a much higher carbon content than that of any of the foreign product now offered. This reduces any of the deleterous gangues, if present, to a quantity so small as to come well under all chemical specifications of the consumer.

As far as the combustion test is concerned the domestic flake is equal and in many cases superior to that of the foreign stock.

From the above it is difficult to see where the foreign graphite taken as a whole can compare with the domestic flake such as can be placed on the market today. Many of the buyers still claim that it would not be advantageous for them to buy domestic flake due to its impurity. This is done, in many cases, to obtain a better quotation, and is effective, generally speaking. If this domestic product is really inferior why do the consumers consider it at all?

For a time during the war it was made compulsory to use domestic flake mixed with Ceylon for crucible purposes. The mixture was approximately 75 per cent. Ceylon material supplied the higher carbon content to have made a very good mixture because the domestic flake furnished extra binding material to compensate for the weakness in the Ceylon graphite, while the Ceylon material supplies the higher carbon content to compensate for the relatively low carbon of the domestic flake then used.

Great strides have been made in the art of concentrating disseminated graphite ores in the past few years, stimulated no doubt by the demand caused by the war. These improvements have practically placed foreign graphite where in a short time the competition will be so keen as to practically eliminate it, if disseminated deposits can produce and maintain the tonnage to meet consumption requirements. The outlook for the future tonnage appears to be promising as the domestic disseminated deposits have been scarcely developed as yet, and there is the possibility of finding new deposits to replace those that become depleted.

Th old prejudices against domestic flake are gradually disappearing and when the formulae for crucible mixtures are so arranged as to admit of its use a great obstacle to the industry will be removed.

Much could be done to assist the domestic industry if consumers and producers insisted upon a strict physical and chemical standardization of the stocks to meet the requirements, establish a high standard and have the price based accordingly.

Note:

This is the fourth article on the Graphite Industry contributed to the "Journal" by Mr. Spearman. For previous articles see issues Feb. 12th, page 87, Aug. 6th, 1919, page 586, Jan. 16th, 1920, page 32. See also account of Dominion Crucible Company in last-named issue.

INCREASE IN SELLING PRICE OF COAL AT CALGARY

Calgary prices for coal have been raised from $9.75 to $10.50 per ton for lump coal, and to $8.75 for steam sizes. This increase is necessitated by the advance in miner's wages. The miners have not yet signified their acceptance of the proferred increased, but if ratified it is retroactive to 1st April.

"THE CANADIAN INSTITUTE OF MINING AND METALLURGY."

The "Bulletin" announces change of name, and appointment of Mr. Lamb as Secretary Emeritus

With this month the Institute opens a new chapter in its history. The legal formalities which were necessary in order to give effect to the decision to change the name having now been all complied with, the Canadian Mining Institute became, on April 11, the Canadian Institute of Mining and Metallurgy. As the letter ballot proved, the change was desired by the majority of the members, and there is no doubt that those who, for sentimental or other reasons, were in favor of adhering to the original name will soon become reconciled to the change. It is probable that the majority of those who would have preferred to perpetuate the old style are charter members, or at least members of very long standing, who have watched the Institute grow from very humble beginnings, and who have helped to steer it through troubled waters on many occasions. The Institute has attained its present strong position largely as the result of their labors, and is is only natural that they should be jealous of its traditions; but it is safe to say they will be no less loyal to the Canadian Institute of Mining and Metallurgy than they were to the Canadian Mining Institute. As showing the present-day tendency of mining men to give proper recognition to metallurgists, however, it

Mr. H. MORTIMER LAMB, who retires after 15 years' service as Secretary of the Canadian Mining Institute, and is appointed Secretary Emeritus.

is of interest to note that the Mining Society of Nova Scotia, with traditions extending back even further than our own institute, and with a record of which any society might well be proud, is now considering the advisability of changing its name to "The Nova Scotia Mining and Metallurgical Society."

This month also marks another break in the continuity of the Institute's history, the Council having accepted, with great regret, the resignation of Mr. H. Mortimer-Lamb as Secretary. Mr. Lamb has ably filled this position for a period of fifteen years, and has thus been very closely associated with the work of the Institute throughout the most critical stages of its growth. Fortunately, the Council has been able to retain in some degree his services and the benefit of his experience, and as Secretary Emeritus Mr. Lamb will continue for the time being at least, to devote attention to the affairs of the Institute, particularly as the editor of the Annual Transactions.

FIRST QUARTER FOR ONTARIO MINES SHOWS INCREASE.

The Ontario Department of Lands, Forests and Mines has just issued a report showing an increase in the value of the output for the first quarter of the year in metalliferous mines, smelters and refining works of Ontario, of nearly one million dollars over the corresponding period of 1919.

Owing to Ontario's contribution, Canada was the only country able to report an increased output of gold of 1919. Production for the first quarter shows an increase of nearly 46 per cent over the first three months of 1919. Of the total output of $2,953,036, Porcupine contributed $2,694,665. Kirkland Lake $247,339, and the balance $11,032 came from the Augonaut mine in Gauthier township and from refining of nickel-copper matte. The output from Porcupine came from the following mines: Hollinger Consolidated, McIntyre, Dome, Dome Lake, Porcupine Crown, and Davidson Consolidated. At Kirkland Lake the producers in order were Lake Shore, Teck-Hughes and Kirkland Lake. Production is still hampered by insufficient labor, and although the wage scale has been increased to equal that at Sudbury and Cobalt, the effect has not been appreciable. In addition, gold mines produced 24,913 ounces of silver valued at $31,373. The total tonnage of ore milled was 360,327 tons. As regards mill equipment the producers report 5,485 tons daily milling capacity which includes 210 stamps capable of treating 3,880 tons. Ball and tube mills installed have a capacity of 1,605 tons daily.

Silver.

The quantity of silver marketed during the period shows a falling off, despite the high price of the metal, which averaged $1.30 per fine ounce. When the price began to recede, some of the larger producers held a considerable proportion of their output in the hope that the market would recover. The course, however, continued downward, the present level being about $1 per ounce. The average price was $1.01 for the corresponding period in 1919. Of the total of 2,280,665 ounces, Cobalt and Gowganda contributed 2,244,709 ounces while 11,763 ounces were recovered from nickel copper refining and 24,193 from gold ores. In addition certain silver producers were paid $7,111 for 54,518 pouds of cobalt contained in the ores and concentrates sold.

Refineries:—At Deloro, Thorold and Welland the three operating silver-cobalt refineries treated 219 tons of ore, 655 of concentrates and 626 of residues for a total recovery of 829,142 ounces of silver in addition to arsenic, cobalt and nickel in various forms. Only 5,535 lbs. of nickel oxide were marketed in this form, the major part of the output, as noted in the table, coming from the Port Colborne nickel-copper refinery. Metals Chemical, Ltd., at Welland has sold its plant to Ontario Smelters & Refiners, Ltd., which will carry on the business in future, using a different process. The new company also owns the plant at Chippawa formerly operated by the Standard Smelting and Refining Company.

Summary of Metalliferous Production—First Quarter of 1920.

	Quantity		Value $	
	1919	1920	1919	1920
	Ounces	Ounces		
Gold	98,188	142,840	2,026,536	2,953,036
Silver	3,105,002	2,280,665	3,152,700	2,954,695
Platinum metals	.....	100	.....	7,172
	Lbs.	Lbs.		
Copper, blister	1,724,631	1,508,014	270,493	242,630
	Tons	Tons		
Copper in matte exported (*)	2,674	1,976	588,280	553,280
Nickel in matte exported (*)	5,610	4,571	2,692,800	2,285,500
Iron ore exported, short	4,840	44	41,118	322
Iron, pig (†)	14,170	13,428	399,963	344,241
	Lbs.	Lbs.		
Cobalt, metallic	13,594	46,479	20,889	108,430
Cobalt oxide	127,954	213,024	186,036	340,232
Nickel oxide	5,070	1,788,183	1,421	413,944
Nickel, metallic	1,830,569	2,159,316	756,062	753,169
Other Nickel Compounds	33,716	159,183	5,804	15,308
Other Cobalt Compounds	14,189	1,417	9,827	1,417
Lead, pig	567,716	509,075	34,684	48,278
Total			10,186,613	11,021,654

* Copper in matte was valued at 11 cents and nickel at 24 cents per pound in 1919. For 1920 the values have been placed at 14 and 25 cents per pound respectively. The total matte produced contained 7,038 tons of nickel and 3,631 tons of copper.

† Total output of pig iron was 152,022 tons worth $3,897,211. Figures in the table represent proportional product from Ontario ore.

SAVING THE PRECIOUS METALS

It is now announced by the Ontario Bureau of Mines that gold, silver, platinum, palladium, rhodium, ruthenium, osium and iridium were recovered at the Port Colborne nickel refinery, where Sudbury mattes are refined. The amounts recovered were probably small and are not given separately. The announcement is an interesting one, as it is regarded as highly desirable that the production of these metals in Canada should have been undertaken long ago. The metals of the platinum group are very valuable and the sources of supply are few. The Sudbury nickel-copper ores have long been known to carry small quantities of these precious metals and their recovery is regarded as one of the advantages of the process adopted by the Brittish America Nickel Corporations for refinin gores from Sudbury properties.—R. E.H.

Conveying Systems

JOHN S. WATTS, New Glasgow.

Of late years, there has been developed, and placed on the market, sueh a large variety of conveying apparatus, of so many different types, that it is now possible to purehase a type of conveyor to suit almost any eonceivable eonveying problem, with almost as mueh simplicity as the purchase of such standard produets as a lathe or planer.

The manufacture and design of conveying equipment has reaehed the stage where these machines are made practically as standard lines, with the exeellenee of design whieh naturally follows from continuous experienee in their manufacture and operation.

This is a distinet step forward from the older praetice, when every conveyor was considered as a special problem to be solved only by the operating companies' engineers, who would naturally have less experienee than that of the engineering staff of a company regularly manufacturing conveyors.

The operating companies' engineers, however, still have, and must continue to have, the final responsibility of deeiding whieh of the numerous types of convcyors will best fill their requirements.

To deeide this question intelligently, requires a knowledge of the eharaeteristies of all the various types of apparatus, a knowledge whieh is not possessed by the average engineer, and it is in the hope that it will be of some assistance to engineers in deeiding on the right kind of conveyor, that this article has been written.

The conveying problems may be divided into two broad classes, namely, those in which the receiving point, and delivery point are not in any fixed position, and those cases in which the receiving and delivery points are fixed.

In describing the various designs of eonveyors that are used, under the eonditions speeified, it will be understood that no referenee is made to what may be eonsidered as standard equipment that is universally known and used, sueh as overhead travelling eranes, man or horse-propelled trueks, wheel barrows and the like. Not that these do not require study, and are sometimes the right solution to a conveying problem, but that the intended function of this article is to give a eomprehensive list of the available, but less well known and more modern conveyors, with the limitations of eaeh type.

Taking up the first-named class of eonveying problem, the requirements may be stated in general terms, as being the moving of material from any point anywhere within a certain area to any other point, whieh may be anywhere within the same or another given area.

If the material to be moved, eonsists of a large number of comparatively light parts, whieh can be conveniently plaeed in boxes or trays after being operated upon, and are to be moved to another point in the same shop, over a reasonably smooth floor, the transporting elevating trucks, which ean be pushed under the loaded box, and the load then raised by the truck a few inches clear of the floor, are the best type. These transveyors or elevating trucks are now suffieiently well known to need no further description.

When the parts to be moved are single heavy pieees, but the other eonditions are as outlined in the last paragraph, the best solution is to use a portable crane, similar to that shown in Figure 1. This, of course, assuming that an overhead travelling crane is not available, or already has more work than it can handle.

If the floor of the shop is not smooth enough to allow the transveyor or portable crane to be hauled over it with a reasonable effort, or if the floor space is too eonfined, or if the material has to be eonveyed some distanee, as into another shop, the overhead trolley will best fill the conditions. An example of this type is shown in Figure 2.

While the receiving and delivery positions, are, with this last apparatus, eonfined to points under the line of the overhead beams, by fitting switehes and junetions, in a manner similar to those used on a railway traek, this system ean be made to serve a large area at a reasonably low expense.

Fig. 1.

Outside of the older methods of handling material, such as trueks or ears, hauled by men or horses, eleetrie or gasoline traetors, the above mentioned systems of conveying, represent the choice of apparatus we have, and knowing the eonditions, there need be no trouble in deeiding upon the right one.

The second elass, where the delivery and receiving points are fixed, introduce a much greater range and variety of conditions, of material to be handled, and of equipment that may be used.

This elass can be further sub-divided, in aeeordance with the general direction in whieh the material is to be conveyed, namely:

1. Vertically upward.
2. On an incline upward.
3. Horizontally.
4. On an incline downward.
5. A combination of any or all of the above directions.

Taking these sub-divisions in their numerical order, we have:—

1—Conveying Vertically Upward.

The available methods are:

The lift or elevator, operated by air, hydraulic. steam or electric power. These are used, when the material is in large heavy pices, or varies in bulk and shape. The power to be used will be necessarily decided by what power is available.

The chain elevator fitted with buckets, arms or other attachments, suitable for the material. For light material, a belt is sometimes substituted for the chain, the buckets being fastened to the belt.

The choice of equipment for cases under this subdivision is practically decided by the class of material to be handled, and the problem should present little difficulty to the engineer.

Fig. 2.

The next subdivision presents a more varied combination of conditions, and is:

2—Conveying on an Incline Upwards.

This may be subdivided further into—

2a—Conveying up an incline of 20° or more, from the horizontal;

2b—Conveying up an incline of less than 20° from the horizontal.

2a—Inclines of 20° or More.

We are compelled to use either a bucket or chain elevator, similar to those described under sub-section 1. If the grade is not too steep, the chains may be fitted with flights or scraper plates, which drag the material along a trough of steel or wood but these can only be used for comparatively fine and light material.

If the material be very light, such as sawdust, tan bark, etc. and the distance not too great a very simple type of conveyor can be used made of a wire rope with circular discs of cast iron, clamped on it at intervals, and working in a semi-circular trough.

For very long distances, a cableway must be used with a carriage travelling on the cable, and hauled up by a hoisting engine at one end.

For slopes of 20° or over those conveyors having a flat conveying surface, such as steel plate or belt conveyors, cannot be used, because the material would slide backward.

The type of conveyor to be used must be decided to suit the material to be handled. Heavy material in lumps will be best conveyed by the bucket elevator. For barrels or packages use a chain elevator fitted with the proper attachments for carrying that shape of package that is to be elevated. Light material in small pieces can be elevated by the chain with scraper flights in a trough. Heavy materials to be transported a long distance, require a cable conveyor.

2b—Inclines of Less than 20°.

Under these conditions, we have the choice of all of the types descriebd under section 2a, and in addition we have the following:

For moderately light material, we can use the rubber belt conveyor, but the material must be such that it can be delivered onto the belt without cutting or abrading it, and the weight must be low enough, not to sag the belt too much between the roller supports. Hard material must be delivered onto the belt at about the same speed, and in the same direction, as that in which the belt is travelling.

For heavy or hot material which would damage a rubber belt, we must use a steel plate or pan conveyor.

3—Horizontal Conveyors.

For horizontal conveying, we can use any of the types outlined in the previous sections, the choice depending on the class of material to be handled, and the quantity to be conveyed in a given time.

Where a large output of heavy material is to be conveyed a distance of not over about five hundred feet the bucket type of conveyor is the best. The buckets can be made of large capacity, holding a ton or more if necessary, and deliveries of one thousand tons per hour are being handled by this type with excellent results in low cost. This type can be run outdoors exposed to severe climatic conditions without detriment.

For smaller outputs of any kind of material that is not sticky and for any reasonable distance, the vibrating conveyor is most suitable, being simple and rugged in construction. This type consists, in general, of a steel trough mounted on wooden legs set at a slight angle. The trough is given a vibrating, or to and fro, motion by a crank shaft. The general idea can be seen from Figure 3.

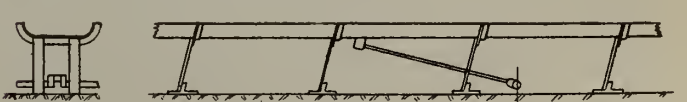


FIGURE 3

Some makers use rollers to carry the trough and cause the material to travel along the trough, by giving the trough a quick forward and slow return movement, by means of a link motion actuated by the crank shaft.

This type of conveyor is not as well known on this continent as it deserve to be, but is much used in Europe, and for rough hard work is a machine that will

give little or no trouble. It will elevate material up a slight grade about 2 per cent being the maximum, but depending upon the difference between the co-efficient of friction of the material, at rest and in motion.

This difference between the friction at rest, and in motion, is the basis upon which the machine depends to perform its function. The trough itself only vibrates backward and forward a few inches, while the material travels along the trough at a practically uniform speed.

When the material requires to be examined, and rock or other debris picked out, the bucket conveyor is eliminated from consideration, and a vibrating or a flat plate conveyor of either steel or rubber must used.

For fine material of a gritty nature, to be conveyed a short distance, a screw conveyor such as that shown in Figure 4, makes an easily arranged system.

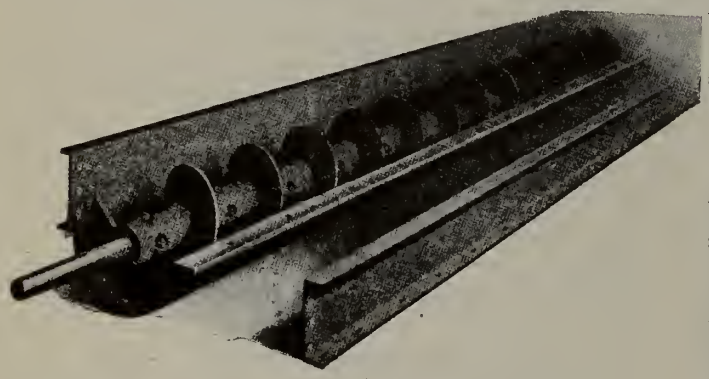


Fig. 4.

4.—Conveying Downwards

When the material is to be transported on a downward inclination, we have the choice of all of the types already described, and also some others, descriptions of which follow.

Where the downward grade is at an angle of not less than about 35 degrees from the horizontal, depending upon the co-efficient of friction of the material, all that is needed is a chute to guide the material. The force of gravity will cause the material to slide down the chute to its destination. The chute can be made straight, curved or spiral, or any shape required to join the delivery point to the receiving point, so long as the grade is not less than that needed to cause the material to slide.

If it is impossible to get an inclination of 35 degrees, the material will not slide, but one of the types of gravity conveyors can be used. These are made with sides, like a chute, but the bottom is made of rollers, which can be made of any shape or size to suit the material to be handled. The material must be nearly uniform in cross section, and must be long enough to span over at least three rollers.

When the inclination is not less than ten degrees from the horizontal, and the material such that it cannot be handled by a roller gravity conveyor, a shaking chute will deliver the material.

This is simply an ordinary chute, suspended by eyebolts, and given a shaking movement, backward and forward in the same direction as the flow of the material, of some four or five inches, by eccentrics driven by a revolving shaft running at fifty to ninety revolutions per minute, depending upon the inclination of the chute, and the friction of the material on the chute bottom.

If the material will float in water, or is fine enough to be carried in suspension by a current of water, the hydraulic flume may be a simple solution. This is merely a stream of water carried in a wooden trough, and where ample water is available provides a cheap method for the disposal of ashes.

A Unique System of Ash Disposal.

A very economical method of ash disposal is in vogue at the Wabana Iron Mine at Bell Island, Newfoundland. This island is situated in Conception Bay, and the bay is frozen over every winter.

The power house is situated on a wharf at the water's edge, and the wharf is equipped with a coal handling tower, which has a crane on it, handling a grab bucket, by means of which the coal is unloaded from steamers in the summer season.

In the Winter, the ashes are allowed to accumulate on the wharf until the ice commences to break up and drift out to sea. When this occurs there is a continuous procession of large ice cakes passing the wharf for some days, and as each cake passes the wharf, the grab bucket picks up a load of ashes and deposits it on an ice cake, which the ice carries out to deep water before it melts.

In any of the above types, the loading point can be placed anywhere on the line of the conveyor. The delivery point on the large bucket conveyor, is of necessity at the end of the conveyor.

The smaller bucket conveyors can be arranged to deliver at any point, in a horizontal part of the conveyor, by having a moveable tripper, which will upset the bucket at any desired point.

The rubber belt conveyors can also deliver at any point in their length, by the use of a moveable tripper, which is, however, a rather expensive and complicated piece of mechanism.

The flat plate steel conveyors, can only deliver at the end of the conveyor.

The chain conveyors, and vibrating conveyors, can deliver at any point in their line, by having gates fitted in the bottom of the trough at the desired delivery points.

The vibrating conveyor has the further advantage that by using perforated plates in the trough, it can deliver various sized products at various points.

5—Conveying in both vertical and horizontal directions or any combination of indications.

This division requires further subdivision, as follows:—

5a—Where the centre line of the conveyor is always in the same plane.

5—Where the direction of the flow may be changed sideways, as well as changing in inclination.

5a.

This constitutes the cases where the material has to be conveyed at varied inclinations, but in plain view the centre line of the conveyor will be a straight line.

With limitations depending upon the inclination, all of the conveyors described in the previous sections can be used, if the conditions specified in the other sections are not violated.

The steel plate type of conveyor would require a separate conveyor for each change of direction. That is, we could arrange a conveyor running up one incline, and delivering its material to another conveyor running on a different incline. The other types can change their direction without difficulty in one plane.

5b.

As in section 5a, all the types will fulfil this condition more or less easily, but require as a general thing, a complete conveyor for each change of direction that is not in the plane passing through the centre line of the conveyor.

However, there are a few types which can accomplish the conveying of materials in a tortuous direction, more simply if the conditions are favorable.

For heavy material, over long distances, the cableway is the most flexible apparatus.

For light material, such as shavings, sawdust, etc., a blower, will blow this material through piping in the most contorted construction, given pressure and capacity sufficient but is limited somewhat as to distance.

For conveying small parcels, in any direction, a lead pipe is used, of about 3 inches diameter, with a circular carrier made to fit it, and having a felt disc to make it airtight. This carrier is forced through the pipe by air pressure of about ten pounds, or sometimes a vacuum is used of the same amount. The carrier will convey anything that can be placed in it, and will travel aronnd a radius of as small as twelve feet.

RECENT PUBLICATIONS OF THE GEOLOGICAL SURVEY.

The Survey has recently distributed an unusually numerous and useful series of maps and bulletins. In addition to the Stellarton, Nova Scotia, sheet and the Sandon sheet, previously noted, the following have been received by the "Journal":

Blairmore, Alberta:—A contoured topographical map, geologically colored of the district around Blairmore, including the colliery towns of Bellevue, Hillcrest, Blairmore, Coleman, Carbondale and Lille, and showing the mines of the following companies, namely. McGillivary Creek Coal and Coke Co., International Coal and Coke Co., West Canadian Collieries, Franco-Canadian Collieries, Hillcrest Collieries, Maple Leaf Coal Co., Leitch Collieries, and Burmis Coal Co. Seventeen sections are shown of the geological structure across the three parallel mountain ridges which are the features of this district. The map is a very interesting one. Geological work was done by W. W. Leach in 1911-12 and B. Rose in 1915. Topography by W. H. Boyd and B. R. MacKay. Scale is one mile to the inch. Publication No. 1584.

Buckingham, Hull and Labelle Counties, Quebec:—A map coloured geologically showing the vicinity of Buckingham, Que. An explanatory note states that the various rock types in this district are so intimately intermingled that uninterrupted areas of the same rock, even a few hundred square feet in extent, are uncommon. The colour scheme of the map is most involved, and it is a most creditable production. Geological work was done by M. E. Wilson in 1913-1915, and the geographical details are compiled by J. O. Fortin from various official sources. Publication No. 1691. Scale one mile to the inch.

Geology of Matachewan District, Northern Ontario:—By H. C. Cooke, Publication No 178, Memoir No. 115. Accompanied by geological map. Scale one mile to the inch. Although this Report is devoted to the geology of the Matachewan District, following the traditional and laudable custom of the Canadian Geological Survey, it is prefaced by historical information, and by a description of the fauna and flora and the general phlsiographical character of the district. Some of the most far-sighted and discriminating remarks in Canadian literature are to be found in the records of the Survey, and it is pleasing to observe that the admirable tradition of the fonnders of the Survey is maintained.

The geological description is too extensive and detailed to admit of condensed review, but Mr. Cooke's summarized conclusions as to the origin of the ore-bodies are as follows:—

"The internal structure of the ore-bodies, consisting of a pegmatite vein at the centre, a middle zone of mineralized and altered rock, on each side, and an outer zone of altered rock without mineralization, which grades into unaltered country rock with irregular and embayed contacts, is clear evidence that the deposits in schist have been formed by the alteration and mineralization of the country rock by solutions coming up along the central vein. The partial calcitization of the feldspar of the pegmatite indicates a change in the character of the solutions during the formation of the ore-bodies.

The serial composition of the various veins of pegmatite, varying from veins of pure quartz up through pegmatites of increasing feldspar content, to dykes of pure porphyry, indicates an igneous origin for all.

The satellitic arrangement of the veins, in that with few exceptions they are grouped within an area bounded by a line drawn about 1,000 feet from the edge of the porphyry mass, with the major number within 500 feet, points conclusively to their genetic connection with the porphyry intrusive.

Veins or dykes approaching the poprhyry in composition deposited little or no gold, but did in places deposit pyrite. They had no strong alterative action on the wall rocks. Pegmatites deposited auriferous pyrite, and had a powerful alterative action on the wall rocks. Quartz veins had little action on the wall rocks, and deposited little or no pyrite. Other things being equal a rough proportion exists between the size of the vein and the size of the altered zone around it.

It is concluded, therefore, that the schist ores of Matachewan district were deposited by juvenile solutions originating as the last products of the differentiation of masses of intrusive granite porphyry. The solutions were at first rich in silica, soda, and alumina, which crystallized out first to form the material of pegmatite veins. The separation of these constituents left the solutions relatively enriched in lime, carbon dioxide, iron, sulphur, potash, and gold, and their reactions with the wall rocks caused the formation of replacement deposits whose principal minerals are calcite and auriferous pyrite.

There is little direct evidence to connect the gold of the Davidson property with the porphyry, except the fact that the veins are confined within the intrusive mass. However, the proof that the neighbouring stock, which is petrographically identical with the Davidson porphyry, carried gold, renders the conclusion inevitable that the gold of the Davidson property was also a magmatic constituent. The differentiation has here continued uninterruptedly to the stage in which the mineral constituents of the magmatic solutions are silica and gold, and these are deposited as quartz with native gold."

The Report notes the occurrence of asbestos at Rahn Lake in the western part of Bannockburn Township. Specimens were submitted to Mr. Harvie of the Survey, who pronounced them of first quality, but not so good as the best Black Lake asbestos. The Report

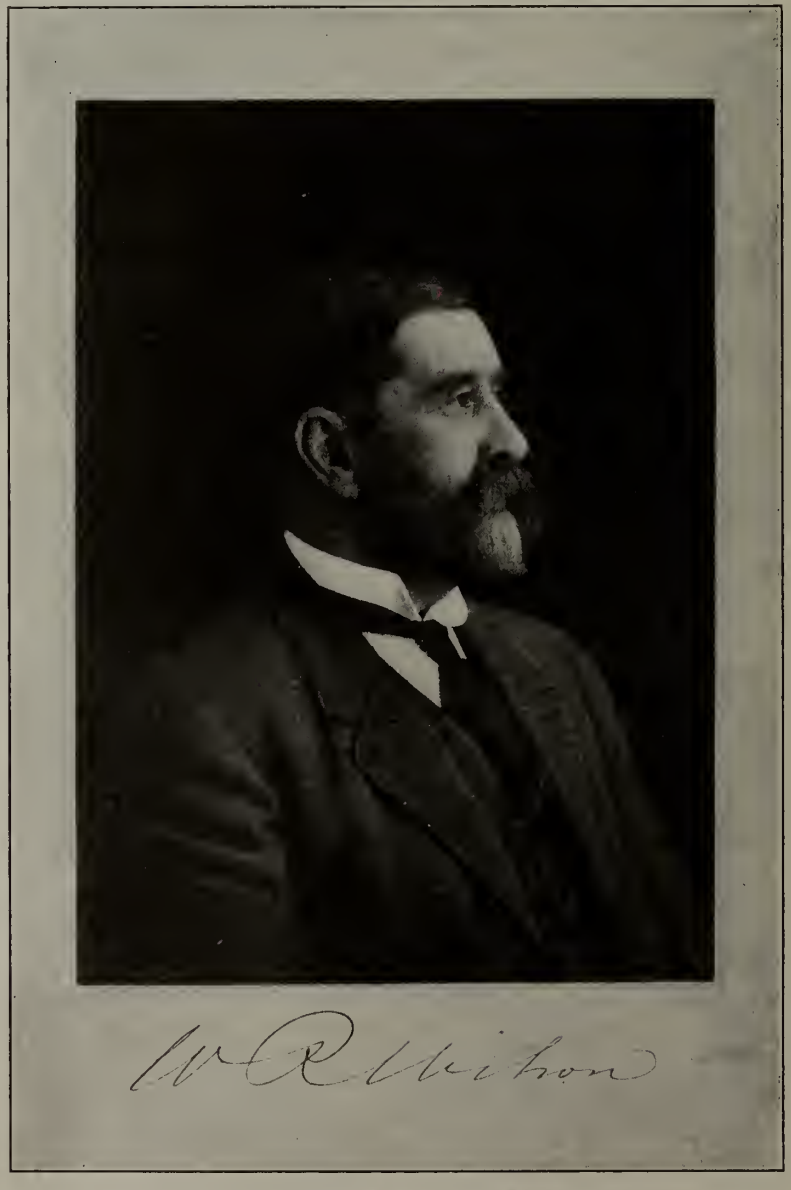
states that should development prove a sufficient supply at Rahn Lake to make mining profitable, only improved facilities of transportation will be necessary to make this field economically valuable.

Small deposits of fluorspur, barite and hematite are referred to, which were not seen by Mr. Cooke, who copies the references made to these occurrences in the report by A. G. Burrows.

Geology and Ore Deposits of Ainsworth Mining Camp, British Columbia. By S. J. Schofield. No. 1773. Memoir 117. Accompanied by twelve coloured maps in pocket, which include topographical and geological maps of Ainsworth District, diagram of mineral claims in districts, and a number of diagrams showing the geology of selected mining operations.

The deposits of economic importance in this camp are entirely silver-lead ores. Previous to 1914 the zinc which was associated with the silver and lead in the primary deposits was worthless or detrimental to the ores, but owing to the increase in the value of zinc and the erection of a smelter at Trail for its recovery, its presence now adds to the value of the deposits at Ainsworth.

Prospects for the continuance of mining in the Ainsworth district are considered to be good. The success of the Highland in proving that the ore bodies extend at least to 700 ft. below the outcrop in the case of veins of the true fissure type, and the occurrence of the replacement deposits in limestone 350 ft. vertically below the outcrop in the Florence mine, augur well for deeper mining, especially as, so far as can be determined, the tenor of the ore does not appreciably decrease at depth. A study of the various mines has been shown that the ore-bodies so far discovered have three well-defined modes of occurrence and in the future economic devlopmnt of these deposits it is recommended that this fact should be kept in mind, and should govern the methods of exploration of the veins. The Report deals fully with these differing modes of occurrence.



Mr. W. R. WILSON, recently appointed President of the Crow's Nest Pass Coal Co., Fernie.

REPORT OF DOMINION STEEL CORPORATION FOR 1919.

The Report of the Dominion Steel Corporation shows production during the fiscal years 1918 and 1919 as follows:

	1918. Tons.	1919. Tons.
Pig iron	307,863	184,229
Steel ingots	341,603	219,943
Blooms and billets	47,890	26,165
Standard rails	164,972	28,976
Light rails	.....	3,319
Wire rods	26,746	44,436
Bars	1,459	1,245
Wire (includes used in making rails)	6,043	15,542
Nails	5,508	12,386
Plates	.....	3,252
Coal	3,622,644	3,502,069

The Report states with reference to production:

"Although every possible effort was made by your directors and the officers of the Dominion Coal Company to maintain the output of the collieries, it was somewhat less than that of last year. The total production from all collieries for the past five years was as follows:

Year ending 31st March, 1920, 3,502,069 tons; March 1919 3,622,644 tons; March 1918, 3,781,615 tons; March 1917, 4,279,772 tons; March 1916, 5,261,198 tons.

"On account of trade conditions operation of the steel company's works was greatly restricted during the months of August, Septemebr, October and November, and in consequence the year's output of steel was correspondingly reduced. During the last quarter of the fiscal year operations were gradually increased and are now upon a more satisfactory basis.

"It will be noted that a new item has been added to the list of materials produced and that steel plates are now being made in quantity."

The net addition to value of properties during the year amounted to $4,329,043, principally represented by the erection of the plate mill, additional electric power equipment at Sydney plant and at the Wabana mines, and improvements to the collieries and power systems of the collieries in Cape Breton and at Springhill.

The profit and loss account for the fiscal years ending March 31st compare as follows:

	1919	1918.	1917.
Op. income	$5,532,529	$8,768,054	$11,030,112
Depreciation, etc.	1,266,856	1,304,323	1,384,242
Balance	$4,265,673	$7,463,731	$9,645,870
Interest	1,004,060	1,013,263	1,064,209
Net income	$3,261,613	$6,450,468	$8,581,661
Pref. dividends	420,000	420,000	420,000
Do. other Co.'s	560,000	560,000	560,000
Net profits	$2,281,613	$5,470,468	$7,601,661
Com. dividends	2,029,629	1,765,373	1,444,397
Surplus	$ 251,984	$3,705,095	$6,157,264
Prev. surplus	7,959,252	13,754,157	7,596,893
T'l surplus	$8,211,230	$17,459,252	$13,754,151
Reserves	.....	9,500,000	.....
P. & L. balance	$8,211,236	$7,959,252	$13,754,157

The common stock shows an increase from $32,097,700 in 1918 to $37,100,000 in 1919, and the balance available for common stock dividends amounted to 7.1 per cent on the old capitalization, and 6.15 per cent on the increased common stock liability, the six per cent dividend being earned by a narrow margin.

Reference is made to the sale of 50,000 shares of common stock to British interests, as follows:—"During the year an offer was made by a syndicate of British capitalists to purchase on favorable terms 50000 ordinary shares of the capital stock of the corporation which had been allotted to the Dominion Iron and Steel Company, Limited, which the directors of that company considered advisable to accept. The proceeds of this sale will furnish a part of the funds required to cover expenditures on its property undertaken and in prospect. The instalments payable under the agreement providing for this new capital have been received; the balance is included in accounts receivable under the heading of current and working assets. The discount on these shares has been written off general reserve, reducing the balance in this account to $10,000,000."

In connection with the mooted entrance of Dominion Steel Corporation into a holding company incorporated in Nova Scotia as "British Empire Steel Corporation," the President, Mr. Roy M. Wolvin, states: "Your directors are carefully considering the proposals, and if they are approved, will submit them for your consideration at a special meeting to be called for the purpose."

The Balance Sheet for 1918 and 1919 compares as follows:

	1919.	1918.
Assets:		
Properties	$79,861,902	$75,509,711
Trustees account	145,752	142,432
Current:		
Inventories	9,490,369	9,314,602
Accounts receivable	6,737,807	5,039,479
Cash	1,674,668	3,603,542
Prepayments	.....	585,812
Interest, etc.	.....	1,715,034
Sale of common stock	1,732,530	.....
Employes' Balances	196,155	.....
Investments	2,222,037	.....
Total current	$22,053,566	$20,258,469
Total assets	$102,645,205	$95,910,612
Liabilities:		
Funded Debt	$20,450,683	$20,830,097
Reserves	2,074,449	2,656,742
Pref. Stock	7,000,000	7,000,000
Do. other companies	8,000,000	8,000,000
Common stock	37,100,000	32,097,700
Special reserves	.....	11,500,000
Common stock	37,100,000	32,097,700
Deferred payments	208,000	234,000
Surplus	8,211,237	7,959,252
*Gen. Reserve	10,000,000	.....

Current:		
Accounts payable	3,881,634	4,827,930
Accruals	230,378	235,925
Bank loans, etc.	4,844,860	. . . . .
Dividends payable	643,966	568,966
Total current	$9,600,837	$5,632,821
Total liabilities	$102,645,205	$95,910,612

* After deducting difference between par and proceeds of 50,000 shares of corporation common stock.

ALBERTA MINERS OBTAIN LARGE WAGE INCREASE

An agreement has been arrived at between the coal operators of Alberta and the representatives of the United Mine Workers of America, whereby a 27 per cent increase will be given to all day men over October scale, to be retroactive to April 1. This increase includes a preliminary 14 per cent increase given last January. The contract men will get 24 cents a ton increase on the war bonus of 92 cents. This is seven per cent more than has been awarded in the United States central competitive field.

The agreement is to be submitted to a vote of the miners.

Our Northern Ontario Letter

THE SILVER MINES.

Great interest has centered during the past week about the trend of quotations for silver, the recent decline in price having apparently been quite contrary to the generally accepted opinion. In view of the calculations of many careful observers having proved to be quite unsound as shown during the past week, there is now a tendency to become reticent over the situation and to abide strictly by the verdict of events and time. Seemingly, however, when quotations during the second week in June declined to 81 cents an ounce and then fluctuated upward above 90 cents, the recession in price may have gone its full course, and steadier quotations may now rule.

Taking into account the amount of cobalt metallics and cobalt oxide produced by the silver mines of Cobalt during the first quarter of 1920, the silver mines of Ontario produced $3,404,774 for the period as compared with $3,369,452 during the corresponding period of 1919, thus showing an increase of $35.322. The quarterly statement just issued by the Ontario Bureau of Mines shows a decline of $198,005 in silver production for the quarter as compared with a year ago, and in that way leaves the impression that the value of the output from the silver mines decline that amount. An analysis of the report, however, brings out the fact of the increase.

It is learned in reliable quarters that the Ontario Bureau will conduct a resurvey of the geology of the Cobalt silver area, and that Cyril W. Knight, Assistant Provincial Geologist, will commence the important work at an early date. The decision appears to be the direct result of representation made by the Temiskaming Mine Managers' Association to Premier Drury, and to the Minister of Mines, Hon. Harry Mills, on the occasion of their visit to Cobalt last fall. This resurvey has long since been regarded as advisable, owing to the large amount of underground work done since the previous report was made, now making it possible to study the geology with greater accuracy and to present a report that will prove of value to the mines.

In order to combat the lower quotations for silver provided they should continue downward, the mines of Cobalt will reduce the amount of low grade ore being treated, and in that way by increasing the number of ounces in the ore handled will produce an equal value per ton as though silver had remained high. This will mean of course, a reduction in tonnage and lessened production at the lower-grade mines. Contrary to the pessimistic views expressed in certain newspapers, the moderate producers will not be placed in peril, while the chief producers are still able to produce at a cost not far under fifty per cent of the gross yield. The standing of the camp is exceptionally strong, even in the light of present low prices for the metal.

Announcement is made that the Mining Corporation of Canada has become interested in the exploration and development of the Flin-Flon property in Northern Manitoba. At the annual meeting of the Mining Corporation, the following directors were elected:— 1st Vice-President; W. R. P. Parker, 2nd Vice-President; G. M. Clark, J. W. Watson, Thomas Plunkett and D'Arcy Weatherbe, directors.

Arrangements are being made to operate the old Colonial Mine, situated in the mineralized silver area of Cobalt, but which has been idle for some years. The Colonial adjoins the O'Brien Mine as well as the Violet property of the La Rose Consolidated. The rock formation consists of keewatin overlying diabase and with numerous veins opened up. Underground work formerly carried on resulted in considerable medium-grade ore being placed in sight. Some high-grade shoots more or less limited in extent were also encountered. A peculiar fact in connection with the property is that repeated bids have been made for it, but have all been refused, and that despite the property lying in idleness it has been regarded as a potential mine and one that may reasonably develop into a steady and important shipper. Tenders are being called for several hundred feet of underground work.

For the first five months of this year, the Nipissing mine has produced $1,837,118, according to regular statements. The report for May, just issued by Hugh Park, manager, to the president and directors shows an output of $335,597 for the 30-day period.

In summarizing the work during May, Mr. Park states:—

"During the month of May the company mined ore of an estimated value of $335,597, allowing 99¼ cents per ounce of silver. Shipments of bullion and residue from Nipissing and custom ores are estimated to have a net value of $405,746.

"Favorable developments were met with at the first and second levels of 63 shaft. Several new veins are being developed and results to date have been satisfactory. In all cases the veins are small but of good assay. The mill rock is of good grade. The distance between levels is 95 feet.

"Stopping operations and general development work at all shafts continue to be favorable during the month.

The usual amount of development is proceeding."

"Burrowite," a new explosive, is being tried out at some of the Cobalt mines, and is stated to have stood up well under careful tests. It is stated that provided sufficient encouragement is offered, arrangements will be made to manufacture Burrowite in the Cobalt district. Not only is the new explosive said to be non-freezing, but to produce less gas than some of the brands now in use.

Encouraging results are reported from the Bonsall property in the Gowganda district where a small mining plant is in operation and where work is being carried on between a depth of 100 and 150 feet. The Bonsall is controlled by Senator M. J. O'Brien, Sir Clifford Sifton and Mr. Glendenning.

Announcement is made to the "Journal" that work has just been resumed on the White Reserve mine in in the Maple Mountain section of the Eelk Lake district. It is stated that work will be concentrated on the new rich vein opened up at surface last Autumn, just prior to being compelled to close through labor shortage.

In various parts of the Elk Lake and Gowganda districts, numerous bush fires are reported and at the time of writing rain is badly needed to prevent an enormous loss of timber, as well as restriction of prospecting activity in some parts of these districts.

Ore and Bullion Shipments

During the week ended June 11th, four Cobalt companies shipped an aggregate of seven cars containing half a million pounds of ore. The Nipissing with four cars was the heaviest shipper as shown in the following summary:—

Shippers	Cars	Pds.
Nipissing	4	348,612
La Rose	1	65,992
Mining Corporation	1	65,070
Dominion Reduction	1	60,000
Totals	7	539,581

Bullion shipments during the week consisted of one quite large consignment from the Mining Corporation, 99 bars containing 100,333 fine ounces being sent out on June 10th.

THE GOLD MINES.

Gold mining in Ontario promises to attain a point actually in excess of silver mining by the end of the current year. The production of gold for the first quarter of 1920 showed an increase of 46 per cent over the corresponding period of 1919, and at a rate of close to a million dollars a month. This exceeds any previous record in the history of mining in the province and seems to offer conclusive proof of the strong physical condition of the mines.

Producing gold mines report a total capacity of 5,485 tons daily. Running at full capacity and recovering an average of $9 a ton, the output would amount to more than $18,000,000 annually. The present rate amounts to about two-thirds capacity, the only barrier to maximum output being the acute shortage of labor. The situation is one of great promise.

On June 16th the Hollinger will disburse a dividend of one per cent.' the amount to be distributed being $246,000. This is the third dividend of like amount to be paid this year.

At a depth of 140 feet on the Porcupine-Keora a vein measuring some ten feet in width has been encountered and, although average assays have not yet been announced, it is understood the vein matter shows quite heavy mineralization. The development is regarded as the future of that part of the Porcupine districts hinges to an important degree on the measure of success achieved at the Keora. Former exploration work with diamond drills indicated the presence of ore at depth, and the present development program has for its object the confirmation of the earlier results.

The Davidson Consolidated is called for tenders to sink a central shaft to a depth of 1,000 feet, which is taken as an indication that the finances required have been subscribed. It is understood the result if work at depth has been more satisfactory than in the levels lying closer to surface.

The annual report of the Dome Mines is favorable. Although the mill did not resume operations until last May, after the shutdown of the previous year, and, therefore, earnings are really only for ten and two months, the recovery amounted to $1,773,374, maintenance expenses of $930,762, leaving net operating earnings of $842,612, to which is added revenues from other sources, chiefly discount and exchange, amounting in all to $109,372, making a total net profit of $951,984. Deductions amounting to $600,170 were made chiefly for depletion of mining claims and properties, $325,190, and plant depreciation and replacement, etc., $234,373, leaving a net surplus for the year of $351,814. The mines improved financial position is seen in the fact that current assets exceed current liabilities by $1,253,025 compared with $488,895 a year ago. Total assets have increased to $5,909,318, compared with $5,002,625.

President J. S. Basche, whose comments are of the briefest character, says, "The company had a satisfactory year, in spite of starting it under the handicap of non-productive operation during the first forty days, and having to start the plant on a small tonnage, and increase gradually. As indicated in the report of the operating management, the mine and plant are in first-class condition to enable operations to be continued at a satisfactory profit, but the success of future operations must, to a great extent, depend upon the amount and efficiency of labor obtainable.

In the Kirkland Lake district, wages are being offered to the scale at Porcupine, Sudbury and Cobalt, the object being to induce men to remain at their jobs as well as to encourage others to enter the camp.

During the first quarter of 1920 the mines of Kirkland Lake produced close on a quarter of a million dollars. These mills were in operation, the Lake Shore, Teck-Hughes and Kirkland Lake. A similar performance is expected for the second quarter, while an increase for the third and fourth quarters may be expected. The reason for this is the fact that it is planned to operate the Tough Oakes mill during the third quarter, while, for the fourth quarter, the new mill of the Wright-Hargreaves is expected to be completed and in operation.

From the West Shiningtree district, conservative mining reports, notably by George R. Rogers of the Wasapika tend to expose various blatant reports which formerly circulated. Mr. Rogers presents an excellent report in which he expresses the belief that he can mine the Wasapika, adopting selective mining methods, at a profit, but makes it clear that the recent reports of sensational finds are misleading. The announcement is receiving favorable comment in mining circles in other parts of Northern Ontario.

WASAPIKA GOLD MINE.

The following statement concerning developments at Wasapika mine has been given out by the president of Wasapika Consolidated Mines, Limited.

"The results obtained in the development of the Wasapika ore deposit by the new company which took over the property a few months ago, has given rise to some stories of sensational nature. It has been reported that ore carrying $200 in gold per ton has been encountered at the second level. The company wishes to advise its shareholders and the public that the results obtained, do not indicate the presence of any considerable body of ore of such high grade.

"The preliminary sampling underground, as at the surface, indicates that the ore deposit carries enough gold to permit profitable mining, but the venture is still in the early speculative stage, which does not permit positive statements concerning its success.

"In order that the significance of the results obtained recently may be understood, it should be stated here that the underground work has indicated that the Wasapika ore deposit is a much bigger one than it appears to be on the surface. There only the footwall portion is exposed. The work at the 100 ft. level showed an additional hanging wall portion which at surface is hidden under a low wet depression. The footwall quartz at the 100 ft. level showed in the crosscut ore carrying about $12 gold per ton. The hanging wall quartz samples showed $3 to $11. The intervening schist carries only $1 or $2 gold per ton.

"The systematic surface sampling of the footwall quartz had indicated the presence of an orebody carrying $8 or $9 per ton. The work at the 100 ft. crosscut gave the hoped for results with regard to the footwall quartz and also disclosed more quartz that may prove an important source of ore. In may prove profitable to mine the whole deposit, including quartz and schist, for a width of 20 ft.; but the present indications are that the low values in the schist will make selective mining preferable.

"The deposit has recently been cut twice at depths between 160 and 204 ft., and ore of similar character exposed. Here again the deposit shows much quartz in addition to the main footwall portion. The preliminary sampling indicates that the values are holding well with depth.

"The management proposes first to open up the footwall portion of the deposit and to begin mining and milling this ore before attempting to explore thoroughly the hanging wall portion. The alternative method of mining the whole deposit at once would give lower costs per ton, but there would be much dilution by the inclusion of lowgrade schist. When development is further advanced and milling tests are possible, the possibilities of this method can also be investigated."
—R.E.H.

MINING CORPORATION'S AFFAIRS

According to the annual report submitted at the annual meeting of the Mining Corporation of Canada held in Toronto on Saturday, June 5th, the profits on the years operations were $908,000 for what was really only ten months, owing to the strike, compared with $925,000 in the previous year. The Mining Corporation is an outgrowth of the old Townsite Mine, to which was subsequently added the Cobalt Lake, City of Cobalt, Cobalt Station Ground, Little Nipissing and Buffalo. It was announced that the Corporation is associated with W. B. Thompson & Co., of New York, on the option of the Flin Flon Mine in northwestern Manitoba. This great copper property is now being explored by the sinking of shafts and doing a number of drifts on the vein, with a view to confirming the diamond drill results which indicated twenty to thirty million tons of copper ore in sight. The option runs until next March, but the development work may justify decisive action before that time. It is estimated that a total capital outlay in connection with the project of $8,000,000 to $10,000,000 would be necessary to bring it to a completed stage. The Mining Corporation since its formation has paid dividends amounting to $5,083,862, exclusive of the current dividend of almost $250,000 soon to be paid. The former Board of Directors and officer were elected as follows: Sir Henry M. Pellatt, C.V.O., President; J. P. Watson, First Vice-President; W. R. P. Parker, Second Vice-President; G. M. Clark, J. G. Watson, Thomas Plunkett, and D'Arcy Weatherbe.

THE SILVER MARKET

By R. E. HORE

The continued weakness of the market for silver is disturbing shareholders of silver mining companies. The metal still commands a high price as compared with that of a few years ago, but the higher cost of production and scarcity of high grade ore necessitates a fairly high price for silver. For some weeks, however, the price has been steadily downward and the recent sharp break has directed much attention to the changed position of the silver producers.

There are doubtless good reasons for the weakness of the silver market; but since the chief consumers are in far away countries, and are dealt with through metal brokers, there are few persons here who can give a very sattisfacory statement concerning the recent drop or the probable future trend of prices. Metal brokers in London and New York could doubtless make some interesting comments on the situation, for they are in closer touch with the consumers than are many silver producers. Some of our silver producers are nevertheless in close touch with the markets and give to the selling of their product such attention that shareholders may have confidence that good judgement, based on experience in other periods of changing prices, will be exercised in selling Canadian silver.

Aside from the fact that high prices for silver mean large profits for the shareholders and permit high wages for the miners, there is under such conditions an opportunity to market ore that in periods of low prices would be useless. Since most of our silver is exported, higher prices for silver mean greater gain for this country generally and it is in the general interest that there should be no return to the pre war prices.

It may be true that Cobalt has seen its best days and is now showing by its declining production that a large part of the higher grade ore has been mined, nevertheless, if high prices can be obtained for silver, Cobalt will be a producing district for many years. It is well to realize that mining is a liquidating process and that long years of operation are not desirable from the operator's standpoint; but limitations as to mining and milling facilities will make even the mining of the relatively small ore deposits at Cobalt a matter of several years yet.

British Columbia Letter

THE METAL MINES.

Stewart, B. C.

The Patracia, Magee, and Montana groups of Mineral Claims, situated on the Marmot River, are to be actively developed during the summer. On the Patricia a 4-foot lead of good ore has been opened, samples from which have given returns from $15 to $35 in gold and as high as $62 in silver.

General R. G. Edwards Leckie, who was prominently identified with the Canadian Expeditionary force, having been on foreign service throughout the war, has resumed practice in British Columbia as a mining engineer. In 1910 General Leckie became interested in the Hercules group of mineral claims, Salmon River district. Some development was done and the Crown grant was obtained to the property. No progress was made in opening the claims during the war. General Leckie, however, has now taken up the task of developing, proving, and if warranted putting the property on a producing basis.

J. D. Craig, an engineer in the employ of the Dominion Government, has left for Portland Canal to take charge of the Canadian party, whose duty it will be to co-operate with United States surveyors in the establishment of a clearer definition of the Canadian Alaskan boundary. Stone cairns on the mountains, bronze monuments and a 20-ft. lane through the forest will mark the boundary by the time the party have finished their season's work. Commenting on his task Mr. Craig said: "The wisdom of marking the boundary some sixteen years ago—a marking which has since become more or less obliterated—is now apparent. As it happens about 90 per cent. of the silver recently discovered has been on the Canadian side. If the survey had been delayed it might have made the settlement of the line more difficult to agree upon." A neutral strip of 60 feet on either side of the boundary is to be preserved, as is the custom on the whole 5,000 miles of Alaskan and U. S. boundary, except where titles to the strip had previously passed out of the Government. Mr. Craig does not think this will mean that the strip will be withheld from mineral development, but that in the case of location of mineral special leases will have to be obtained from Ottawa or Washington.

The Prospectors Association of Stewart, recognizing the value of publicity, have arranged for the assemblage and display of an exhibit of the minerals of the district. It is to be quite comprehensive including specimens from all the well known properties of the Portland Canal region, and should be both interesting through the town.

Alice Arm, B. C.

The snow is rapidly disappearing in this district and the mining industry is becoming quite active. The Dolly Varden mine again is in full operation and ore shipments are being received at tide water. The La Rose property is to be developed further and a force of men has been put to work. The Moose prospect also is to be opened up and the McLennan Silver Mines Ltd., already have started work on the Royal Group adjoining the Dolly Varden. In the course of the last few weeks a great many miners and prospectors have arrived and as the snow recedes prospectors and miners will make their way up both the Kitsault and the Illiance Rivers.

Kamloops, B. C.

It begins to look as though the Stump Lake Mine of the Donohoe Mines Corporation is to be made productive within a short time. Machinery has been ordered for a modern concentrating plant, the foundations of which are now being constructed. The plant it is hoped will be ready for operation in three or four months at the outside. It will have a capacity of 50 tons a day. The ore of the Donohoe mine is principally silver bearing but carries besides gold, lead and copper, the metal content varying from $20 to $600. The property recently was inspected by William J. Shedwick, Jr. of the Kennecot Copper Corporation and Lewis A. Levensaler and Francis N. Myers, all of whom are mining engineers.

Nelson, B. C.

The Nelson Mining and Development Company, which is interested in a number of properties, in the Lardeau and Sandon districts, is preparing for considerable development work. The Whitewater and Comstock groups on Cascade Creek, Lardeau, are to be opened up and, to facilitate this, the construction of a nine-mile wagon road is planned. On the Comstock leases there is a good mill site and the erection of a mill is being considered. Some good silver lead showings have been uncovered on the Zincton property near Sandon and, in addition to high grade ore, a considerable quantity of good milling ore has been exposed. Clarence A. Marsh, Secretary of the Company, headquarters Nelson, B. C. also is interested in the Gold Cure mine, situated on the South Fork of Kaslo, and it is his intention to start development here immediately. Ore carrying high silver and lead values already is in evidence and, if the results of further work are satisfactory, the idea is to install a concentration and flotation plant having a capacity of 50 tons a day.

Development work carried on at the Mountain Chief Copper mine, Renata, Arrow Lakes, has demonstrated that the ore body has a depth of 68 feet below the original shaft. There is practically no change in the character of the ore, bornite and Chalcopyrite. It is the intention to explore further along whichever section of the vein appears most attractive.

Trail, B. C.

Receipts at the Trail Smelter of the Consolidated Mining and Smelter Company of Canada for the week ending May 31st were 6,832 tons, of which 67 were concentrates. One of the noteworthy independent shippers was the Bluebell of Riondell, which contributed 180 tons, this indicating that this mine, for a time inactive because of lack of water required for the operation of the mine plant, has resumed operation. Other shippers apart from the Company's properties were Electric Point, Boundary, Washington, 196 tons; Florence, Princess Creek, 67 tons; Josie, Rossland, 170 tons; North Star, Kimberley 181 tons; No. 1 Mine, Ainsworth 127 tons; and the Tom O' Shanter, Riondell 56 tons. The Sullivan Mine, Kimberley, evidently is getting back into its normal gait, having shipped 5,367 tons of zinc ore and 296 tons of lead ore during the week. The total amount of ore to be received at the Smelter up to the present this year is 110,928 tons.

Ymir, B. C.

The Texas-Yankee-Girl mine at Ymir, recently taken over by the Mining Corporation of Canada, is being systematically explored and developed in accordance with plans laid down by A. W. Newbury, one of the Company's engineers. A force of about forty men is engaged and it is expected it will take six months of this work to obtain the information necessary to determine the Company's future plans.

While dealing with this phase of the operations of the Mining Corporation of Canada in British Columbia, it is interesting to note that that concern has previously tried out a number of Provincial mining properties. One of the first of these was the Lode Gold proposition of Prosperine Mountain near Barkerville, upon which a considerable sum of money was spent without obtaining results considered sufficiently satisfactory to warrant the installation of the necessary plant for the handling and treatment of the quartz. In the Bridge River section options were taken on several small gold mines but as far as can be gathered these too after the investment of some money and development were allowed to drop.

Vancouver, B. C.

The retirement of F. M. Sylvester, for years managing director in British Columbia of the Granby Mining and Smelting Co., and the appointment as his successor with the title of General Manager of H. S. Munroe, of New York, has caused somewhat of a stir in provincial mining circles and has given rise to speculaton as to whether the changes presage material revision of the Company's operation policy in western Canada. About all that is known regarding Mr. Munroe's intentions is that he proposes making his headquarters at Anyox, which means that the Company's business in this Province will be curtailed there rather than at Vancouver as in the past. Regret is expressed by the press and in many quarters that Mr. Sylvester should be severing his business relations with the Company, it being pointed out that he has been at the helm during a period marked by much notable achievement and expansion. It was under his direction that the Company took up, developed, and installed an exceptionally modern colliery on coal lands of Vancouver Island. He also saw the installation at Anyox of the first by-product cooking ovens of the Canadian West. In this connection it is said that the Island coal has not proved the success in coking that was expected, the ash content being, in the case of some shipments at least, rather embarrasing. In confirmation of this it is known that coal now is being received at the Anyox plant from eastern British Columbia properties and, as far as experiments with it have been able thus far to determine, promises to give satisfaction.

Victoria, B. C.

According to well authenticated reports Alder Island, one of the smaller members of the Queen Charlotte Group, consists of one large deposit of metallic arsenic. The two or three claims staked over the entire island and samples taken indiscriminately gives returns running from 18 per cent. to 24 per cent. arsenic while the locator states that it is possible to obtain specimens of almost pure mineral. This is interesting because it appears to be the first such deposit of which there is record in British Columbia although for years arsenic has been produced as a by-product from the arsenic-pyrite ores of the Hedley Gold Mining Company.

Grand Forks.

It is announced that the diamond drilling to be undertaken by the Provincial Government in the Franklin Mining Camp will be initiated on the Gloucester group of mineral claims. Drilling equipment has been installed and the work will commence in a few days. These operations are to be carried on under the supervision of T. B. Freeland, Government mining engineer. It is likely that other properties in this locality will receive similar attention.

At a recent meeting of the Mining Bureau of the Vancouver Board of Trade a number of important resolutions were passed. One recommends that the administration of coal and petroleum lands should be transferred from the Lands to the Department of Mines. Another deprecated the action of the Provincial Legislature in placing a reserve on coal lands in the Province. A third proposes the discouragement of the export of certain classes of mineral in order that their refinement within British Columbia might be brought about.

Cowichan, B. C.

The development of the Manganese Deposits of Hill 60, Vancouver Island, is proceeding apace. As work progresses it becomes apparent that a large tonnage is available. Operations have started almost at the summit of the hill and exploration indicates that the ore body extends down for a considerable distance. The aerial tramway, which has been in course of construction for some weeks, is now practically ready for service.

THE COLLIERIES.

Almost coincident with the announcement of the retirement of F. M. Sylvester as Managing Director in British Columbia of the Granby Mining & Smelting Co., and the appointment as General Manager of H. S. Munroe, of New York, comes word from Prince Rupert that shipments of coking coal are being received by the company at Anyox from eastern British Columbia This coal is being tried in the company's by-product ovens, and it is said to be giving satisfaction. It is reported that some of the coal shipped from the Cassidy Collieries, Vancouver Island, has not been the success expected for coking purposes, and that it is proposed trying some from other fields.

An analysis of the latest figures available relative to the coal production of British Columbia shows that, while the output of the mines of the Crow's Nest Pass Field is increasing, that of Vancouver Island Collieries is declining slightly, although not sufficiently for serious comment. This is taken to prove that, notwithstanding general predictions that the shortage of fuel oil would increase the demand for coal, there has been no such result evident up to the present. However, the collieries of Vancouver Island anticipate that the present difficulty in securing adequate supplies of oil will affect their bunker trade. The reports of freight, and passenger vessels being re-converted into coal burners, and of many of those under construc-

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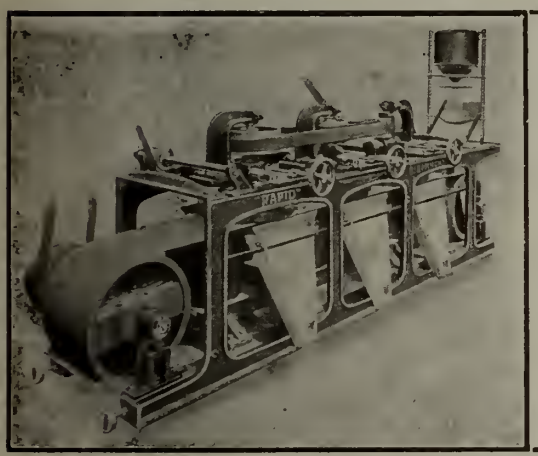

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tion being designed for the use of the latter fuel, are known to be authentic and it is felt that there will be, consequently, an increase in business shortly. Meanwhile the domestic demands have fallen off somewhat and production, as far as the coast mines are concerned, is about stationary. Production in the Crow's Nest Field, on the other hand, is climbing, a good market being found in supplying the Great Northern Ry. Co., by which concern it is used in pulverized form in the operation of the railroad. The greater proportion of the Corbin coal is shipped to Spokane, Wash., a comparative small quantity being taken by the C.P.R. A recent development, the results of which may be of importance, is the shipping of four cars of coal to Winnipeg, Manitoba, by the Crow's Nest Pass Coal Co. This is explained as an emergency shipment arranged for to meet the shortage caused by the lack of coal usually obtained from the United States. It is an indication, however, that Eastern British Columbia and the Province of Alberta may be called on to meet the requirements of the Canadian Middle West to a greater extent in the future than in the past. Coke production in the Crow's Nest still is far below what it once was, the ovens at Fernie being idle and only some of those of Michel in use, the product of which is absorbed by the Canadian Consolidated Mining & Smelting Co., for the Trail Smelter. The coal output for the month of April in the Crow's Nest and Nicola Fields follows:

Crow's Nest Pass.

	Tons.
Crow's Nest Pass Coal Co., Coal Creek	37,931
Do., Michel	21,529
Corbin Coal & Coke Co., Corbin	17,713
Total	77,173

Nicola-Princeton.

Middlesboro Collieries	6,220
Fleming Coal Co.	2,352
Princeton Coal & Coke Co.	1,267
Total	9,839

The production of Vancouver Island Collieries for the month of May follows:

Vancouver Island.

	Tons.
Canadian Western Fuel Co.	52,193
Canadian Collieries (D) Ltd., Comox	29,169
Do., South Wellington	6,889
Do., Extension	14,175
Pacific Coast Coal Co.	7,793
Nanoose-Wellington Coal Co.	2,251
Granby Mining & Smelting Co., Cassidy	15,107
Total.	127,577

It is possible that the explanation of the action of the Crow's Nest Pass Coal Co.'s shipment to Winnipeg lies in the recent issuance in eastern Canada of a warning circular for the guidance of manufacturers which pointed out that the coal year, starting April 1st, started out with practically no coal reserves, a condition without parallel in the history of the continent, and advising those users within the area of distribution of the coal fields of the maritime provinces and of Alberta and British Columbia to obtain their supplies locally, thus avoiding the overloading of transportation.

The head office of the Crow's Nest Pass Coal Co., as well as that of two subsidiary companies, the Crow's Nest Pass Electric Light & Power Co., Ltd., and the Morrissey Fernie and Michel Ry., has been transferred from Toronto to Fernie, B.C. W. R. Wilson, General Manager of the company, has been elected to the presidency vice the late Elias Rogers, and A. Klauer, chief accountant for a long term, has been made treasurer.

At the annual meeting of the Rocky Mountain Branch of the Canadian Mining Institute, which was held at Fernie on May 27th, an instructive paper was read by Robert Strachan, Inspector of Mines, on the coalfields of the Crow's Nest Pass. He told of operations from the year 1873 to the present, dwelt on the abnormalities of the formation, and explained some of the methods most useful in overcoming the difficulties and the dangers of extracting coal. W. P. Williams, president of this Branch of the Institute, presided, and Dr. McDonald, Inspector of Mines, Calgary, acted as secretary. There was an address of welcome by Mayor Henderson, of Fernie, B.C., and a speech was delivered by A. I. Fisher, member of the Legislative Assembly, who expressed the opinion that because of the precautionary measures introduced by the Department of Mines, the experiences of the past, always involving interruption of work and loss of production and sometimes causing loss of life, had not been repeated of late. However, the government officials welcomed suggestions, particularly from a practical man, and he recommended that Mr. Strachan's paper be submitted to the Department of Mines. W. R. Wilson, General Manager of the Crow's Nest Pass Coal Co., entertained the delegates at luncheon. Subsequently the mines were inspected.

The Canadian Western Fuel Co.'s (Nanaimo) First Aid and Mine Rescue Assn., held their third annual competition recently for the company's shield. This is confined to novice or first year men and the high grade of the work performed was gratifying both to judges and the discriminating spectators. The winning team for 1920 was as follows: David Simpson (Captain) and Chas. Nicholls, William Thorpe, Robt. Humphries, and Jack Carnelly.

Announcement was made in Vancouver, B.C., of another increase in the retail price of coal This advance took effect on the 1st of June. It amounts to 50c a ton, which means that lump coal now is selling for $14 a ton. The Vancouver Coal Dealers' Association assert that the cause of the rise is the increased cost of doing business.

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EDITORIAL

Coal Production in N. S.—Its Bearing on Canada's Fuel Problem

THE coal production of Nova Scotia has recently come into much prominence, and during the month of June a number of significant happenings have been recorded in the newspapers that have brought this long suffering industry to public attention.

A debate took place in the Commons on the general question of national coal supply, which elicited the information that the Government were keeping in close touch with conditions, but left the impression that our parliamentary leaders still look upon the United States as the sheet anchor of coal supply and possess small faith in our domestic resources. In the Senate, the Hon. Smeaton White brought the coal situation before the Government, and brought out the further intimation that the Government would shortly introduce legislation to control the disposal of coal mined in Canada, and that a sub-Committee of the Cabinet, consisting of the Minister of Railways and the Minister of Labor had been appointed to enquire into the whole question of Canada's coal supply "**for the coming season.**" The inability of our national leaders to grasp the great importance of the fuel situation is evidenced by the limitation of the enquiry the Government propose. It provides a firsthand illustration of the hand-to-mouth manner in which our national fuel supply has been dealt with, and the partial view that has been taken upon every successive recrudescence of a question that will persist to the end of time, and will affect the national aims and evolution of Canada as no other question does or will do.

We have studied the coal question in Canada for many years, and the conclusion has been forced upon us that **Canada can not persist as a separate political entity in North America unless Canada becomes self-sustaining as to bituminous coal supply.** If any person can point out a way of escape from this conclusion we shall be extremely glad to hear of it. The conclusion is an uncomfortable one, but it is one that should be faced, and **must be faced** if Canada is to pursue in future years that orderly procession of national growth to which every patriotic citizen looks forward.

THE crisis in fuel supply has not come unheralded. Year after year in the columns of the "Canadian Mining Journal" its approach has been forecasted. We trust that our readers will forgive the full quotation that is elsewhere given in this issue of a review of the coal production of Nova Scotia during 1918, reiterating similar statements made in 1917 and 1916. A recapitulation of the conditions attendant upon coal production in Nova Scotia at this time would necessitate identical statements, merely emphasised by their greater seriousness and wider application.

The present inadequacy of coal production in Nova Scotia arises from conditions that were categorically listed in 1916, the year when the output capacity of the collieries in Nova Scotia reached the recorded maximum of tonnage. Almost four years have passed since 1916, and in every succeeding winter a so-called "crisis" in fuel supply has taken place, with temporary excitement and temporary remedies having temporary results. The "crisis" of the coming winter may be greater or less according as Nature is kind, and in proportion to the number and extent of railway labor troubles, but Canada's trouble consists in a chronic fuel insufficiency, arising from neglect to develop the coal seams of Nova Scotia as a source of domestic supply.

THE fuel problem has been studied by various bodies and excellent reports have been made thereon, but there has been no concentration of aim or continuity of purpose in our national fuel policy. Perhaps this is because the problem has not been conceived as a national one, in which private enterprise and occasional departmental enquiry can play only a limited part. The Commission of Conservation has done good work in giving publicity to various phases of the question. The meaning of the term "conservation" has been defined by the Commission as applying to the efficient utilization of natural resources, which is a very happy definition in regard to coal supply. The work of the Commision is definitely limited by its lack of executive powers, and it can do nothing more than point out what should be done. The enquiry of the Manufacturers' Association will doubtless bear good fruit, but it can not be implemented by

the vigorous action that the problem demands. The work of the Advisory Council is of the utmost value, but the fullest utilization of carbonized lignites and peat can never amount to more than a palliation of the chronic inadequacy of domestic bituminous coal production in Canada east of Alberta. The functions of the Mines Department consist in assisting the mining industry of Canada in obtaining and recording scientific and statistical observations, but as the Department works upon a limited appropriation, and does not possess executive powers, it cannot direct the actual development of minerals. The functions of temporary government appointees such as the Fuel Controller and the Director of Coal Operations in the West arise out of temporary emergencies connected with war times and with the evolution of organized labor policies during a time of disturbed social conditions, and such government oversight will presumably disappear when the originating causes pass away.

WE would suggest, for the consideration of the Government, the creation of a permanent body charged with oversight of the fuel suppy of Canada. This body should either be vested with executive powers, or its recommendations should be made the basis of legislation by the usual processes. The suggestion which is here made of what would practically amount to a Ministry of Fuel Supply is admittedly novel, and possibly has no peace-time precedent, but it is submitted in support of the suggestion that Canada's fuel problem has no precedent.

We do not believe that there is any question in Canada that approaches in gravity, or in its bearing on national life, the problem of a fuel supply within our frontiers. Put in another phrasing, the development of our coal resources is necessary to Canada's continuance as a nation, either within the British Empire or without that confederation of nations. We do not state that a development of the coal beds of Canada is essential to the wealth, the personal safety, or the culture of the population of that territorial entity known as Canada, because it is quite possible that all these things may be equally secured by those who may reside in that territory in the future should one political government only remain in North America. Our descendants cannot resist absorption into the United States at some future time if we rely on the United States for coal supply in preference to mining coal at home. No modern nation can persist that does not possess its own bituminous coal supply, except, as in the case of some small European nations, by the consent and the opposed national policies of surrounding nations—in other words, on sufferance. The non-development of our coal resources is precisely equivalent to our non-possession of such resources, and will have precisely the same consequences.

The functions of a Fuel Ministry would be, in certain respects, identical with the functions of a Committee of National Defence.

IN the recent parliamentary debate the Government was able to produce figures showing that it had been able to maintain importations of United States coal at as high a rate as in the corresponding period of last year, but no mention was made of any policy leading to an increase in Canadian coal production, and it is this implied resignation to a position of dependence in coal supply that is so discouraging to those who know that Canada can become self-supporting, if she wills to be so.

The road to fuel independence is not a royal one in Canada. Increase in coal production is only possible by large expenditures in development and by a large increase in the numbers of the coal-mining population. These things take time and thought, and what is planned today cannot bear fruit for years, and may be for decades. As an instance of popular misconception, a statement recently went the round of the newspapers that the Dominion Coal Company had "ordered" the immediate increase of its output to 20,000 tons daily. As bearing on this, it may be recollected that at a recent meeting of the Dominion Steel Corporation the President referred to the retarded development of the collieries and mentioned the shrinkage in output capacity occasioned by the lack of development expenditures during the war period. Deferred mine development can never be overtaken. Similarly, it is never possible to obtain emergency supplies from coal deposits unless the mines are at all times maintained in a position to put out coal. If Canada can only produce 13,000,000 tons of bituminous coal annually from her mines, there is no comfort in the thought that we own the second largest coal reserves in the world. All we can call our own; all the coal that is of any use to this country is 13,000,000 tons annually. We could use 30,000,000 tons annually. The United States is actually producing 700,000,000 tons annually.

WE admit that at the present time it is cheaper and easier to buy coal from the United States than it is to mine it and transport it to market in Canada. Canada's fuel difficulty is a consequence of her separate national existence in North America. If Canada desires to continue as an independent political entity in North America she must accept the fuel problem and overcome it. It is not possible to have one's cake and eat it too.

LIGHT RAILWAY FOR GOWGANDA.

The company which has undertaken to build a light railway into the Gowganda silver mining district is now selling bonds to finance the enterprise and it is expected that the railway will soon be built.

The great nickel-copper industry of the Sudbury district has grown from the discovery of ore during construction of the Canadian Pacific Railway and the silver mining industry of Cobalt dates from the

discovery of silver during the construction of the Temiskaming and Northern Ontario railway. In both cases railway transportation was available as soon as there was ore to ship.

There are great advantages in being located close to the railroad and those who endeavor to make mines in any other location find the burden of road construction a hard one. Too often the lack of vigor in attacking the transportation problem results in failure to develop promising mineral deposits in Ontario. A property lying a few miles away from a railroad is often considered as inaccessible. The building of light railroads and waggon roads to serve such mining districts would result in greatly increased development of the mineral resources.

It is to be hoped therefore that the men who are enterprising enough to build a light railroad to Gowganda will be well rewarded for their effort and that the success of their venture will lead to more ambitious plans for the opening up of Ontario's hinterland. Then we will have more intensive prospecting in areas that are at present ignored because of distance from the few railways that cross the country. The Government railways will be benefited by the business that will come from new mining districts reached by waggon roads and light railways. It is in the general interest that such feeders to the trunk lines be constructed.

Conditions Attending the Mining of Coal in Nova Scotia

By The EDITOR

"The situation of the coal industry in Nova Scotia at the close of 1918 is similar to that at the end of 1917, but very much worse, and a description of the state of affairs today would necessitate practically a repetition of the statements made in the New Year Edition of The Morning Chronicle a year ago.

> 'The reduction of the production of coal 'in the years 1914, 1915 and 1916, and the inevi 'tably still greater reduction in 1917, is a mat- 'ter of very serious moment from any angle at 'which it may be viewed.'

Last year this statement was quoted, with the further remark that 'the complete certainty of a still further reduction in 1918 only adds greater emphasis to this 'statement.'

Unfortunately the writer's forecast of 1918 production—and he has been accused of pessimism—was too optimistic. A production for 1918 was forecast about 5,400,000 tons, but the actual figures for this year will not exceed 5,175,000 tons.

It is also unfortunately only too certain that the production of the year 1919 cannot materially exceed that of 1918, but the trade outlook is too uncertain to warrant any definite forecast of production.

In commenting on the production shown by the 1917 figures, the presence of an even more serious feature, namely, "the probability of a 'continuance of the di- 'minished rate of coal production for a number of years 'to come, and this from causes not dependent on the 'length, or the outcome of the war" was forecasted.'

Some of the causes for this opinion may be mentioned. Certain of these causes were operating before the war, as was pointed out in 1916; others are the result of the war during its continuance, and others again are now coming into operation as the combined result of pre-war tendencies and causes originating in the war and its aftermath.

Causes operating before the war were the coming exhaustion of many of the collieries then in operation, a number of which have in the meantime been abandoned; and the steadily increasing physical difficulties attending the extraction of coal because of the practical exhaustion of the land areas and the larger percentage of coal that must be mined from submarine areas to maintain the rate of output.

Another pre-war cause was the low selling price obtainable for coal, assisted by an incomplete apprehension among the operators of the ultimate and true cost of producing coal over a long period of years. The long continuance of low selling prices had before the war reduced the coal companies to a state of financial embarrassment that but for the stimulus of the war would have in the meantime forced them into liquidation, that is, such of them as were not already in that condition.

Comparison of Output

The production of the larger companies compare with the year before the war as follows:

	1913	1917	1918	1919	1920 Estimated
Dominion Coal Company	5,120,573	3,916,548	3,639,312	3,481,079	3,600,000
Nova Scotia Steel Company	813,877	577,171	502,018	550,965	575,000
Acadia Coal Company	539,121	398,507	277,526	407,326	500,000
Intercolonial Coal Company	189,550	179,700	176,814	185,417	180,000
Inverness Coal and Ry Co	293,847	202,719	204,495	139,200	
Maritime Coal and Ry. Co.	155,051	200,000	180,000		545,000
Other operators	151,466	192,355	233,095	396,013	
Total	7,263,485	5,667,000	5,213,260	5,160,000	5,400,000
Percentage of production from Cape Breton Island	81½ p.c.	78 p.c.	77½ p.c.	75½ p.c.	73 p.c.
Reduction from the basis of 1913		23 p.c.	28 p.c.	29 p.c.	25 p.c.

During the war period the production has declined in a manner that can be understood from the following tabular comparison of outputs:

Output of Nova Scotia Collieries. (Long tons).

1913—7,263,485
1914—6,500,031
1916—6,171,424
1917—5,667,000
1918—5,213,260
1919—5,160,000
1920—5,400,000 (Est.)

It is well understood that the reduction in outputs during the war period is due to enlistments in the army, and no useful purpose is to be served by discussing this phase of the matter. The producing capacity of the collieries might be restored so far as workmen employed is concerned, by returning to the collieries the men who left in the same proportions in which they were taken, but this is hardly possible, because there is a permanent loss of miners due to losses during the war, and to the fact that only a proportion of the men who went away will return to work at the collieries.

Composition of working Forces.

The working forces at the collieries today contain a larger proportion —a much larger proportion—of auxiliary or non-producing workmen than is necessary The composition of the working forces at the collieries is in fact so inefficient and uneconomical that it cannot continue.

The truth is that there are more men employed in transporting and handling the coal to-day than were employed when the maximum outputs of 1913 were being obtained but the number of actual producers has been reduced by -half. As the writer stated last year it is not implied that a smaller number of auxiliary workers could handle the outputs now being produced, but it is certain that the same number of men could handle twice as much coal as they are now doing.

Capacities of Collieries Reduced

The lack of capital during the first two years of the war, accompanied during the last two years by a shortage of workmen and inability to obtain deliveries of machinery and structural material, has resulted in reducing the capacity of the collieries for output, so that, no matter how large the number of men that could be obtained for work in the collieries, the production cannot be increased materially until the production of the advance work underground is made possible by several years work.

The combination of reduced outputs, increased rates of wages and material costs, inefficient working organizations and increased transportation costs and increased physical difficulties of extraction have brought the costs of production to an unremunerative point, and to a point that makes competition with American coal impossible. At the present time, and for some years, no Nova Scotian coal to speak of has gone to the Montreal market, but before the war two million tons per annum were sent there, and presumably this market must once more be looked to by coal operators in this Province.

Increased Cost of Production.

While there is a certain abnormality in the local coal situation which will gradually disappear as world affairs swing into into the old accustomed channels, yet there are certain features which will affect the coal trade here either permanently, or over a long period to come. A permanently increased cost of production has been brought about by the increased physical difficulties of mining, by altered standards of labor return for money expended in wages, by increased costs of material, on which similar influences have been exerted to those that have gone to increase the price of coal production; by increased taxation imposts, and by recently enacted laws such as the Workmen's Compensation Act and the weekly pay. No comment is here indicated on the advisability of these laws. They may be very advisable, and the trend of political thought should prepare us for even more radical legislation along these lines, but it is sufficient for the present argument that they have directly increased the cost of coal production.

Added to and accompanying this factor of increased costs of production, is the lessened capacity of the mines for output, a condition that must persist until peace has restored the years that the war has eaten.

There is also the permanent loss of mining population occasioned by the heavy enlistments of miners. This is without doubt a permanent factor, and one which will have to be reckoned with, as the drain of enlistment was concentrated on a selected class from a selected employment. The importation of workmen from Europe will be necessary to supply the labor shortage when the present slack and hesitancy in business has passed away and the essential soundness of Canada's future is revealed once more, but foreign importations cannot make up for the loss of the native Nova Scotian miner, who is a disappearing asset of this Province.

The summation of the foregoing factors do not permit optimism regarding the future of the coal industry in Nova Scotia."

(Re-published, with the addition of the figures of production since recorded, from the Halifax "Morning Chronicle" of January 1st., 1919.)

The deterrents to production above enumerated are not altered in kind, but they are more definite and permanent than when the foregoing was written. There is at this time at the collieries a shortage of production labor, and a surplus of non-productive labor, labor that insofar as it is surplus is also useless. The output capacity of the collieries is reduced, and its restoration will take years to effect. Permanent reduction in the resident mining population has taken place. This loss can only be made good by immigration. Increased cost of production and decreased hours of labor are also permanent factors, likely to increase in severity.

The conditions are of a nature that will not ameliorate under a waiting policy, but require drastic remedies. Some of the measures that would offset the small production and increased cost of coal—to a large extent cause and effect—are a reduction of the non-productive labor employed, large recruitment of productive labor, the adoption of double or treble shifts, and the immediate expenditure of money and labor on the development of new mine openings.

No single factor of development can have such an increasing effect on production as the unified management of the Sydney coalfield properties which will be possible if and when the consolidation of the companies takes place that is proposed under the charter of British Empire Steel Corporation. Upon the consummation of this event it will be possible to immediately enlarge the area of working faces tributary to collieries that are now circumscribed by lease lines

preventing further advance of the working places. The output of a number of collieries could under such conditions be much enlarged without important expenditure, and without necessitating the employment of additional non-productive labor. The coal which can be produced by working faces now idle can be handled by the men now necessary to deal with a very much smaller output of coal.

The proposed consolidation could not be undertaken at a more opportune moment in regard to the future development and the planning of new collieries. If this opportunity to plan out the future winnings of the Sydney Coalfield is taken it will enable a thing to be done that has always been eminently desirable but never previously possible, namely, the conception of the Sydney field as one continuous deposit, and the laying of plans for its development to serve one individual interest. The possibilities for simplification of the engineering problems, for economies in haulage, ventilation, pumping and generation and transmission of motive power; for the proper rotational working of the superimposed coal seams; for the adoption of improved technical methods, for comprehensive vision and resulting efficiency, are as immense as they are fascinating. Always provided that the direction is competent, the opportunity is unique, and if it is taken, the results will justify the dreams of those who have visualised the Sydney Coalfield as one that can only give its maximum yield under single management.

THE RE-OPENING OF SILVER ISLET MINE

J. J. O'Connor

The Silver Islet Syndicate are meeting with gratifying results in their explorations underground, in this famous old mine. The unwatering operation is proceeding at an easy pace, the level being kept just below the samplers, who are now sampling the upper levels and slopes. One hundred samples were dispatched to Haileybury on the 14th inst for analysis.

The airlift discharges one thousand gallons of water per minute. It is in striking contrast to the old Cornish pump, formerly in use, and still in position, that only had a capacity of about fifty gallons per minute, but yet, had no difficulty in keeping the mine dry. The power required for the air-lift, is scarcely one quarter of that used in operating the old pump.

Superintendent Greener announced today, that they had encountered a body of high-grade ore, 25 ft. in length, and from 18 to 27 inches in thickness, varying in values from 1,000 to 2,000 ounces per ton, about halfway down to the first level (approximately 35 feet below the surface) in the roof.

The Syndicate is to be congratulated on having its faith confirmed, at such an early date in its operations, and it is hoped that its enterprise will meet with the reward it deserves. It again suggests the old question: Will Silver Islet come back?, Will it again take its old place as one of the leading silver producers in this Province? It is sincerely hoped that it may, and that its whistle, which blew a few days ago, for the first time in 36 years, may long continue to echo along the frowning shore line.

The Hon. Harry Mills, Minister of Mines, had the honor of starting the engine, when the present operations were begun. Captain James Cross, a veteran of over 50 years at this mine, hoisted the flag that was flown on the beginning of mining operations, by the Silver Islet Consolidated Mining Company, in 1870. The ore discovered is "macfarlanite" and is peculiar to Silver Islet.

BOOK REVIEW.

MANUAL FOR THE OIL AND GAS INDUSTRY, by Ralph Arnold, J. L. Darnell and others. John Wiley and Sons, New York.

This book has been compiled for the purpose of assisting the taxpayer of the oil and gas industry in preparing his Federal tax returns. It is consequently of comparatively little interest to Canadians, but those in the oil and gas industry will find in it much useful information for there is dealt within the book matters that vitally affect all companies here as well as in the United States. Part II of the volume deals with depreciation. Part III consists of descriptions of methods of estimating underground oil resources. The data given are based on a systematic study of thousands of production records by the Bureau of Mines.

NEW MAP OF THE RICE LAKE MINING DISTRICT MANITOBA.

The "Journal is in receipt of two sample maps of the Rice Lake District of Manitoba, one printed on thin paper and the other printed on stout paper, issued by the Topographical Surveys Branch of the Department of the Interior. We are advised by Mr. E. Deville, the Surveyor-General that this map shows all the surveys in the district and will be sold by the Branch at a nominal price. The map is on a scale of one mile to the inch, showing the Manigotan River and its lakes, Rice Lake and the Wanipigow Lake and river. The recorded claims are plotted and the map contains a schedule showing all the surveyed claims, giving location and lot number. An inset to the map shows the relation of the Rice Lake District to the province of Manitoba. The publication of this map will fill a public demand, and the Topographical Surveys Branch is to be congratulated on its opportune appearance.

TORONTO NOTES.

The directors of Ontario Kirkland Mines were in Toronto on Saturday last on their way back to Philadelphia, after having attended the annual meeting at the camp last week. It was decided to commence at once the erection of a mill and ground will be broken for a mill of one hundred-ton capacity.

A circular has been issued by the Teck-Hughes Mine in which it is intimated that some scheme may be arranged to reorganize the company and by increasing the authorized capital to effectually cope with the financial situation which has arisen, and which made it impossible to meet the payment of bonds which fall due to October. The mine is understood to be now on a profitable producing basis and that by the financial adjustments now in progress the affairs of the company may be worked into a sounder basis.

Mr. G. F. Hendricks, representing the firm of J. S. Rose of New York city, dealers in Industrial Diamonds for Mining Drills and diamond pointed tools, has opened a Canadian office in Toronto in the Page Building. The firm is sales agents for L. M. Van Moppes and Sons and J. K. Gullard, Ltd., of London, Eng., two of the largest dealers in this line in the world. Mr. Hendricks is well known to the Canadian mining industry, being a mining engineer who has spent considerable time among the mines of Northern Ontario.

An Occurrenee of Tin near the Ontario-Manitoba Boundary

(J. S. DeLURY).

In an article[1] which appeared recently, attention was called to the occurrence of tin in some bodies of sulphide minerals found in the vicinity of West Hawk and Star Lakes near the boundary line between Ontario and Manitoba. Since the writing of that article some additional information has been obtained in regard to these deposits and attention is being called to them again not on account of their commercial possibilities, for the tin is apparently not sufficiently abundant for profitable extraction, but on account of the interesting manner of occurrence and the mineral associations.

The reported occurrences of tin in Canada are few and none of them are of commercial importance. Reports of sulphide tin are exceptional, though it is believed that this form of tin is more common than is generally supposed. The difficulty of detecting small quantities of tin in combination with sulphur suggests that most commercial assays would fail to indicate its presence.

Geology.

The geology of the area in which the stanniferous sulphides occur has been briefly discussed by the writer in some articles,[2] written on the occurrence of which is bounded by the intrusive granite on either side. The schists are largely of the hornblende variety and were derived from basic lavas. Metamorphosed conglomerates and other sediments are also found in the belt. The granite body appears to have been the source of most of the ore-minerals and, at different times during the later stages of cooling, there passed out from it mineral deposits of several forms and materials. There are some deposits in the locality which may not have been derived from the granite. In the list of occurrences which are now to be described, only those which appear to be directly attributable to the granite will be mentioned.

Pegmatite Dikes.

These are found in the schists, generally within a few hundred feet of the contact with granite. Molybdenite is the prominent economic mineral found occurring in the dikes; it is usually in crystals of good size. Masses of crystals have been found weighing twenty pounds or more and some work done since the showings were examined is said to have exposed many masses even larger than these. A careful search for minerals of tin and tungsten was made in the excavations in the pegmatite dikes; but no trace of any of these was found.

Aplite Dikes.

These are other off-shoots from the granite magma.

Neil Martin and Cabin on West Hawk Lake

Cabin on West Hawk Lake where Tin was reduced in Stove. Neil Martin on the right.

molydbenum and tungsten in the same locality and sketch maps were made showing the outcrops of rocks and geographical features, so that here only brief mention will be made of the relations existing between those rock units of the area which are of importance in conection with the ore-minerals. The formations are similar to those described by Lawson as appearing in the Lake of the Woods District and are all of pre-Cambrian age.

A biotite granite, mostly coarse-grained and reddish in appearance, is the youngest rock. It has intruded all the other types of the area. The ore-minerals are found largely in a belt of schistose rocks

They are not large and the molybdenite in them is in small crystals and grains and is very irregularly distributed.

Pegmatitic Quartz-Veins.

Two of these veins have been found. They belong to a transition type between normal pegmatites and quartz-veins. The economic minerals found in thes deposits are gold, bismuth, bismuthinite, molybdenite, arsenopyrite and small amounts of chalcopyrite. This association of minerals is identical with that reported o fthe contents of the Mikado Mine, which lies in the western part of the Lake of the Woods district and only about ten miles southeast of these deposits. There is consequently a strong probability that the Mikado vein and perhaps many of the other quartz veins found on the Lake of the Woods are directly attributable to the intrusion of the same

[1] Transactions, C. M. J. 1919. P. 326.

[2] Can. Min. Journal. Vol. 38. P.460. Can. Min. Journal. Vol. 39 P. 186.

granite that produced the mineralization in the boundary area and which is believed to extend into the Lake of the Woods.

Molybdenite-bearing Quartz-Veins. In some porphyries derived from the granite magma and in adjoining masses of schist are some wide bands occupied by quartz and fractured country rock filled with quartz stringers and carrying fine-grained molybdenite and small amounts of pyrite and chalcopyrite. Channel samples of this material, taken across considerable widths give assays showing a molybdenite content up to one per cent, and values in gold, silver and copper totalling about two dollars to the ton. Very little work has been done on this type of deposit, though considering the possible extent of them and the possibility of finding other and richer bodies of the same nature, it would seem well worth while to investigate the deposits already found and to conduct a search for more.

Scheelite-bearing Deposits. These Seem to have been given off from the granite at a later stage than the deposits which have been already mentioned. Scheelite occurs in altered bands and patches in the hornblende schist in company with epidote, vesuvianite, feldspar and other high-temperature minerals. Small amounts of molybdenite, pyrrhotite, chalcopyrite, sphene and ilmenite are also associated as well as calcite and quartz.

Sulphide-bearing zone in Schist. These zones are numerous and large. They are found chiefly in the vicinity of West Hawk and Star Lakes. The abundant sulphide is pyrrhotite. Pyrite is fairly general in occurrence and in places is abundant. Other minerals found irregularly distributed and in varying though usually small quantity are arsenopyrite, zinc blende, galena, chalcopyrite, scheelite and its high-temperature associates, quartz, calcite and siderite. Low nickel assays have been reported from some of the pyrrhotite. The most interesting feature of these sulphide deposits is the presence of small quantities of tin.

The Occurrence of Tin. Mr. Neil Martin, a prospector who has been in this part of the country since the boom days of the Lake of the Woods district, has for years been roasting samples from these sulphide deposits in his stove and has been obtaining beads of metal from them. Samples of these metals were sent by Mr. Martin to different assayers and tin was reported from some of them. Unfortunately the people whom Mr. Martin informed of this were skeptical and hinted at tin cans, etc., as being the source of the metal. Though samples from the same places as those which furnished the tin were sent to many assayers, no tin was reported. Of the metal samples originally handed to the writer, the first ones examined contained lead or a mixture of lead and zinc, but one was examined which consisted mainly of tin.

An examination of the deposits was then made to ascertain if possible in what mineral the tin is carried. This was difficult, since most of the sulphides are intimately mixed. Many tests were made and of all of them, the original method adopted by Mr. Martin was the most successful. In only one case was a definite mineral found which gave a satisfactory test for tin. This was a sample of what appeared to be chalcopyrite; a good blowpipe test was obtained from this, indicating that the mineral is a member of the isomorphous group between chalcopyrite and stannite. Unfortunately not enough material was left for a complete analysis, but it is hoped that more will be obtained.

Samples from the sulphides lodes were sent to be assayed. Most of the returns showed less than one per cent of tin; a typical set of samples showed 0.18, 0.18, 0.00 and 0.30 per cent of the metal.

Mr. Martin deserves great credit for his persistence and ability in demonstrating the existence of tin and the public who doubted his findings owe him an apology and a deal of praise.

Though a careful search has been made in many of the more promising places, no cassiterite has yet been found in the area.

The Origin of the Sulphide Lodes. The writer has not completed his examination of the sulphide bodies so that the following ideas concerning them must not be regarded as final conclusions, though the evidence is strong that they are correct.

The fact that the molydenite came from the granite is obvious. The association of this mineral with scheelite, bismuth minerals and gold connects the deposits carrying these metals also with the granite. The occurrence of scheelite in the sulphide lodes points to the granite as the source of the sulphides. Finally the presence of tin, so generally associated wtih granites and so commonly found with tungsten and molybdenum, shows beyond much doubt that many of the constituents of the sulphide lodes came from the granite. That the sulphide lodes are subsequent to the granite in their formation is indicated by the fact that a pegmatite dike, apparently an off-shoot from the granite, is seen at one place to be impregnated and partly replaced by sulphides connected with one of the principal deposits.

Origin of Lake of the Woods Gold and Bearing on the Economic Geology of the Vicinity. It has been pointed out that the associations of minerals indicate a similarity in origin between the gold-bearing veins of the Lake of the Woods and the mineral deposits of the district near the Boundary, which have been connected with the intrusion of a particular granite. It would be expected that this same granite would be found in the Lake of the Woods. Lawson's description of the granites of that area leads to the belief that this inference is correct.

There is reason for hope that deposits of tin and of tungsten will be found in the Lake of the Woods area. The wide distribution of molybdenite there adds considerably to the hope. It is more doubtful that commercial deposits will be found. Many of the larger deposits near the boundary appear to be too low-grade and the richer ones are generally too small to be considered. It is to be hoped that some of the bodies already found will prove to have the right combination of size and richness to be workable and that further prospecting in the Lake of the Woods area will bring some more of these interesting deposits to light. The general attitude of apathy and condemnation assumed towards the Lake of the Woods country are not altogether warranted.

It should be added that in view of the association of silver with tin in some valuable sulphide deposits in Bolivia and Tasmania, several samples from the sulphide lodes were assayed by the writer. No silver was found in any of them.

Mr. Stuart A. Marvin, of the firm of Fleming and and Marvin, 1102 C.P.R. Building, Toronto, has formed a partnership with Mr. H. Herbert Scarlett, formerly with Bryant, Isard and Co. The new firm will operate under the old firm name and will conduct a general stock brokerage business, dealing in securities in all markets.

Nova Scotia Notes

Changes in the Official Staff of the Dominion Coal Co. Resignation of Messrs. Tonge and Herd.

Recent changes in the staff of the Dominion Coal Company have involved the resignation of Mr. A. J. Tonge, the General Superintendent of Mines and Mr. Walter Herd, the Mining Engineer of the Company.

Mr. Tonge was appointed Mining Engineer of the Dominion Coal Company in 1912. When Mr. D. H. McDongall was appointed General Manager of the Dominion Steel Corporation and removed his office to Sydney, in 1917, Mr. Tonge was appointed General Superintendent in charge at the collieries. At the Annual Meeting of the Mining Society of Nova Scotia in May,, he was elected to the office of President of the Society. He is also a Councillor of the Canadian Mining Institute. Previously to coming to Canada, Mr. Tonge was General Manager of the Hulton Collieries in Lancashire, England, where he succeeded his father as certificated colliery manager, and was in charge of operations for 29 years. He is a past-President of the Manchester Geological Society. During Mr. Tonge's service with the Dominion Coal Company he has had to deal with several difficult mine fires and explosions, at the Springhill Mines and at No. 12 Colliery in the Lingan district, and he was consulted with regard to the extinction of the mine fire at the Allan Shafts, Stellarton, and the re-opening of this mine. A large number of additions and improvements have been made under Mr. Tonge's directions to the motive-power and mechanical equipment of the Dominion collieries, but latterly, owing to the time occupied by executive duties and the adjustment of labor questions, Mr. Tonge was unable to devote much time to the technical questions of mine operations

MR. WALTER HERD

Mr. Walter Herd had been with the Dominion Coal Company about two years when war broke out, and, on the nomination of the Canadian Mining Institute was given a commission in one of the Tunneling Units. He later transferred to the Canadian Forestry Corps and served throughout the war, during which time he had oversight of large forestry operations, involving heavy money expenditures. Later he was placed in charge of the inspection of timbering of dug-outs and underground excavations with a view to the economy of supporting timber. During this work he saw much of the heavy fighting of the war. Mr. Herd retired as Lt.-Colonel and has the O. B. E.

Since returning from overseas, Mr. Herd has filled the position of Mining Engineer. Previous to the war he had experience in charge of Springhill Mines, where he was the resident Superintendent. He was also for a time in charge of the iron-ore operations of the Dominion Steel Company at Wabana. His previous experience includes management of collieries in Scotland and South Wales.

A paper was read before the Mining Society of Nova Scotia recently by Mr. Herd suggesting the application of hydraulic stowing to the recovery of the pillars in the first lift of the underseas collieries. (See "Journal" of May 14th and 21st, pp. 384 and 412).

It is understood that Mr. Tonge will return to England, and that Mr. Herd will become a directing officer and a partner in a lumbering company that has its headquarters in Halifax, N.S.

No announcements have been made of any appointments in succession to Messrs. Tonge and Herd in connection with the technical direction of the collieries.

The Dominion Coal Company has been singularly fortunate in attracting the services of mining engineers of wide experience and good reputation, but it has been singularly unfortunate in retaining their services. Within the past fifteen years the Dominion Coal Company has had four successive incumbents of the position of general superintendent of mines, or technical director. Each of these men upon leaving the Company's service obtained positions of greater responsibility and enlarged emolument. The conditions which brought about the severance of these engineers from the connection with the Company have been various, but they have had one constant feature, namely, that they were related to questions of executive policy, and were not in any case referable to the technical abilities or the engineering direction of the development of the collieries.

The unfortunate result of the numerous changes has been to deprive the mining operations of the Company of continuity in the technical direction of its mining operations, and of the fruition of the observations of competent engineers when these had ripened through the necessary length of experience. Each new incumbent in office has had to begin his education in local mining matters where his predecessor began, and the Company has lost all the benefits of accumulated observation and all the advantages which come from continuity of policy and definite aims. The lack of continuity in management has adversely affected the ambitions and life studies of the subordinate officers

of this large Company. The number of officials of long service in the Dominion Coal Company is surprisingly large considering the frequency of changes in management and control, but the repeated changes of technical policy that are inseparable from changes in managerial personnel, tend to discourage the intellectual processes of subordinate officials and finally to reduce them to a state of inocuous acquiesence in any and all directions from a superior source.

If changes in control and management of industrial companies are inseparable from modern tendencies—and they seem to be so—it would perhaps be well to adopt the policy that is followed in government departments, where, when political changes occur, the minister changes, but the deputy-minister, who is the technical director and the repository of observed facts and accumulated experience, remains.

The plans for the colliery development of today should have been laid many years ago, and the programme of development for twenty years to come should be prepared today. The technical direction of a large coalfield is best achieved by the scientific mind, the possessor of which is not necessarily the best executive; and to achieve the best results in any scientific field it is requisite that a competent mind should be concentrated over a long period of years, undisturbed by passing events. Only in this way is the ripened vision and the thorough understanding requisite to technical success acquired, and, when the time comes, passed along to others.

A mining company can possess no more valuable asset than an engineer who has grown up with the mining field, has steeped his mind in knowledge of its characteristics, and has had leisure to follow technical problems to their logical conclusion. The evolution of such an officer requires first, the selection of the proper man, and, secondly, his retirement from all ephemeral executive duties, and, thirdly, the concentration of years of thought and investigation on the problems of the field selected for a life's work.

Revival of Former System of District Superintendence.

The division of the colliery into superintendence districts was begun under Mr. G. H. Duggan's management and was continued until a few years ago when through death and resignations the district superintendents were reduced to two in number, namely Messrs. A. McEachern and A. Macdonald who were appointed assistants to the General Superintendent of Mines.

Pursuant to a circular issued by M. H. J. McCann, the Assistant General Manager of the Coal Company the collieries are again divided into districts, but three districts of four, as previously are designated.

No. 1 District, of which A. McEachern is appointed Superintendent, contains the collieries in the central Glace Bay district, namely, Nos. 1, 2 and 9, 5, 10, 11 and 24. In this district is included most of the land area of the Hub, Harbor, Phalen and Emery seams, and the as yet unworked land area of the lower seams. A new shaft is approaching completion between No. 1 and 8 collieries, and the operations in the three upper seams are all submarine. The area of the Phalen seam in No. 5 (Reserve) Colliery is approaching exhaustion and No. 10 and 11 collieries represent the workings on the underlying Emery seam in the Reserve area. No. 24 colliery is the latest opening on the Emery seam, and at some future period another Emery seam colliery will be opened to work the seam where it underlies the exhausted land workings of No. 1 and 2 collieries.

Mr. A. Macdonald is appointed Superintendent of collieries Nos. 4, 6, 21, 22 and 25. No. 4 is Caledonia Colliery, and it is anticipated that a new shaft will be sunk to work the submarine area of Phalen seam coal now being drawn to No. 4 Shaft. No. 6 is a Phalen-seam colliery, entirely submarine with a large tributary area still to be drawn from. Nos. 21 and 22 are mining a tongue-shaped land area of coal in the Morien Basin which proceeds seawards at the village of Morien, where the old Morien Colliery, (successively known as the Gowrie and Blockhouse and North Atlantic Collieries) is being re-opened and designated No. 25 Colliery.

The Collieries in the Lingan-Victoria Basin, (now known as the Waterford District) are Nos. 12, 14, 15, 16 and 17, and are placed under the superintendence of Mr. J. C. Nicholson. In this district several additional groups of collieries are projected upon the Lingan and Victoria seams, and at some future date the underlying seams, of which there are several, will be worked, An overlying seam, the Barrasois, is being tapped from the Victoria seam by cross-measure drifts proceeding from the existing collieries. The Barrasois, Victoria and Lingan seams in the Waterford district are recognised as the equivalents of the Hub, Harbor and Phalen seams in the Glace Bay district, but the correlation of these with the Morien seams is still a matter of conjecture, as is also the correlation of the Waterford Seams with those across the entrance to Sydney Harbor that have been extensively worked at Sydney Mines. Much interest attaches to the progress of the sinking of the deeps in No. 17 Colliery, Victoria Seam, as these are now aproaching the line of the disturbance that runs under Sydney Harbor.

MR. ALEX. McEACHERN

Following the re-arrangement and revival of the district superintendence organization, other promotions have been given effect to. P. T. Prendergast formerly manager of Nos. 2 and 9 collieries is appointed Assistant District Superintendent in No. 1 District. D. J. McCuish is appointed manager of No. 2 Colliery, and W. S. McDonald becomes Assistant Manager. Mr. J. J. McNeil is appointed Manager of No. 9 Colliery, resigning his position as Deputy Inspector of Mine under the Provincial Government. Previously to taking a position on the inspectorate Mr. McNiell was Manager of the same colliery.

Vincent McFadden, who has for many years been the Electrical Engineer of the Dominion Company, and has since Mr. J. S. Whyte resigned the position of Mechanical Engineer to go with the Acadia Coal Company, also acted as Mechanical Engineer, has resigned and is succeeded by Maurice Murphy, Mechanical Superintendent of the Dominion Steel Company. Mr. Murphy has been with the Steel Company since it was commenced and has gradually risen in successive official positions connected with mechanical equipment.

Re-organization of Dominion Coal Police Department.

The police and watchmen employees of the Dominion Steel Corporation, which includes the Dominion Coal Company, are again placed under the direction of Capt. D. A. Noble. This appointment re-establishes a former arrangement. During the war period Capt. Noble was Registra and director of Aliens under the direction of the Ottawa authorities, and the absence of any unpleasantness in connection with large number of registered aliens in the Sydney District was in large measure due to Capt. Noble's careful handling of a delicate combination of circumstances.

MR. ALEX. MACDONALD

The Output Position of the Dominion Coal Company.

The disastrous effect of war upon production of the Dominion Coal Company in the Sydney field is shown by the following comparison of the daily average output of the collieries in the Summer of 1914 as compared with the daily average of production in May 1920. It will be seen that the daily average has been reduced from almost 20,000 tons to about 10,700 tons. The periodic daily maximum, which comes midway between paydays, is at the present time around 12,000 tons, comparing with 21,000 tons in 1914.

Mine Number	Seam	Daily Average Beginning 1914 Tons	Daily Average May 1920 Tons
1	Phalen	2,000	1,070
2	„	3,200	1,930
3	„	400	Exhausted
4	„	1,600	1,120
5	„	700	340
6	„	800	760
7	Hub	800	Closed
8	Harbor	250	Exhausted
9	„	1,600	930
10	Emery	800	410
11	„	400	580
12	Victoria	1,600	600
14	„	1,600	640
15	Lingan	1,000	460
16	„	1,300	490
17	Victoria	200	100
21	Birch Grove	700	500
22	„	600	600
24	Emery	....	120
25	Morien	....	....
		19,550	10,650

It will be seen from the foregoing that the development of No. 17, which was well advanced in 1914, was entirely arrested by the war.

During the war period three collieries were closed and conditions did not permit of replacement by new winnings. No. 24 Colliery is still in the initial stages of production, and No. 25 Colliery (Morien Colliery) is being unwatered preparatory to commencing mining operations.

METAL QUOTATIONS.

Fair prices for ingot metals at Montreal, 23rd June 1920.

	Per lb.—Per cent
Electro copper	24
Castings copper	23½
Zinc	10½
Lead	10
Tin	57
Antimony	11½
Aluminum	37

PERSONAL.

Prof. J. S. DeLury acting head of the Department of Geology, University of Manitoba, will spend several weeks in the Rice Lake gold area this summer for the Manitoba Government.

Sir John Cadman Defends British Oil Policy

An Attitude of Impartiality and Fairness.

Reading an important paper on "The Oil Resources of the British Empire" before the Indian and Colonial sections of the Royal Society of Arts recently, Professor Sir John Cadman, who has for a considerable time been acting as official advisor to the Government as principal permanent official of the Petroleum Executive, said there had been of late in regard to the British Empire and its oil policy some idea that we were attempting to dominate the supplies of this planet. The British Empire consisted of one-fifth of the surveyed land of the globe, and it was only natural that we should in some measure look after our citizens. On the one hand, there were groups of capitalists attempting, and rightly so, to secure concessions in new territories; on the other hand, the results of the great war has brought about a world shortage of oil. That commodity has been used to an extent never before known. As inevitably happened, when there was a shortage, the price had gone up, and there were some people who imagined that this could be corrected by price-limiting machinery. Such regulation, however, would result in focussing the shortage more acutely on those nations which adopted it.

Mesopotamia's Oil.

An outcry had arisen in the United States that Great Britain was attempting to "collar" the world's supply of oil and the people who were trying to secure territories at the moment were centering their activities on Mesopotamia. Now, it had been known for many years that oil existed in Mesopotamia. Indeed, it had been open to every comer, of no matter what nation, to prospect the oil territories of Mesopotamia, and to secure rights of exploitation. But at last Mesopotamia had come under the mandate of a stable Government, and it was wonderful how active people became in attempting to secure opportunities of working a territory when stable Government was going to keep law and order for these people to operate within such area. It was also wonderful that certain interests in America should wake up very readily to the possibilities of oil in those territories and rush into an attack upon those organizations which had tried to look after the supplies under the British flag.

As to the proportions in which oil supplies existed in various countries of the world today, Sir John Cadman said that the continent of North America produced over 85 per cent. of the world's output of crude oil. Of this the United States produced in her own territory nearly 70 per cent. If the quantity produced by the United States in Mexico was added, the total United States control in North America was at least 80 per cent. of the world's supply. The British Empire, however, produced only 2½ per cent. of the world's oil supply, or, if Persia might be said to be under British influence, about 4½ per cent. of the whole.

Future Supplies.

For the invaluable assistance we had received from the United States in the way of oil supplies in war and peace we could not fail to feel profoundly grateful. But the greatest producer of oil to-day was absorbing more and more of her own supply, and it behoved us to look around and see in the most friendly way where we were going to be served when the United States found it difficult to supply us, and we, too, were calling for more and more of this vital product.

Sir John proceeded to combat the statement that Great Britain was developing an oil policy which definitely excluded the foreigner from participating in and helping to develop any of the Empire's 2½ per cent. production to-day. In regard to Persia, the suggestion that Americans were under special disability in that country was absolutely incorrect. As the Anglo-Persian Oil Company held the concession, other British and foreign interests were naturally excluded, but there was no truth in the statement that the Anglo-Persian Oil Company's rights had been in any way strengthened by the Anglo-Persian agreement of 1918. The concession was acquired in 1910 through the individual enterprise of Mr. W. K. d'Arcy, and it was equally open to Americans or any other nations to secure it.

Result of British Enterprise.

Any oil concessions which British subjects held abroad had been acquired purely by individual enterprise, and they enjoyed no special advantage in the way of Government backing, nor did they wait to secure Government encouragement and support. On this difficult question he could only say that Great Britain was too sensible of what she owed to those who had kept her so well supplied in the past to adopt any attitude other than that of strict impartiality and fairness.

Mr. E. G. Pretyman, M.P., who presided, said that personally he rather thongh that, so far as the American oil magnates having any complaint against Great Britain, the boot was on the other foot, and the attitude of our Government and always been rather to leave our nationals, entirely unsupported, to their own resources, whereas other Governments had done their best to look after the interests of those who were trying to use their financial resources for the development of supplies outside of their own borders. His view was that, where private enterprise was acting entirely on its own, unsupported by the Government behind them, we ought not to interfere to give our own nations particular advantage over others, but where other nationals were being supported by their own Government then our nationals should receive similar support from our own Government.

NEW COLLIERY PROPOSED IN THE MORIEN BASIN, SYDNEY COALFIELD.

It is understood that Mr. Vincent Mc Fadden, formerly Electrical and Mechanical Engineer of the Dominion Coal Company, in conjunction with Mr. Cavvichi of Halifix, N.S. contemplates the opening of a colliery at False Bay Beach, on what are known as the General Montgomery Moore areas. The area covered by the Moore leases is entirely a land area and is underlain by the Tracy Seam, the lowest of the Sydney Coalfield series, and partially underlain by one or more of the seams above. The areas are situated on the fringe of the Morien Basin. The coal seams proceed to sea under slight cover, the abutting submarine leases being held by the Dominion Coal Company as the assigns of the Cumberland Coal and Railway Company.

PRESENT POSITION OF THE GOLD MINING INDUSTRY OF NORTHERN ONTARIO.

By J. A. McRae, Cobalt, Ontario.

The gold mining industry of Northern Ontario is growing at a rate far in excess of expectations, as shown in the official figures from the mines. The increase of 46 per cent. in production for the first quarter of this year as compared with that of the corresponding period last year so strengthened the position of the industry as to assure it of actually exceeding the sister industry, silver mining, for the first time since the discovery of silver in Cobalt.

While gold production promises to approximate around a million dollars a month for this year, it is interesting to note that producing gold mines report milling capacity of 5,485 tons daily. These figures taken together with the average grade of the ore treated, shows that present equipment is being utilized at only two-thirds capacity and that when operated at full blast should produce close to $18,000,000.

Ore is High Grade.

In arriving at the importance of such property, it may be well to keep in mind the fact that the average amount of gold recovered from each ton of ore treated was $9.19 for the past year, a figure which promises to be well maintained. The ore at the Lake Shore over $20 to the ton, at the Porcupine Crown runs about $11 to the ton, the McIntyre a little over $10 to the ton, the Hollinger $9.09 a ton and the Dome $6.50 to the ton. The other mines have ore approximating the above average.

The excellent physical condition of the mines as well as the comparatively favorable conditions under which they are developed enables them to operate at a favorable margin of net profits at a time when many gold mines in other parts of the world have been compelled to close down. This may reasonably be taken as an indication that with the return to conditions under which mines in other parts of the world may resume production, the mines of the Porcupine district will become doubly prosperous.

Output Steadily Increasing.

As evidence of the steady growth of the industry, the following figures may be presented, representing the production record during a period when some of the leading mines were operated at reduced capacity on account of a shortage of workmen as well as adverse economic conditions:—

Year	Ounces	Value
1910	3,089	$ 63,849
1911	2,062	42,625
1912	86.523	1,788,596
1913	219,801	4,543 690
1914	268,264	5,545,509
1915	406,577	8,404,693
1916	497,836	10,339,259
1917	420.894	8,698 881
1918	450,000	9,100,000
1919	505,963	10,451.688

While the above figures cover the output for the whole of the province of Ontario, more than 90 per cent., or close to $10,000,000 was Porcupine's share of the 1919 total.

As regards the present, current production from the mines of Porcupine has shown a considerable increase during the opening months of 1920, and the aggregate output is now close to $1,000,000 monthly.

The Future Outlook.

Concerning the future, with such a record as that above referred to established at a time when conditions were quite abnormally unfavorable, and at a time when all the mines operated at reduced capacity, the various operating companies may be permitted to anticipat a greatly increased record from this rate forward, all of which tends to offer every inducement for mining interests in other countries to turn their attention to Canada and especially Northern Ontario.

Big Virgin Field.

While the Porcupine field is the centre of Ontario's gold mining industry, and, in addition to its present proven mines with ore blocked out and in sight amounting to more than three score million dollars ahead of production, has a large outlying area which offers big scope for further exploration and much promise of additional mines being developed; it would be entirely misleading to conclude without making reference to the other parts of the district where commercial deposits of gold-bearing ore have been found. Chief among these might be mentioned the Kirkland Lake gold area, situated some 60 or 70 miles south-east from Porcupine, where current production for three mines now amounts to over $100,000 monthly, with a fourth mill ready to resume work in September and the construction of a fifth to be completed in the early Autumn. From these five mines it is calculated that a production at the rate of $2,500,000 a year will be established during the coming year.

The Newer Districts.

Other centres where considerable development work is being done with promise of success include: Boston Creek, Larder Lake, West Shiningtree, Fort Matachewan, Munro Township and Bourke's Siding.

Summarized, with the likelihood of the Porcupine mines producting at the rate of at least $12,500,000 by the end of this year, by which time the Kirkland Lake mines will be producing at the rate of approximately $2,500,000 a year, considerable added encouragement may reasonably be offered to those who would enter these as well as the newer areas in search of new mines.

DOME MINES ANNUAL MEETING.

The annual meeting of Domes Mines Company, Limited, was held in Toronto on Friday, when it was announced by J. S. Bache, the President, that the regular $1 dividend would be continued, and that any further payments would be on the account of repayment of capital. Speaking of the question of future dividends, the President said that it was recognized that the $1,000,000 which the company has today in cash and bonds, was all the working capital required and that repayment of capital in lieu of increased dividends was being considered. In regard to the operations of the past year it was stated that the progress made was remarkable when considered that only 250 men had been available instead of the 700 required. Answering the report given currency at the meeting that the gold mines of the Porcupine district might shut down, C. D. Kaeding, the general manager, said that unless labor quit, or their demands became higher than at present, there would be no shut-down of the Dome Mines. The regular dividend of $100,000 was declared by the directors previous to the annual meeting. A vote of confidence in the directors and H. P. De Pencier was passed and the former board of directors was re-elected.

Our Northern Ontario Letter

THE SILVER MINES.

Announcement from New York that the Pittman Bill has become operative, tends to strengthen silver quotations in all parts of the world. The bill provides that more than a quarter of a billion ounces are to be purchased at $1 an ounce or under. It also provides that such price is to be paid only for silver produced in the United States. Accordingly, quotations for the metal jumped from a low of 80 cents to 99½ cents an ounce during the third week of June, the quotation being in New York and for silver produced in advance to that point, yet a very marked increase occurred, and the indications appear to be that a minimum price approximating 99½ cents an ounce may rule for the next year or so, not only in the U. S., but in all parts of the world.

With a premium of around 15 per cent. on New York funds, the Canadian producers are receiving more in Canadian currency than the United States producers are receiving in the currency of that country.

Silver production is still stated to be far below consumption. In the period between April 1st and June 2nd, Great Britain exported more than $27,000,000 in silver to the Far East, while imports into Great Britain amounted to less than $11,000,000. During the corresponding period the silver stored in the national bank of Germany decreased to $182,200, or practically nil as of June 3rd, as compared with more than $3,000,000 as of May 20th. All these figures go to show that Europe is shooting a final bolt in the attempt to make permanent the break in silver prices. But, in the opinion of silver producers of the Cobalt district, this artificial scheme is bound to fail and the law of supply and demand is certain to prove immutable. It is for this reason that the recent price of 80 cents caused no very great alarm to the Cobalt miners.

A feature of this week in connection with the silver mining industry of Ontario is the increasing interest in the South Lorrain silver area. At the Keeley mine, now being operated by the Associated Gold Mines of West Australia, a medium tonnage of ore is said to have been opened up in the lower workings in that section of the property adjacent to the boundary of the Beaver Lake ground. This holding is also under option to the Associated Company. Good values are stated to have been encountered on the Beaver Lake side of the boundary. In the meantime the installation of milling equipment is proceeding.

Work of surveying the Haileybury Frontier property in South Lorrain has been carried out preparatory to resuming exploration work. It is stated that about $50,000 will be spent in further opening up this promising property which has lain idle for a number of years. It is situated close to the Keeley as well as the Wettlaufer Mines.

The address of the Associated Gold Mines of Western Australia, as well as that of the Haileybury Frontier Mines, is Haileybury, Ont.

Information from Gowganda continues to be encouraging. In addition to the leading operations, such as the Miller Lake-O'Brien and the Castle property of the Tretheway-Cobalt, quite a number of smaller operations are under way. Work in all directions in this district promises to take on added impetus provided the construction of the proposed light narrow-gauge railway is proceeded with this summer. In this connection, a bond issue of $300,000, 7 per cent., first mortgage ten-years, is being made by the Northern Light Railways Company. It is intimated that a part of the money may be subscribed by British interests already interested in mining in this part of Northern Ontario. The railway is to be 36-inch gauge, equipped with freight cars capable of handling 25 tons each, and passenger coaches with seating capacity for about 25 persons each.

A good deal of interest is now being shown in the possibility of finding crude oil in the northern part of the district of Temiskaming. The presence of oil shales at Long Rapids on the Abitibi River, an analysis of which was made by M. Y. Williams was well as J. Keele of the Geological Survey Branch, Ottawa, shows an encouraging crude oil content. The samples were taken from the exposed surface, and leads to the belief that if explored at a lower horizon the shales may be found to contain commercial deposits of oil.

Cobalt mining companies have been approached by would-be oil explorers, and considerable field work is expected to be undertaken within a reasonably short time, in the prospecting oil field. It is believed probable that one or more oil drilling outfits may be transported down river this summer so as to carry on exploration work during the coming winter. The distance from the railway is only a little over 100 miles.

THE GOLD MINES.

During the 5½ four-weekly periods from January 1st, to June 2nd, the Hollinger Consolidated Gold Mines had a total income of $2,879,706. This was at the rate of approximately $575,941 every month or at the rate of $6,911,292 a year. It compares with an income of $2,822,858 in the corresponding period of 1919. Not only does the report show a slight increase in income, but it also shows a decline in expenditure from $1,507,060 in the first five months of 1919 to $1,448,020 in the corresponding period of 1920. The average number of men employed amounted to 1,098 as compared with 1,259.

A special general meeting of the Porcupine V.N.T. Gold Mines has been called for July 14th for the purpose of considering and if approved, ratifying a plan to borrow $50,000 from the Associated Gold Mines of Western Australia against which a first mortgage would be given. This is believed to have been decided upon as a means of putting the mine and mill in shape for operation, following which the current production would provide for the necessary expenditure.

Intimation of encouraging development at the 10th level of the Dome Mines at the point where drifting has been extended onto the Dome Extension gave rise to renewed activity in the shares of the last named company. The Dome Mines holds an option on the Dome Extension which provides for the exchange of 30 shares of Dome Extension for one share of Dome Mines provided the latter company elects to exercise the option on or before October of this year.

The Dome Lake mine has been closed down indefinitely, and the underground workings are stated to be being allowed to flood. Economic conditions as well as labor shortage have militated against the profitable operation of the low-grade ore which has been found to occur only in patches. It is thought that at some future date, under more favorable conditions, the property can be re-opened, with possibilities of more satisfactory results.

It is stated at Kirkland Lake that although the Teck-Hughes Mine is now on a profitable producing basis, yet the earnings are not sufficiently large to retire the bond issue which comes due in October. As a consequence of this, a plan of reorganization is contemplated with increased capitalization to finance the retirement of the bonds. A meeting will be held some time in July to consider this matter.

At the Kirkland Lake mine of the Beaver Consolidated, production is stated to be at the rate of around $1,200 daily. This is the largest output achieved by this property. In the meantime, the main shaft is being extended from the 700 to the 900-ft. level, at which point a station should be cut early in July.

The King Kirkland Gold Mines, with head office at Kirkland Lake, Ont., and promoted by interests in Buffalo, has completed its organization of a $2,500,000 company, made up of 2,500,000 shares of the par value of $1 each. Of this, 1,250,000 shares are in the treasury to finance development work. Visible gold is in evidence on surface. The company owns seven mining claims situated in the central part of the township of Lebel.

At the Miller Independence Mines of Bosfon Creek, good headway is being made in cross-cut work at the 500-ft. level. A number of highly mineralized veins have been cut, and the work is approaching the zone in which it is expected to encounter the downward continuation of the rich ore body which was developed to a depth of 200 feet in an incline shaft. Considerable interest ataches to this important work, the result of which should be known before the end of July.

Work has been stopped on the property of the Matachewan Gold Mines, the reason given being that it has been decided to await the development of electric energy on the Montreal River. Diamond drill work carried on is said to have been quite favorable and such as to encourage aggressive operations just as soon as cheaper power is made available.

From present indications, five mines in the Kirkland Lake district will be producing gold before the end of the current year. An output at the rate of close to two and a half billion dolars annually is predicted.

At present the Lake Shore, Kirkland Lake and Teck-Hughes are treating an aggregate of close to 300 tons of ore daily, and producing at the rate of about $115,000 a month. With the Tough-Oakes mill to be pressed into service again in the late summer and with the mill of the Wright Hargreaves to be completed this fall, the daily tonnage should reach 600 tons and the monthly output should exceed $200,000.

Following is a preliminary estimate of what may be achieved as of the closing months of the current year:—

Company	Daily Capacity in Tons	Monthly production
Lake Shore Mines	60	$45,000
Wright-Hargreaves	180	45,000
Tough-Oakes	120	40,000
Kirkland Lake	130	38,000
Teck-Hughes	120	35,000
Totals	610	$203,000

The properties next in line are the Ontario-Kirkland and the Orr Gold Mines, the former of which has been developed to a depth of 450 feet and on which arrangements are even now being made to install a mill. The Orr Gold Mines has considerable gold in sight, but has been held in idleness, being involved with the Kirkland-Porphyry Company which has gone into voluntary liquidation because of trouble between the owning interests.

Other properties in the Kirkland Lake district which hold out big promise for the near future are the Bidgood Mines, Canadian-Kirkland, La Bell-Kirkland, etc.

This summarizes the properties in the Kirkland Lake gold area which are already on a producing basis or in an advanced stage of development. There are also a number of promising prospects about which the future will probably bring interesting news, with considerable liklihood of additional mines being developed from among them.

The Robb-Clemens claim, situated in Fort Matachewan, restaked recently due to failure of its owners to record the necessary assessment work, has been reyested in the names of the original holders, it having been found that the failure to record the work rested with Messrs. Norrington and Smith who had the claim under option, and who had performed a large amount of work, which they had forgotten to record.

At the Peerless Gold Mines, formerly the Mondeau property of Boston Creek, some good values are being encountered at a depth of 250 feet. Assays range from a few dollars to as high as $148 to the ton, the latter being across about four feet in width. While the average for the vein as so far opened up is far below the figure above given, yet a fair tonnage of good grade ore is stated to have been placed in sight.

Ore Shipments.

During the week ended June 17th, seven Cobalt companies shipped an aggregate of thirteen cars containing more than one million pounds of ore. The output was the heaviest for a good many weeks. The Nipissing alone shipped five cars containing approximately 447,241 pounds.

Following is a summary:—

Shipper	Cars	Pounds
Nipissing	5	447,241
Coniagas	2	173,797
Mining Corporation	2	130,301
La Rose	1	81,207
McKinley-Darragh	1	80,410
O'Brien	1	64,000
Dominion Reduction	1	64,000
Totals	13	1,040,956

During the corresponding period, no bullion was sent out, the reason for this being that the price of the metal slumped sharply about the middle of the week. Now, however, with quotations strengthened, shipments may soon be released.

Accompanying the current dividend cheque, an interim report on Hollinger Consolidated Gold Mines, has been sent out. The report covers the five and half four-weekly periods from January 1 to June 2 of this year. For the period covered by the report the total income was $2,879,706 compared with $2,822,858 in the same time last year. Total expenditure, including maintenance, showed slight reduction of $1,448,020, compared with $1,507,060. Net profits, therefore, were $1,431,685 against $1,315,798, or an increase of $115,000. Expenditure for plant was $83,363 compared with $75,079 and the dividends were unchanged at $738,000. The average tonnage per day showed a favorable production, reaching a total of 4056 against 3907.

BRITISH COLUMBIA LETTER.

The Metal Mines.

Alice Arm. B.C.

Lieut.-Col. S. R. Heakes, O.B.E., who prior to the war was the Manager for the Kerr Lake Mines, northern Ontario, is visiting the Alice Arm District. He is making an inspection of various mining properties of the section and will continue into the Portland Canal area before returning. His purpose is to obtain first-hand information regarding the mineral possibilities of different northern British Columbia camps on behalf of English clients. Col. Heakes asserts that English capital will be available to assist in the mineral development of this country as soon as the exchange situation rights itself.

The Toric Group of Mineral Claims, situated on the east side of the Kitsault River, are reported to have been bonded by John C. Pederson, one of the pioneers of the Alice Arm Camp. He obtained control from the original stakers and proposes commencing development this summer. It is understood that, in addition to further general exploration, diamond drilling is to be started.

Hearthley Boy.

The Drum Lummon Mine is keeping its mill, erected at tidewater, busy handling ore of good grade and it is reported that a considerable quantity of high grade ore is being sacked ready for shipment.

Cranbrook, B.C.

Mining men of Cranbrook are more than usually interested in the placer operations on Wild Horse and Perry Creeks. The Gamble Mining Co., whose holdings are on the former waterway, is said to have obtained good results already while on Perry Creek, where a local syndicate is preparing for work, the prospects are said to be quite as satisfactory.

Greenwood, B.C.

Duncan McIntosh, one of the lessees of the Bell Mine, Greenwood District, reports that the mine work is continuing as actively as the shortage of labor will permit. However the men available are working in ore averaging 175 ounces of silver, 8 per cent lead and about the same of zinc. About 1100 feet of driving and crosscutting has been done and several good leads are exposed, three of which are being worked.

Trail, B.C.

Two new shippers have joined the list of contributories to the Canadian Consolidated Mining and Smelting Company's smelter at Trail according to returns for the first week in June. They are the Mountain Chief, the Renata copper property which shipped 423 tons last year, and the Monarch, of Field, which shipped 190 tons in 1919. Ten properties shipped exclusive of the Company's proportion. Receipts for the week were 5353 tons, making the total for the year 124,979 tons.

The Consolidated Mining and Smelting Company has engaged Wm. Forrest of High River, Alberta, to take charge of the Company's several farms situated in the vicinity of the smelter at Trail. Mr. Forrest takes up his duties immediately. It is understood that at present most of the land will be seeded in alfalfa but eventually it is proposed that the farms will be well stocked and made to yield dairy as well as general farm products. This, it is presumed, is the Company's answer to complaints made in the past by independent farmers in the neighborhood of Trail that the smelter fumes made profitable farming out of the question.

The copper plant of the Consolidated Mining and Smelting Company is expected to resume operations about July 1st. Only one furnace is likely to be blown in at first, other units being added as the smelter feed increases. The converter, whose utility is the convertion of copper matte into blister, also will be started as well as the first division of the copper refinery. When the concentrating mill of the Canada Copper Co., Copper Mountain, with its daily capacity of 2,000 tons of ore, begins contributing its concentrates the copper section of the Trail Smelter will be kept active as, in addition, it will have to take care of the product of both the Consolidated and of custom ores. The refinery, as enlarged, will be capable of producing daily some 100 tons of refined copper.

Work on the new copper rod mill, estimated to cost $250,000, is making satisfactory progress.

The magnetic test mill, operated for sometime on Sullivan Mine Ores in competition with the Sullivan flotation mill, has been closed down and is being dismantled. While this method of treatment was not altogether unsatisfactory it is not deemed as successful economically as the Company's improved flotation process in application to the particular ores in question.

Vancouver, B.C.

Charles E. Camsell, for several years in charge of the British Columbia Station of the Canadian Geological Survey, has been appointed Deputy Minister of Mines for Canada, succeeding R. G. McConnell, who has resigned.

Mr. McConnell, who is 63 years of age and a native of Quebec, has been associated with geological research work in Canada for many years. In 1879 he worked as assistant to the late Dr. G. M. Dawson in Western Canada. He has explored much in the north, having traversed the whole or large portions of the Stikine, Liard, Mackenzie, Porcupine, Lewis and Yukon rivers. He is the author of numerous reports and monographs, his "Geology of the Rossland Camp" being regarded as a text book.

In Mr. Camsell the Canadian Ministry has found a worthy successor to Mr. McConnell and his appointment is particularly popular from Western Canadian mining men by whom he is well-known and without exception highly respected. He is a product of the West, having been born at Fort Liard, where his father was Factor for the Hudson's Bay Company. After graduating from the University of Manitoba Mr. Camsell wandered over the wilds of the north country for six years. His adventures and experiences during that period are the subject of an interesting sketch in one of the recent issues of the Canadian Mining Institute Bulletin (see page 496, issue June 18th, 1920.) Subsequently he took post-graduate courses in geology at Queen's and Harvard Universities. There followed a few years of private professional work after which he became attached to the Canadian Geological Survey.

The operations of S. J. Marsh, of the Cariboo Gold, Platinum Extracting Co., headquarters at Quesnel, B.

C., are being watched with interest by the miners of the Cariboo, as well as by those interested in placer ground throughout the Province. Mr. Marsh announces that he is in the market for black sand such as is found along the Fraser, Tulameen, Thompson and other rivers of British Columbia. This contains values of varying importance in gold and platinum and it is Mr. Marsh's claim that he has invented, and demonstrated in a practical way, a device for the economic extraction of these precious metals from the sand. The Plant necessary to set in motion this electrochemical process, as it is termed is reported to have been assembled at Quesnel. Sixty days are set as the time needed to prepare for operation. Mr. Marsh in its request for black sand of the character indicated, undertakes to pay or to guarantee 90 per cent of the assay value of the same. It order to assure the continuous operation of the Quesnel Plant he is installing on the Quesnel River, some twenty-eight miles above the town a drag-seine dredge equipped with a concentrating device designed to separate the black sand from the gravel.

Victoria, B.C.

Henry S. Fleming, of New York, chairman of the Board of Directors of the Canadian Collieries (D) Ltd. has stated here that he proposes investigating the local conditions with a view to the establishment of an iron and steel industry. He proposes calling into consultation Hon. Wm. Sloan, Minister of Mines, and the mining engineers of the Provincial Bureau of Mines. That there is an adequate supply of magnetite, that there is no lack of fuel, and, in short, that everything needed for production is to be found in quantity in the Province is admitted by Mr. Fleming and the question to which he wishes to devote special attention is that of market. In this connection he said: "The whole thing narrows down to whether 325 tons of steel can be disposed of each day in this territory or produced at a cost that will permit of export. Our product will have to be manufactured into such products as billets, nails, wire fencing, etc. It is likely with the present high freight rates we will be able to hold our market here for such products. But my present problem is to find out just how much of these products this territory requires and can absorb."

Mr. Fleming also said that before a steel plant is built there will have to be assurances from the Provincial Government that there will be no eight-hour day restrictions or Sunday laws enforced.

The situation respecting the attitude of the men employed in the coal mines of the Province of Alberta was canvassed in the House of Parliament, Canada, recently when a mill proposing the continuance of the office of Director of Coal Operations, and the confirmation of certain orders of the said officer, was under consideration.

Answering strictures of Messrs. W .L. Mackenzie King and W. S. Fielding, leaders of the Opposition, who declared that by passing the measure the House would be declaring for the principle of the closed shop as far as as the mine in question were concerned. Hon. Arthur Meighen, Minister of Interior, dwelt on the situation existing when the orders were issued. The closed shop, he declared, was better than the frozen home. Coal had to be mined. Further the Bill did not perpetuate the orders but merely gave authority to the Director of Coal Operations, who would vary the orders if found necessary.

It should be explained that the orders in question have to do with the employment of adherents of the One Big Union and of the extreme principles for which that organization is said to stand.

Speaking as a member of the mining district under discussion W. A. Buchanan, of Lethbridge, Alberta, said that the effect of the activity of the Director of Coal Operations had been the promotion of harmony between the employed and employer. Since the appointment an adequate supply of coal had been available, the mines having been operated regularly. He did not think, however, that the director should be permitted dictate as to what Union's members should be permitted to work in the independent mines of the Province of Alberta and he asked whether his orders had this wide application.

Mr. Buchanan was assured that the Director of Coal Operators had never assumed such authority.

On the whole the Bill appears to have met with approval and there seems to be no doubt that it will be endorsed.

The aerial tram of the Lone Star Mine, Greenwood, B.C. District, is being dismantled for installation of the Coalmont Collieries. It is six miles in length and in good condition. It is to be used in the transport of coal from the pitmouth on the north fork of Granite Creek down the hill to the railway.

James Gray, superintendent of the Harvard Coal Co., operating at East Princeton, B.C., reports that the colliery plant has been augmented by a modern screening system and that screened coal is to be shipped to Vancouver City where a good market is assured. Work is in progress on two seams of coal, one six feet and the other nine feet in width.

Vancouver business men have acquired the coal lands formerly controlled by the South Nicola Coal Co., near Nicola, B.C., and proposed to proceed with its development.

George Wilkinson, General Superintendent o fthe Pacific Coast Coal Mines, Ltd., states that Samuel D. Wark has been appointed to re-open the Company's mine at Suquash, Vancouver Island. This mine has been inactive since 1914. Mr. Wark will unwater it, restore ventilation, and put it in shape for production

---

The coal production for the month of May, as far as the figures are available at the time of writing, is as follows:—

VANCOUVER ISLAND.

Canadian Western Fuel Co., Nanaimo	52,193
Canadian Collieries (D) Ltd., Comox	29,167
Canadian Collieries (D) Ltd., South Wellington	6,889
Canadian Collieries (D) Ltd., Extension	14,175
Pacific Coast Coal Mines, Ltd.	7,793
Wellington Nanoose Collieries, Nanoose Bay	2,251
Granby Consolidated Mng. and Smltg Co., Cassidy	15,107
Total	127,575

NICOLA-PRINCETON.

Middlesboro Collieries	6,309
Fleming Coal Co.	2,633
Coalmont Collieries	539
Total	9,481

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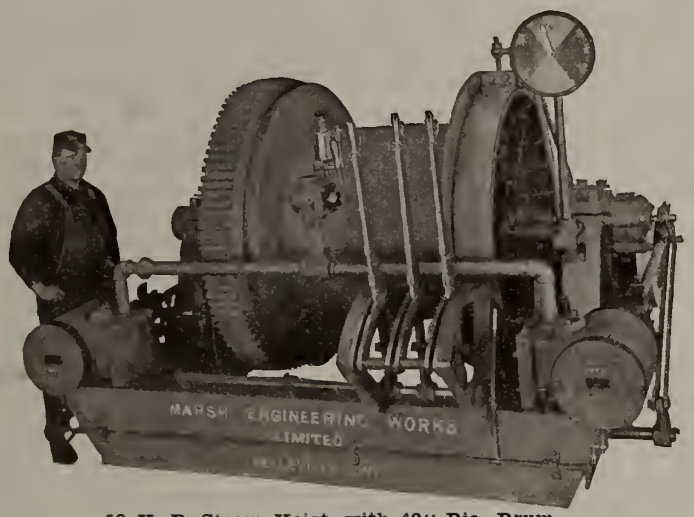

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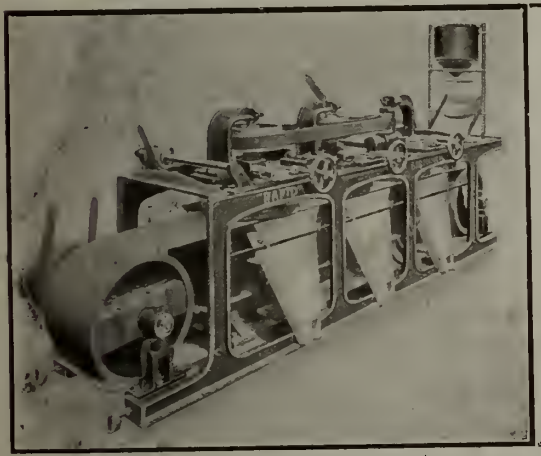

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Gardenvale, P.Q.

THE MINING AND RAILWAY ACTIVITIES OF THE LATE JAMES DUNSMUIR

(Abstracted from the Victoria "Colonist")

Although the Hon. James Dunsmuir carried on the undertakings connected with the family name since the death of his father in 1889, it was the late Robert Dunsmuir who inaugurated the great coal mining industry and amassed the nucleus of the big fortune which has descended to the present generation.

"What Lord Strathcona did for Canada on a large scale, the late Mr. Robert Dunsmuir accomplished for British Columbia," said one of his biographers some years ago. He was a Scotsman, and, possessed of the best traits of his countrymen, he applied these to the creation of large industries on a Vancouver Island. Coal mining and lumbering engaged his activities from the first, and he was the first man to take practical steps toward the opening up of this part of the Province when he built the line of railway connecting Victoria with the mines at Nanaimo. This involved no trifling expenditure, and the fact that he was prepared to make the financial venture indicated vast faith in the resources of this section of Canada.

The sailing vessel on which Mr. Robert Dunsmuir sailed from Scotland stranded at the mouth of the Columbia River while heading up the coast. The crew had heard of the discovery of gold in California, and deserted in a body. There was no alternative but for the passengers to go ashore. This was at Fort Vancouver, Washington, and while waiting for transportation to Victoria, Mrs. Dunsmuir, on July 8, 1851, presented her husband with a son. This was to be the Hon. James Dunsmuir, who inherited some of the best characteristics of his parents, being practical, hard-headed, thrifty, and endowed with a good fund of common sense. In later years he possessed the advantage of receiving direct instructions from the founder of the family fortunes, who was but twenty-six years of age when he emigrated from the Old Land, but who made his personality and aggressive business sense felt as soon as he landed on Vancouver Island. Mr. Robert Dunsmuir acted for many years as a mining expert at Nanaimo, in connection with the Vancouver Coal Company, which succeeded the Hudson's Bay Company. The famous Wellington mines were discovered by him in 1869, and from these developed the collieries which became known as the Wellington Colliery Company.

Started at Nanaimo

James Dunsmuir spent his early boyhood at Nanaimo. He was the first white baby that the Indians in that part of the Island had seen, and their curiosity and interest in the child on one occasion led to his disappearance. A search resulted in the discovery of the little boy in the possession of one of the local tribes.

He was educated first at Nanaimo, where his parents lived during the time that the father was engaged in the coal mining operations there, and later he went to Hamilton College, a military institute at Blackburg, Virginia, where he met the lady who afterwards became his wife. When he returned to Vancouver Island he at once joined his father in the management of the coal mining business, which was already assuming huge proportions. Here he gained experience which in later years proved of the greatest practical value, working down in the mines with the men who were digging coal. As time went on the management of the business passed more and more into his hands, and eventually he became excellently fitted to take his place as directing head of the great interests which involved coal mines, logging camps, steamships, etc.

Both his parents were endowed with forceful character. All the children in some degree inherited this, and in none of them was independence of judgment, initiative, willingness to work, desire to grasp the detail of business, more keenly apparent than in James Dunsmuir. He became intimately conversant with every department of the properties which came under his control, and even before his father's death his executive ability was very generally recognized throughout the Island, and, in fact, wherever the Dunsmuir interests reached.

The E. and N. Railway.

The construction of the E. & N. Railway was undertaken in 1882. The road was opened in 1886 from Victoria to Nanaimo, a subsidy of $750,000 cash being secured from the Dominion Government, and a land grant of two million acres being made by the Provincial Government The entire interests were acquired by the Hon. James Dunsmuir in 1902.

The Hon. James Dunsmuir, on the death of his father and brother, became the greatest landed and colliery proprietor in Western Canada, and one of its richest men. As a coalmining operator he was in his element; as a railway manager and landowner he did not feel at home, and this fact accounts for his business policy differing from the usual standards in such matters. Being a single-minded man and simple in his ambitions, having no desire to go beyond that which he understood, he devoted himself to the firm's collieries. The presidency of the railway was simply an inherited obligation, and he had no taste for it. The development of the Comox coal mines, the coke industry in connection therewith, the opening up and development of the Extension mines, the establishment of coal bunkers at Ladysmith, and the freight ferry from that point to Vancouver were all of his initiation, and carried out under his direct supervision.

As incidental to the Extension mine he laid out the townsite of Ladysmith, now a substantial town dependent largely, of course, upon the size of the payrolls at Extension and the smelter. It was at first contemplated to build the coal bunkers at Chemainus, to which point the ferry would have run, but there was some difficulty in adjusting the price to be paid for land for the site of the bunkers, and Mr. Dunsmuir went to Oyster Harbor instead, a decision characteristic of the man. The Alexander Colliery was closed down in a similar way—the result of a strike—and Mr. Dunsmuir never afterwards opened it.

Shortly after Mr. Dunsmuir's resignation of the office of Premier of British Columbia, he decided to dispose of the E. & N. Railway. He had received various offers in that connection, but he was a firm believer in the C.P.R., not only in respect of its ability to make a deal in a satisfactory manner, but also he realized the benefits to be derived from that corporation entering the field on the Island of Vancouver The first proposal was to sell the roadbed of the railway, and to retain the land grant and all its accessory rights, but it became apparent that the effect of separating the railway and the land grant was to subject the latter to taxation. Eventually the railway was purchased by the Canadian Pacific Railway,

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minus the coal rights, fire-clay, etc., Mr Dunsmuir devoting himself exclusively to his other interests.

Early in 1910 he gave an option on his collieries and coal rights in the E &. N. Railway belt, and all business in connection therewith, for $11,000,000, which was acquired by Messrs. Mackenzie & Mann, railway promoters, and thus separated himself practically from all former business with which the Dunsmuir name had been prominently associated for such a long period of years.

MINERALS SEPARATION COMPANY.

Mr. H. L. Sulman Replies to Criticism.

The owners of the Minerals Separation process of oil flotation has experienced much difficulty in obtaining royalties from those who use the process. Many users of flotation consider that the Minerals Separation companies have attempted to collect royalties to which they are not entitled. There have been many processes used that the Minerals Separation company claims are infringments. The difference of opinion has been ventilated time and again in the courts. The endeavor to obtain royalties has naturally resulted in much fighting and the Mineral Separation companies have shown a tendency to fight hard and long for their rights. Some users of the process have had so much at stake that they also have gone to great expense to prove that the company is not entitled to such royalties.

Aside from the disputes over the validity of the patents, there has also been much criticism of the form of agreement required by the Minerals Separation companies from those who are willing to use the process on the company's terms. The Minerals Separation companies are for these and other reasons not receiving bouquets from the American technical press.

During the war the Minerals Separation North America Corporation received further undesirable notoriety, from the fact that its predecessor in America had as agents the German controlled firm of Beer, Sondheimer and Co. The association with this firm was not likely to increase the popularity of Minerals Separation companies.

However it would seem that the unpopularity of the company is to some extent due to parties interested in avoiding the claims for royalties. At times it seems that the criticisms are ill founded and much overdrawn.

It is therefore interesting to read what Mr. H. L. Sulman has to say in the May issue of the Mining Magazine with reference to some of the recent criticism.

Mr. Sulman deals at some length with the remarks published in American technical journals in reference to his contributions on the Minerals Separation process and his connection with the Minerals Separation companies. He states that he is not a large shareholder in the companies, but that he has been and now is consulting metallurgist and that those in control have nothing to fear from their detractors. Mr. Sulman evidently believes that much of the criticism is not impartial. He says "a small section of the American technical press apparently has motives for attacking the Corporation, seemingly with the object of creating a volume of hostile opinion designed to have what effect it may upon the interests of the corporation in matters still awaiting final decision in the United States Courts." —R.E.H.

CHANGES IN CANADIAN FAIRBANKS-MORSE ORGANISATION.

Mr. C. J. Brittain, formerly Managing-Director of the Winnipeg, Calgary and Saskatoon Branches of The Canadian Fairbanks-Morse Co., Limited, has been appointed Vice-President and General Sales Manager of that organization, with headquarters in Montreal. Mr. Brittain succeeds Mr. C. Graham Drinkwater, who has been Vice-President in charge of sales for many years, and who has resigned to join the banking firm of Aldred & Company, Limited.

Mr. Brittain brings to his new post a wide experience of many years and a splendid record of achievement. He was one of the first salesmen engaged by The Canadian Fairbanks-Morse Co., Limited in the early days of the company and he has made good in every position to which he has been appointed. He has the entire confidence and hearty support of all those who know him, both in the organization and as customers.

MR. C. J. BRITTAIN

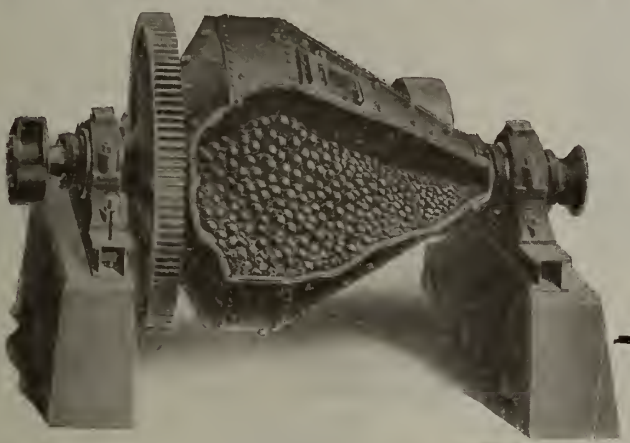
Mr. Kenneth Forbes, who has been Manager of the St. John, N.B. Branch, goes to Winnipeg to assume charge of that Branch, together with that of the Regina Branch, which is under construction at the present.

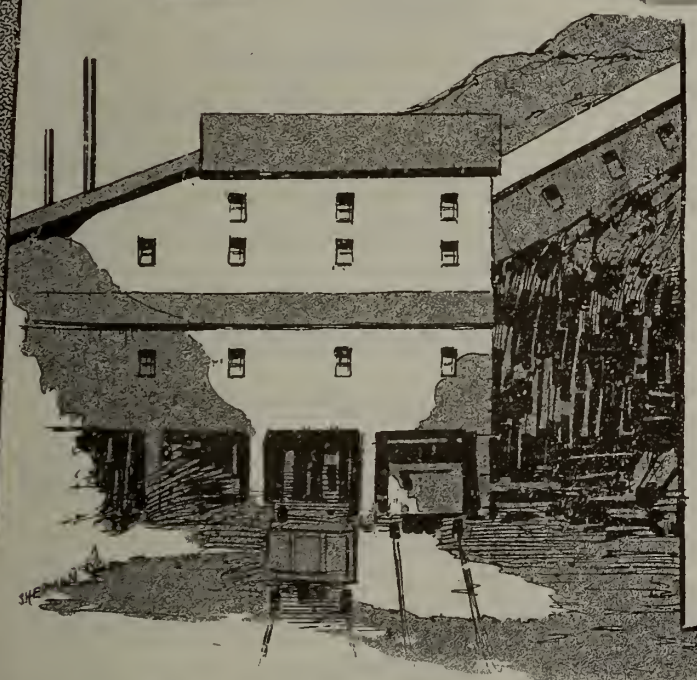
Mr. Forbes is succeeded at St. John, N.B., by Mr. W. J. Hill. Other changes in the management of the Sales Department—all of which represent well-earned promotion and increased opportunity to assume greater responsibilities—are the appointments of Mr. Malcolm Cordell to be Montreal Manager, and Mr. George L. Nies and Mr. Archibald Turnbull, who will become Managers of the Calgary and Saskatoon Branches respectively, taking up a portion of the duties which formerly came under the direction of Mr. Brittain.

The funeral of the late J. F. Whitson, of the Northern Development branch of the Department of Forests and Mines, who died very suddenly of heart failure in Sudbury last Saturday, took place in Toronto on June 14th. The late Mr. Whitson was connected with the Ontario Government for thirty years, and was well-known throughout Northern Ontario. Previous to his appointment as Commissioner of Northern Development in 1902, he was Assistant Director of Surveys.

Mr. J. G. Ross of the Milton Hersey Company, Ltd., Montreal, is examining properties in the Western States.

THE PRINCIPLE THAT APPEALED TO ENGINEERS





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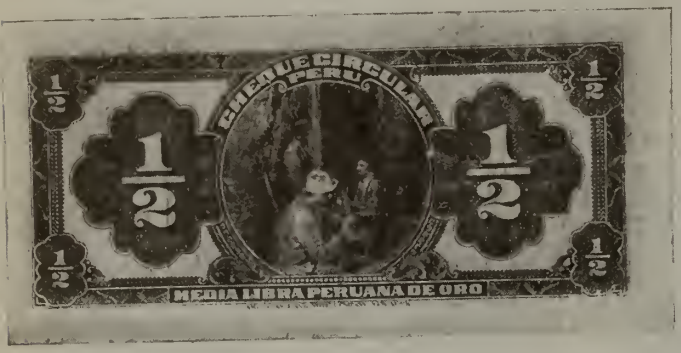
POWER ROCK DRILLS SHOWN AT WORK ON SOUTH AMERICAN BANKNOTES.

(By F. A. McLEAN).

A representative of the Ingersoll-Rand Company who returned from a business trip to the West Coast of South America a few months ago brought back with him two interesting souvenirs in the form of Peruvian bank notes bearing on their reverse sides reproductions of rock drills of the type manufactured by this Company, as may be noted from the accompanying illustration, which is somewhat smaller than the original.



The banknotes were engraved for Peruvian bank customers by the American Banknote Company of New York, whose name appears in English near the bottom of the bills. The value of the Peruvian Libra in our money is nominally $4.86 2-3, the same as the English pound, although the present quotation in New York is about $4.30. As it is unlawful in most civilized countries to photograph or make any work of reproductions of currency, permission had to be obtained from the Peruvian Government before photographic copies of the notes could be made.

Mining is the most important source of national wealth in Peru, and the use of a rock-drill upon the country's bank notes as a symbol of the mining industry is interesting as showing how widespread is the standardization of this type of modern mining equipment.

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EDITORIAL

The Reasoned Optimism of Canadian Geologists

Two significant statements have recently appeared in print made by geologists who have a thorough knowledge of Canadian rock formations. Writing in "Canada," Dr. Miller concludes an article dealing with the occurrence of silver in Ontario by remarking: "When Ontario's resources become better known there "is little doubt that further prospecting will lead to "discoveries quite as wonderful as those of Cobalt." There is no person better qualified to form a judgment on this question than Dr. W. G. Miller.

Alfred R. Whitman, writing to Mr. C. G. Daimpre of Toronto, states "it is no longer debatable, but is an "established fact, that the whole Canadian field con-"sists of formation geologically favorable to the con-"currence of rich mineral deposits." "It has long "rankled in my mind"—writes Mr. Whitman—"that "a people enterprising and industrious in so many "ways as the Anglo-Saxons of today should so ob-"stinately ignore and neglect an area so rich and im-"mense, and so near to a dense and wealthy population "as the Canadian North."

Chase S. Osborn, in the "Iron Hunter" wrote: "North of us lies the vastest unexplored territory in "the world. I refer to the Dominion of Canada. It "is rich, and where it is untouched by man it is clean. "There is not a drop of unwholesome water nor any "poisonous insects or reptiles between Lake Superior "and the aurora borealis.....To young men of "courage and resource the limitless North offers the "cleanest fight in the World, and if you win, the "fruits of victory are plenteous and satisfying."

Charles Camsell, the recently appointed Deputy Minister of Mines, some time ago revised Dr. George Dawson's estimate of the unexplored territory of Canada and concluded that one-quarter of the Dominion remains untouched by the prospector. He quoted Dawson as remarking in 1908 that the existence of so vast a stretch of unknown territory might be considered a reproach upon Canadians "as indicating a lack of justifiable curiosity towards what our country contains."

Mr. Camsell remarked: "That reproach still remains "on us, and will continue so long as such a large pro-"portion of our country remains unknown."

A glace through a year's issues of the "Canadian Mining Journal" will show how new is the knowledge of some Canadian mineral deposits, and how tantalisingly scant and inexact is the information that exists in regard to them. Descriptions have appeared in our columns of most promising finds of the precious metals in the pre-Cambrian rocks of the Upper Harricana River in Quebec, in similar formations in Northern Manitoba, and attention has been drawn to the richness of precious metal ores in Northern British Columbia. The discovery of salt at Malagash, Nova Scotia, and its association with potash-bearing minerals, more detailed information on oil possibilities, the occurrence of radium-bearing ores in Northern Ontario, and, in our last issue, Mr. de Lury's account of the detection of traces of tin in another part of Ontario, are at least suggestive, and indicate that a complete conception of the genesis and occurrence of mineral ores in Canada is only in the making. So far, our knowledge of these matters consists of disjointed and unconnected memoranda, and the patient labors of a few generations of workers, all too few for the territory to be covered—a territory only three parts known even at this date—adumbrate the appearance of a coherent whole, and the availibility of a sufficient accumulation of recorded data to enable a new generation of geologists to build a completed structure that shall be worthy of the herculean labors of their pioneer predecessors and instructors.

The consensus of authorities quoted combined with the periodical recording of new mineral discoveries justify a continued optimism in Canada's future as a mineral producer. Indeed we may look for further important discoveries as more and more the accumulated store of geological records are drawn upon and as the search for minerals in increasingly guided by deductions based thereon.

THE UNIONIZATION OF TECHNICAL MEN.

The letter from the Secretary of the British Columbia Technical Association, contained in this issue, will be interpreted according to the mentality, the economic training and the corporate affiliations of the reader, but its significant feature is that unionization of technical men is an accomplished fact in one province of Canada. The reference in the concluding paragraph to a "Canadian Technical Association" is probably prophetic in the issue of being an intelligent anticipation of coming events.

The meat of the letter is the clear-cut statement: "The primary object of this Association is the protec- "tion and advancement of the material welfare of "its members." It fell to Dr. Turnbull's lot at the Vancouver Meeting of the Canadian Mining Institute to acquaint that gathering with the aims of the newly formed Association, and in doing so he emphasised service as the primary object. He stated that the Association did not want to adopt the trade union method of forcing concessions if they could be obtained in any other way. Between service to others and self-interest Dr. Turnbull suggested a midway path could be found, and concluded by advising those technical men who did not agree with the aims of the Association to "come in, and make it suit you." It is just as well to avoid ambiguity, and as we suggested in this column some months ago, while the British Columbia Association began by making "service" the keynote of its policies, it is useless to disguise the fact that the genesis of this association, and similar associations in other countries, is the necessity laid upon the technical men either to organize for self-protection, or suffer piecemeal disintegration of all their hopes and ambitions in life.

The increase of the material welfare by any body of men is an understandable aim, much preferable to any claim for consideration based upon public interest. Notwithstanding all the Christian virtues supposed to reside in self-abnegation, it is generally regarded as eminently proper that men should look after their own. It is a viewpoint that all can understand, and the British Columbia Technical Association has done the proper thing to declare its real objects so unmistakably.

At the same time there is much danger in undue emphasis of the statement that the technical workers constitute a "third class," the remainder of the public being composed of Labor and Capital. There is also very much to be said against the attempt to legislate the prescription of the status and practice of technical employment in such wholesale blanket enactments as the draft of the Professional Engineers Act which the British Columbia Technical Association originated and backed in its progress through the Legislature of that Province. Class consciousness is a thing that is very much overdone in these days, and it is a thing foreign to the mentality of the technical worker, who is above all men an individualist and a solitary seeker of untrodden paths. A coercion of the individual, a standardization of thought leading to stagnation and lessened initiative, is an unavoidable accompanyment of class legislation and a too pronounced class consciousness. History abounds with examples of national culture that have declined and died because of the rigid division of the people into guilds, castes, priesthoods and classes. We believe the safeguard against such dangers lies in the eman- accompaniment of class legislation and a too processes, and would therefore endorse the recommendation already referred to that technical men should join their own organizations and assist in guiding along proper lines a movement that is already important, and bids fair to become much more influential and widespread.

Science has no bounds. The influence exerted upon mankind by scientific workers will not be in proportion to their mutual organization, but will arise in the future as it has done in the past from the unknown and often obscure investigator who plays very little part in the active life of men and is often careless of material welfare. The impossibility of defining the indefinable will always militate against the formation of technical workers into a bourgeois class, and our intellectual classes will persist as a vivifying, and sometimes disturbing element in our national life

A further responsibility devolves upon those who advocate the unionization of technical workers, namely, that by a process which can be seen in daily operation in Canada, policies may originate which will eliminate from the organization those who enter the ranks of the employer and those daring and ambitious souls who will run their lifecourse untrammelled and scorn direction from any course. Thus such an organization may tend to become mediocre in is composition, and it will devolve upon the leaders to prevent a lowering of professional attainments and the creation of a class that will be midway between the trades unionist and scientific workers of acknowledged eminence, and content to stay there.

.. ONTARIO GOVERNMENT ASSISTING IN .. MARKETING ORE.

Development of the mineral resources of Ontario is making good progress in spite of unfavorable conditions. Better progress might, however, be made if those who develop properties could more readily obtain some return from the preliminary work. At present the producer of small lots of ore finds the cost of marketing very high. Consequently production of metals in Ontario is confined to a comparatively small number of properties, most of which have costly equipment.

From time to time there has been some discussion of the advisability of establishing Government stamp-mills

for the treating of gold ores. It has been pointed out that in Australia a very large number of men are able to market gold from their properties without building expensive mills themselves. One mill serves for many small producers and the miner is then somewhat in the position of the farmer who can sell his grain to the miller. Mine owners of this class in Ontario are not as numerous as they should be. There are many properties lying idle because they are commonly considered as individual properties that would have to bear the burden of costly plant, rather than as sources of ore for a customs plant.

At Cobalt there has been some degree of co-operation between mine owners in treating ores. The customs concentrator has proven of great help in increasing production. Sources of ore have changed, but the concentrator has been kept continuously in operation and many improvements made in treatment methods. The ore sampling works established by Campbell and Deyell and recently taken over by the Ontario Government has also served a useful purpose and seems destined to play a vital part in the development of a new phase in the mining industry in Ontario.

Since the Government took over the plant it has been put in better shape to meet the requirements of mine oprators. A very considerable portion of the product of Cobalt is now sampled at this plant and the assaying done here is becoming more and more the basis of transactions between sellers and buyers.

A feature of the work now done at this Government owned and operated sampling plant that could be developed with advantage to small producers is that of assisting in the sale of ore sampled. The producer of small amounts of silver ore can now ship to the Government plant and have his ore sampled there and sold. As yet comparatively few producers have taken advantage of this means of disposing of ore; but a beginning has been made and many will be glad to learn of the Government's endeavor to assist in marketing ore.

CANADA'S FUEL PROBLEM.

The Interstate Commerce Commission of the United States has directed that after June 24th priority in car supply and preference in traffic movement is to be accorded to bituminous coal for trans-shipment to coastwise points. The intention of this order is to help the bituminous coal situation in the New England States and the vicinity of New York. Its effect will be to place a restriction, which may or may not amount to a complete embargo according to domestic needs, on the export of bituminous coal from United States Atlantic ports.

As under existing conditions of dependence on the United States for coal supply, Canada is, in this regard, merely an extension of the United States, it is necessary that whatever regulatory action is taken by the Government of the United States in regard to coal distribution, must be adopted in Canada also. The Canadian Government has therefore conferred the necessary powers upon the Board of Railway Commissioners, a proceeding that seemed to offer the best way out of an immediate difficulty. Probably the country, as did Parliament, will approve of course taken and will agree that the Board of Railway Commissioners is the body best fitted to handle a situation that is so very largely a difficulty of transportation.

Nevertheless, the action of the Government is nothing more than a temporary measure to meet an immediately pressing situation, and it promises no security against the annual occurrence of a condition that is caused by a chronic fuel inadequacy occasioned by the non-development of our domestic coal resources.

Deserved recognition of the good treatment Canada has received from the United States was accorded by speakers on both sides of the House when the Resolution above referred to was under discussion, and several speakers hoped for a continuance of friendly relations between the two countries. This is something that all the sane people on either side of the line take for granted, but what has the question of coal supply to do with the international relations? Canada's fuel problem is her own, and can only be solved by Canadians. What we take to be the outstanding fact connected with the supply of bituminous coal in Canada is that the Canadian production has steadily declined year by year, whereas the production of the United States has rapidly mounted by annual increments of astonishing proportions.

The effect of increased exports of coal upon domestic supply in the United States has, we believe, been exaggerated. The fuel difficulty in the United States in a reflex of the neglect of railways and railway equipment in years past. The term "car shortage" includes many other deficiencies besides a numerical shortage of rolling stock. The output capacity of the coal mines in the United States has never been really tested because the bottleneck of transportation has always prevented them from achieving the maximum of production. In Canada the tonnage of coal that has been shipped to Europe is absurdly small when compared with the actual deficiency in production, and in Nova Scotia the whole of the tale is told when it is pointed out that the output capacity of the collieries is at this time 5½ million tons annually, and that in 1914 it was 7½ million tons. Similar comparisons could be made with regard to the coal production of British Columbia and Alberta

If Canada would produce more coal there would be enough for our own domestic uses and a much greater margin for export than has ever been seen yet.

We would repeat the suggestion made in these columns last week, namely, that a permanent body should be formed to study the means by which coal production

can be increased in Canada. The basis for this unusual suggestion is a belief that unless Canada becomes self-supporting in bituminous coal supply she must, for obvious reasons, lose her national identity.

WILL MAKE NEW GEOLOGICAL SURVEY OF COBALT.

Mr. Cyril W. Knight, Assistant Provincial Geologist, is now at Cobalt making a study of the geology of the camp for the Ontario Bureau of Mines. Mr. Knight was Dr. W. G. Miller's assistant when the first examination of the discoveries at Cobalt was made by the Bureau. He helped to make the preliminary map in 1905 and the larger scale detailed map prepared by the Bureau in 1906-07. He has since made some underground studies, and is now beginning a systematic examination of the area.

The development of the several mines at Cobalt has given much information that is not easily obtainable by outsiders. The several companies have learned much about the nature of the deposits since they began to work them and the information has been pooled to some extent. There is however much work to be done that is in the general interest and the Bureau is looked to for geological work that individual companies are unwilling to undertake. It is not unlikely that systematic study will result in the obtaining of data that will help in the search for more ore.

CORRESPONDENCE

The Editor, Canadian Mining Journal.

Dear Sir,—Acting upon instructions from the Executive Committee of the Provincial Council of the British Columbia Technical Association, I append herewith a brief statement of the history and accomplishments of our organization, with the hope that it may be of some service in inaugurating similar organizations in other provinces of Canada.

The action of the Toronto Branch of the Engineering Institute of Canada in drawing up resolutions which were forwarded to their headquarters, asking that an organization upon similar lines to those of the B.C.T.A. should be formed, is a further reason for our venturing to write to you upon this subject at the present time.

No doubt you are aware of similar movements in Europe, such as the Federation of Professional Workers in Great Britain and also in the United States, such as the American Association of Engineers.

"Labor," by means of "Unions," is forcing up "Wages" for the "Laborer." "Capitalists and Employers" by similar combinations are raising commodity prices. Neither of these two great classes are interested directly in promoting the welfare of the technical worker. Unless some effective force is organized the product depending upon technical effort will continue to be appropriated mainly by the two organized classes. A nation-wide combination of professional workers is the only effective method of asserting that there is a third class whose rights must be properly considered. That the existence of this third class is rapidly receiving prominent recognition is indicated by the discussions that took place in the House of Commons at Ottawa on May 7th last, on the establishment of a National Research Institute in Canada. For example, Mr. Alfred Thompson, Member for Yukon, made the following statement (See House of Commons Debates, May 7th, 1920, p. 2229):

"Canada is rich in mineral resources—immensely rich—but in order to transmute these resources into commodities which the world needs, one thing particularly is required, and that is applied science. Industry you must have—you must have the intelligent artisan; you must have people in the country who have faith enough in its future to put their capital into manufacturing enterprises; but without science that labor and those manufacturing enterprises would not go very far."

The demand for applied scientists and researchers is greater than the supply. What price should be paid for our absolutely essential and primary commodity Who is to dictate the price? These are questions that we alone can settle.

Many professional and technical organizations exist in Canada. The primary object of these existing organizations is essentially the advancement of knowledge. In February, 1919 a number of technical workers in British Columbia co-operated to form the British Columbia Technical Association. The primary object of this Association is the protection and advancement of the material welfare of its members. At the same time this protection operates to the benefit and service of the public by refusing recognition of the pseudo-technologist.

Our infant organization slightly over a year old has in our numerically small province, already about 500 members, with local branches at Vancouver, Victoria, and Cumberland. The membership consists of Civil, Mechanical, Electrical, Chemical and Mining Engineers, Chemists, Geologists, Architects, Naval Architects, University Professors and allied professional workers.

I enclose for your perusal copy of our Constitution. By-laws, list of members, together with our First Annual Report, and would particularly call your attention to the following results of our work:—

(a) List of members to date.

(b) The Professional Engineers' Act of B.C. This Act was based on the Engineering Institute of Canada Model Bill, and was fathered by the Engineers' Joint Legislation Committee. The delegates from the B. C. Technical Association, backed by the organization throughout the province, were very active in working for the passage of the Act.

(c) The Architects' Act of B.C. Our Association was able to give valuable assistance to the Architects Committee in charge of the Bill (a number of whom were members of the B.C. Technical Association).

(d) The Schedule of Minimum Salaries for Civil Engineers.

In addition, special committees have under consideration the preparation of scales of Minimum Fees for Civil Engineers, and also scales of Minimum Fees and Schedules of Minimum Salaries for Mechanical, Electrical, Mining and Chemical Engineers.

Notwithstanding the results already achieved, the Council and Members of our Association feel that our work is circumscribed and that only by the formation of similar organizations in the other provinces and the subsequent federation into a "Canadian Technical Association" can we all obtain the just recognition and dividends that our scientific knowledge and work demand. This will unquestionably react to the advancement of Canada and of our Empire by encouraging more of our youth to choose a scientific career.

We shall be pleased to have you consider our suggestion favourably and to make any enquiries of us that may be of assistance to you and ultimately to our mutual benefit.

Yours faithfully,

R. SNODGRASS,
Secretary-Treasurer.

MINING AND PREPARING DOMESTIC GRAPHITE FOR CRUCIBLE USE.

The United States Bureau of Mines has recently issued Bulletin 112, "Mining and Preparing Domestic Graphite for Crucible Use," by G. D. Dub and F. G. Moses. The work covered by this bulletin was undertaken in connection with the war minerals investigations of the bureau.

Before 1915 nearly all the graphite used in crucible manufacture in the United States was imported, chiefly from Ceylon, Madagascar and Korea. Little domestic domestic graphite was used, that mined being chiefly employed for the manufacture of paint, lubricants, foundry facings and other purposes. Not only was most of the graphite imported, but also all the clay used in crucible manufacture, this clay coming from Klingenburg, Bavaria.

As a result of clay imports from Bavaria being entirely cut off by the war, crucible makers had to turn to domestic sources of clay. The clay problem was soon well in hand, it being found that domestic clays could be obtained that compared favorably with foreign clays.

The use of domestic flake graphite in crucibles, however, in proportions of more than 25 per cent. mixed with imported graphite was not attended with much success.

However, the domestic graphite mining and milling industry expanded rapidly under the pressure of war conditions, being aided by a request of the War Trade Board on August 10, 1918, that crucibles manufactured during the balance of 1918, should contain 20 per cent. domestic flake and 25 per cent. thereafter. At the end of the war there were 39 graphite plants in Alabama, 3 in New York, 5 in Pennsylvania, and 3 in Texas.

The graphite investigations of the Bureau of Mines covered three phases: (1) Field examination of the graphite deposits in the States mentioned, and a study of the methods used in mining and preparing graphite for market; (2) Experimental work on the concentrating and refining of crucible graphite to improve the quality of the product and lessen waste; (3) Experimental work in crucible manufacture to determine the properties of domestic flake and the maximum proportions that might be used without impairing the qualities of the crucibles.

The present importance of these investigations lies in the fact that the domestic industry, if it is to survive the competition of imported graphite, which can be mined and prepared more cheaply than domestic flake, must rely on improved and more efficient methods of producing and preparing graphite. Also, for full extension of the market to domestic producers, crucibles made entirely of domestic flake or nearly all domestic flake, in combination with domestic clays, should be developed.

The bulletin mentioned above outlines the results obtained in the first two phases of the investigation.

The bulletin is in two parts; the first part describes the methods of mining and milling used, suggests a standard method of sampling finished graphite, and describes a rapid and convenient method of analysis developed at the Pittsburgh station of the bureau, which had been assigned the anatylical work and microscopic work. The second part describes experiments on the concentration and milling of graphite, made at the Salt Lake City station of the bureau.

The experimental work on crucible graphite, which was assigned to the Columbus station, will be described in a separate bulletin to be published later.

Copies of Bulletin 112. "Mining and Preparing Domestic Graphite for Crucible Use," may be obtained free of charge by addressing the Director of the Bureau of Mines, Washington, D.C.

ANNUAL REPORT OF THE NEW BRUNSWICK OIL COMPANIES.

Maritime Oilfields.

The report of Maritime Oilfields from October 1st to December 31st, 1919, states that there is a profit of £6,629, in which is included dividends still to be declared of 10 1-3 per cent., less tax, on the Six per Cent. Cumulative Preference Shares and 5 per cent., less tax, on the Ordinary Shares of New Brunswick Gas and Oilfields, Limited. There is a credit balance, including £400 brought forward, of £7,000, out of which, subject to payment of dividends of New Brunswick Gas and Oilfields, Ltd., the directors recommend a dividend of 9 per cent., less tax, on the Ordinary Shares, absorbing £6,237 and leaving to be carried forward £793.

DRILLING IN WEST DOVER OILFIELD, ONT.

Mr. F. H. Stover of the F. H. Stover Drilling Company, recently announced in Toronto that the12-inch drive pipe is set in the Vacuum Gas & Coal Company's well in the West Dover field, and that the well is down 300 feet, and the 10-inch casing will be set at once, when drilling will proceeed as quickly as possible.

The Vacuum Gas & Oil Co.'s West Dover well is situated 600 feet from Petrol Oil & Gas Co.'s No. 1 well, northwest toward the Union Natural Gas Co.'s wells.

Mr. Stover has contracts for five deep wells in the West Dover field.

The Steel Company of Canada has closed down its Hamilton Plant, and two thousand men are thrown out of employment, through coal shortage. The coal used in steel plants is bituminous, and not anthracite. Canada has no anthracite, and must depend on the United States for a supply of that not indispensable, although desirable fuel. Next to the United States, Canada has more bituminous coal than any other nation in the World, and it is bituminous coal that is obtainable in such inadequate quantities in Canada at this time.

The Coal Mining Tradition of the British Empire

Presidential Address by Sir John Cadman, Before the Institution of Mining Engineers.

The British Empire is a world fraternity and the most influential League of Nations history has yet recorded. It was founded by the constant flowing-out from the British Isles of adventurous spirits who, with their descendants, have kept in touch with the land of their origin. The material link has been maritime trade, based upon the mining of coal in Britain, the exportation of manufactured articles with the aid of British coal, and the export of manufactures and of coal in steel ships made in British yards, bringing back cargoes of the produce of those countries where British emigrants have settled.

Wherever British settlers founded states they have emulated, and in some cases, through the opulence of their resources, have outstripped the British Isles in the production of coal and iron; and, in every case, their wealth and importance stands today in proportion to the production of coal and iron within their borders.

In Sir John Cadman's speech there is more than a hint that if decline should mark the future of the British Isles, it will occur because of lessened coal production, and the President of the Institution of Mining Engineers—the parent society of all British mining societies—is living up to the traditions of the race and the Institution when he dares to assess the probable effects upon the Empire of the failure of the British Isles in coal production.

The figures quoted by Sir John Cadman, which were compiled in Toronto by the 12th International Geological Congress in 1913, show that in estimated physical content Canada has sixty times more coal than remains in the British Isles. Such a statement is not, however, sufficiently revealing unless it takes into account the geographical position of the coal deposits and their physical characteristics, but it points distinctly to Canada as the successor of the British Isles in those essential industrial activities that have founded the Empire and knit it together. The burden of Empire is being shifted to Canada. In the light of Sir John Cadman's presentment is it too much to say that Canada's neglect to develop her own coal resources, her thoughtless policy of ease and dependence upon the United States for coal, our present defenceless and humiliating position, have far wider bearings than the present comfort of eight millions of persons in Canada? In a time of world-wide necessity, Canada is found wanting in an essential of national independence, and when world-tides are setting in new directions and it is most desirable that our young country should take these tides at their flood, we are reduced to impotence because our statesmen are unacquainted with the coal-mining tradition of the Empire which, to those who will read it, recites that naval, military and commercial competence all proceed from and are based upon coal.—Ed.

We meet to-day under conditions that are very different from those which were with us last year. Happily the war is over, and although its ravages are still with us, and the irreparable losses we have sustained are ever in our minds, we rejoice that, with our gallant Allies, we have won a victory which will add another page of honour to the history of our Great Empire, and which we hope and pray may have established the peace of the world for many years to come.

In reflecting upon a subject for my Address, I experienced a difficulty, for there is a problem which has been so prominent of late to which I feel that I must refer, a problem which, however, has become so controversial and has raised such divergent views, that I am bound to confess I feel some hesitation in referring to it.

Realizing to the full the risks I am running, and by no means without a feeling of diffidence, I am going to ask you to allow me to direct your attention to that industrial problem which is exercising so much public attention to-day. And in doing so I shall endeavor to indicate the "big side" of the problem with which not only the coal-mining industry of Great Britain, but the whole Empire is brought face to face.

I am, therefore, going to preface my remarks by directing attention to the coal resources of the world, with a view to indicating the magnitude of the subject, and if possible also to draw attention to the poor prospect there is for our industrial future unless we broaden our views and realize our true position in relation to the world's coal resources.

It is so easy for us to become lost in a mist of internal differences, and to forget all that is terrible war has taught us. Never was there a time when the necessity for combination of effort should be more obvious to us, and never was there a time, moreover, when energy and enterprise were more necessary to the welfare and prosperity of Britain.

Let us consider then the estimated coal resources of the world, first of all in relation to their geographical situation, and then with regard to their proximity to industrial centres and their national grouping.

The figures shown on the map exhibited are taken from the *Coal Resources of the World*, compiled and published by the Twelfth International Geological Congress (Canada) in 1913; they include all seams from 1 foot in thickness and over, and down to a depth of 4,000 feet. The estimated reserves of the world, expressed in million tons, are as follows:—

	Million tons.
America	5,105,528
Asia	1,279,586
Europe	784,190
Oceania	170,410
Africa	57,839
Total	7,397,553

These quantities may be subdivided, in accordance with the various nationalities, as follows:—

	Million tons.
United States	3,838,657
British Empire:	
Canada	1,234,269
Great Britain	189,533

Australia	165,572	
India	79,001	
British Africa	56,849	
New Zealand	3,386	
Newfoundland	500	
British North Borneo	75	
		1,729,185
China		995,587
Germany		423,356
Japan		7,970
Rest of the world		402,798
Total		7,397,553

Although these figures are only approximate estimates, the basis on which they have been compiled is the same, and for comparative purposes they are of great interest and value.

It will at once become evident that if the potential value of coal resources is a measure of a country's industrial wealth, the United States of America, China, and Germany, with their stupendous reserves, will last longer in the industrial race than the United Kingdom, but that the British Empire taken as a whole, with her resources scattered about the world, is nevertheless in a position of considerable strength.

Let us examine now the rate at which these reserves have been depleted. It is significant how the order of annual output by nations is arranging itself gradually in accordance with the relative potential magnitude of each country's total resources.

These figures are very striking, for they indicate that for a short period prior to the war the output in the United States of America had increased at an annual rate of 6 per cent, Germany 4 per cent, China 3 per cent, and Great Britain 2 per cent. And it is clear, moreover, that unless some new source of power be discovered, the dominant industrial position will continue to move westward.

It should be observed that Great Britain has occupied a unique position in the past, in that her coalfields are distributed within easy reach of the seaboard, and that as the coal merchant of the world she could place her surplus coal into ships with a facility not possessed by any other nation. With the growth of railways however, this natural advantage is by no means as great as it was. As some indication of the change in this respect, and indeed as an indication of the coal-using capacity of various nations in their industrial development, the railway mileage of some of these countries may be cited; and for this purpose the following figures are of interest:—

	Date	Miles of Railways.		
Country.	opened.	1840.	1906.	1916.
United Kingdom	1825	1,857	23,063	23,701
Germany	1835	341	34,563	37,894
France	1828	....	24,755	32,030
Canada	1836	16	22,452	38,604
Japan	1874	....	4,783	5,856
China	1883	....	.....	6,109
United States	1827	2,818	222,340	259,705

It is, moreover, instructive to examine the shipping tonnage, as recorded in Lloyd's Register, which again may be taken as a measure of a country's industrial capacity:—

Tonnage of Vessels of 100 *Tons and Upwards.*

Country.	1886.	1906.	1916.	1919.
British	11,165,092	17,611,096	20,901,999	18,607,875
U. S.	2,083,002	4,241,589	6,148,861	13,091,773
Worlds total	21,507,856	37,554,017	48,683,136	50,919,273

It would seem that about the year 1923 the United States will have a tonnage equal to that of Great Britain.

Before I elaborate upon the foregoing figures, I should like to say a few words regarding the conditions of production and consumption of coal as an article of wealth.

It will be observed that our resources are distinctly limited, and it may be assumed, with our limited knowledge of the nature of any new source of power, that, compared with any other nation, dearth of coal to this country must mean national ruin.

Enough has been said elsewhere as to the gigantic increase in the population of this country during the past centuries, of the increases in our exports, in all commodities, and of the increase in those areas comprising the British Empire.

But when we consider what have been the factors at work which have made this British Empire, we are forced to no other conclusion than that it is due to the growth of our coal-driven industries and the liberation of human energy.

I do not propose to touch upon this latter phase other than to say that no matter to what extent the enlightened policy of liberty which crept into Europe at this date, has played a part in our general prosperity, it would have been impossible to attain the position we enjoy to-day if it had not been for the power we possessed in our coal resources.

Now, what are the particular aspects of the question that are exercising the minds of thinking people in Great Britain to-day? There is great industrial unrest, a persistent clamoring for better conditions and better wages on the one hand, and for profits and freedom from Government control on the other. So violent did this controversy become that the Coal Industry Commission Act was introduced, and for the purpose of considering the question from every standpoint a Commission of Enquiry was appointed on which sat some of the most violent and vociferous members of each school of thought.

For a time, at any rate, it has afforded some relief to the tension under which the extremists were labouring. Many important points have been considered, but in the deliberations that took place the large aspect of the problem remained in obscurity, and the published proceedings of the enquiry can hardly be said to have added dignity to the parent coal industry of the world.

No sane person will deny that modern civilization requires better living conditions for all; no experienced observer ,moreover, will fail to deplore the paucity of capital development into which a great many of the collieries of the country have dropped; nor will he allow his scientific mind to be satisfied with the extravagant waste of fuel that takes place in almost every industrial and social organization in which coal is used.

At this juncture, when the facts are staring us in the face, and when the nation's industrial existence is in peril, it is lamentable to see such an exhibition of feeling.

What does this state of affairs reveal? It reveals a lack of organization in the industry as a whole, as well as a total ignorance of the rocks towards which we are slowly drifting.

A diminishing output is slowly having a serious effect upon us, and is indicated in the following figures:—

Total Coal Produced Per Annum Per Person Employed

Year.	United Kingdom.	Canada.	Australia.	United States.
1886	312	341	333	400
1900	298	457	426	494
1906	275	439	462	596
1912	244	472	542	660
1916	263	471	547	731

The cause of this diminished production will be found in the increased difficulty of working the coal —not in an absolute sense, for there are probably no mechanical difficulties within very wide limits which ingenuity cannot surmount—but in relation to the ease of working other coalfields to which our own have been, and in some cases still are, superior, but which are gradually gaining on us as our mines become deeper and their more accessible.

There has been much speculation as to the real cause of this diminished rate of output, and it has been said that a policy of restriction of output has been introduced and encouraged by the workers. I have never seen any tangible evidence of such a policy, and I do not believe it to exist; nor do I believe for a moment that the great body of workers in this industry, with their great traditions behind them, are capable of any such policy.

As I have indicated, the deeper the coal has to be drawn, the farther it has to be carried to the shaft and the less must become the output per man unless there be at the same time a progressive and organized introduction of mechanical appliances and better conditions that will enable the human factor to be utilized with greater efficiency.

It seems to me that we must produce cheap coal. By "cheap," I mean relatively cheap, as compared with the ruling prices of the world; and there must be a large surplus for export: for when our coal becomes scarce and dear, as it is temporarily to-day, the world will not adapt itself to our convenience, but will buy elsewhere.

As we know to our cost at the present time, rising prices for coal mean rising prices for every article consumed by the miners as well as by the people; furthermore it is obvious that with the high price of coal, pressure must be exerted continuously to secure the highest wages for the workers. And as ill-paid and discontented workmen generally mean inefficient labour, one is bound to recognize that the real remedy for the production of cheap coal does not lie in curtailing the wages of the workers.

The remedy lies in every section of the industry realizing that the only way in which this country's industrial position may be maintained is by increased efficiency on the part of every human unit in it, by more efficient use of plant and materials, by greater care in the way coal is made use of in the various manufacturing industries and in domestic life, and by the export of greater and greater quantities of coal.

If England does not wake up to the recognition of these fundamental essentials, she will assuredly be relegated to a position amongst the nations of the world very different from that which she occupies to-day.

So long as Great Britain continues to share in the great commerce of the world, so long will her coal-consumption and her output increase.

It is absolutely necessary that every advantage in the way of greater economies of motive power should be converted into capital to be devoted to the further development of the industry; and this applies not only to our collieries, but to every other industry as well.

It is unnecessary for me in an Address of this character to labour the fact that so little of the heat value contained in coal is utilized. It is well known that from 25 to 50 per cent of the total quantity of coal at present consumed can be saved and still the same amount of heat or power be generated. And in the discoveries still to be made in the better utilization of fuel, it is imperative that we should not wait for other naitons to give us the lead. We must stimulate the Watts and and the Murdochs among us, and must be lavish almost to the degree of the spendthrift in our investment in research, whether it be from the national or from the private purse. The coal-mining industry of the country has still much to do in this direction, and it is regrettable that the enlightened policy entered upon by the Doncaster coal-owners, under the able guidance of Dr. J. S. Haldane, and more recently by the Lancashire and Cheshire coal-owners, under the presidency of Mr. R. A. Burrows, has not been followed in other coal-mining centres.

It is in this direction that the solution will be found, rather in wrangling over such hypothetical discussions as to the merits or demerits of nationalization.

I do not wish to imply that considerable progress has not been made in the direction of economy in fuel: there are many industries in which great strides have been made. One has only to look at the progress in blast-furnace practice and in the development of the steam-engine. The excellent paper contributed by Messrs. Hill and Cork* indicates what has been done in this district.

It is not unnatural that nationalization should be suggested at this period of our existence, and we must not dismiss the suggestion and dogmatize as to any hidden motive which has stimulated those who advocate it, for I believe that they are sincere in their belief that it is a simple remedy and an easy way of meeting the tide of circumstance and the difficult national conditions with which we are faced.

I say it is not unnatural that such a proposal should be seriously advanced to-day. We have become so accustomed to Government control in the everyday affairs of life during the war, we are so inured to the establishment of new State departments and to new controllers, that the invasion of what were formerly regarded as the rights of the individual no longer shocks or alarms us. The various functions which it is suggested that the State should undertake in industrial and domestic spheres have assumed truly staggering proportions.

If, however, we reflect on what such State control will involve, we shall realize that it would convert the State into a trading concern and, sooner or later, would involve us in international complications which

* Trans. Inst. M.E., 1918-1919, vol. lvii., page 177.

could only increase the risk of war. We should ,in fact, be emulating the example of Germany, whose method we have learned to despise.

In business it is absolutely necessary to act promptly, to have a free hand, and take risks, and we know that with the most efficient Government department and the very best-intentioned of civil servants such conditions are impossible.

A department of State, constructed under our present Government machinery, must err on the side of safety. With the possibility of public disclosures resulting from mistakes, no business could exist which had to compete in the markets of the world.

Another and most important factor presents itself to the student of this problem. The State, occupying as it does a detached and impartial position, must bring its power into play in the settlement of industrial differences, and, in order to perform this function impartially and honourably, it cannot itself be the controlling authority.

I am almost tempted to think that it would be better for the prosperity of this country if the coal-owners and miners were to combine and form a gigantic trust, so as to stimulate the output and an ever-increasing export of coal, and thus ensure to Great Britain the retention of her place as a seller of coal to the world.

If by maintaining a high price of coal in this country the population could be impelled to find ways and means of using more effectively the heat values contained in the coal, it is conceivable that even this drastic policy might ultimately be to the national advantage.

If the great traditions of the coal-mining industry —an industry of which the country should be justly proud, an industry in which all that is noble and good in the human characteristics of the race has been so conspicuous for centuries—is to count for nought, in Heaven's name let us prepare for our gradual decline under the cloak of nationalization.

In my remarks to you last year I pointed out the vital need there was for all of us to pull together in harmony and work in the closest possible co-operation if we were to secure that victory which we were determined should be ours.

These words I might repeat to you to-day, now that the victory is ours and peace is with us again. There is as great a need as ever at present for that spirit of co-operation and comradeship in the whole of our organization.

The solution of the problem appears to me to lie in a better understanding and a fuller co-operation between all those engaged in the mining industry. We must do our utmost to get rid of misunderstanding, and eliminate the causes of labour antagonism and dissatisfaction. There must be personal as well as collective interest in the prosperity of the industry, and a real and sincere spirit of co-operation among everyone concerned. We must also be thoroughly awake to the need for greater efficiency in our methods and a more complete utilization of the heat values contained in our coal. There must, moreover, be a full realization of the fact, which none of you, I am sure, will question, that this problem is one which stretches far beyond our own shores, and in which is involved the future prosperity—nay, the very destiny —of our country; a realization, too, that our own existence is merged into that of a Greater Britain and that through the combined coal resources of the Empire we may still hold a leading place in the intellectual and industrial development of the world and bring peace and happiness to millions of its peoples.

THE WORLD OUTPUT OF OIL IN 1919

"Petroleum Times," of London gives the world output of petroleum in 1918 and 1919 as follows:

	1919 (In barrels)	1918 (In barrels)
United States	377,719,000	355,927,716
Mexico	87,359,436	63,828,327
Russia	34,284,000	40,456,182
Dutch East Indies	15,780,000	13,284,936
Roumania	6,352,929	8,730,235
India	8,453,800	8,000,000
Persia	8,320,000	7,200,000
Galicia	6,255,300	5,591,620
Peru	2,560,000	2,536,102
Japan and Formosa	2,120,500	2,449,069
Trinidad	2,780,000	2,082,068
Egypt	2,548,000	2,079,750
Scotland	2,048,000	2,032,000
Argentine	1,504,300	1,321,315
Germany	925,420	711,260
Canada	220,000	304,741
Venezuela	245,300	190,080
Italy	38,254	35,953
Other countries (appr.)	25,000	20,000
Totals	559,539,239	516,801,354

With reference to Canada's contribution the following curious editorial comment is made:"..... "It must come as somewhat of a regrettable fact that Canada's production is on the down grade. Here, recent events leave favorable impressions, but we think that until the Dominion's shale reserves are commercially tapped, the Dominion can do little to supply the enormous demand which exists within its own borders." Unless there is a very widespread misapprehension among Canadian geologists it is a little too early to conclude that Canada's oil reserve is all contained in the oil-shale deposits of Nova Scotia and New Brunswick. It is also evident that London opinion attaches greater value to these oil-shales than has been accorded to them by Canadian investors.

NEW BRUNSWICK GAS AND OIL FIELDS

The report of the New Brunswick Gas and Oilfields for the period from August 1st, 1919, to December 31st, 1919 states that the gross revenue amounts to £40,773, and the net profit, after debiting against revenue all well sinking and deepening costs, except the cost of well 52 situated outside the area of the Stony Creek Field, is £18,670, to which add balance brought forward, £25,921, making together £44,591, out of which the directors have carried to general depreciation fund £15,235, bringing it up to £21,235. A dividend of £10. 6s. 8d. per cent. on the Preference Shares will complete payment on the cumulative preferential dividend to December 31st, 1919, including arrears, and the directors accordingly recommend the payment of same, less tax, together with a dividend of 5 per cent. (less tax) on the Ordinary Shares, leaving to be carried forward £17,810.

The Mineral Resources of Alberta

First Annual Report to the Mines Branch of Alberta, 1920.

The Province of Alberta has issued a first annual report on mineral resources made by Dr. John A. Allan, Professor of Geology in the University of Alberta. As stated in the letter of transmittal, the Report, being the first of its kind published by the Provincial Government, is largely a compilation of the information published to date by the Geological Survey and the Mines Branch at Ottawa. About four weeks was spent by Dr. Allan during the summer of 1919 in making a general field survey of some of the mineral deposits, chiefly those containing iron and salt, the observations then made being included in the Report. The eighteen different minerals of economic importance known to exist in Alberta are listed, and the individual occurrences are referred to in detail.

The minerals are: Bitumen, building stone, clay, coal, copper, gold, gypsum, iron, lead, mineral springs, natural gas, nickel, petroleum, phosphate, potash, salt, talc, and zinc.

In order of economic importance these occurrences may be listed as coal, natural gas, clays and bitumen, the remaining minerals being present only in small quantity, or of potential value only, in default of more exact information. The most interesting possibilities are the occurrence of petroleum and the possible association of potash bearing minerals with partially known occurrence of gypsum and salt. The impression is to be gathered from reading the Report that as yet very little is known about the far northern portion of Alberta.

The Report is a fair and discriminating statement of the mineral resources of a province that has hitherto been chiefly interested in agriculture, and has only recently acquired the urban population that requires the development of minerals, or that concentration of capital that renders mineral development possible.

Very little space is given in the report to the coal deposits of Alberta but it is not necessary to be loquacious when it is possible to preface the chapter on coal with the statement that: "Alberta contains 17 per cent of the coal reserves of the world, and about 87 per cent of the coal reserves in Canada."

Whether Alberta's other minerals will prove to be large in quantity and valuable in themselves, the persent state of knowledge of these deposits, as disclosed by the Report, will not permit of judgment at this time but their economic value will be relatively greater because of the proximity of so large a supply of bituminous coal. Speaking superficially, and basing the statement on what is admittedly only a superficial survey of the mineral deposits of Alberta, we believe that this province will some day be the seat of great chemical industries, having as their foundation the availability of coal in great quantity. The occurrences of salt are particularly interesting in this connection, and money spent on proving the occurrence of mineable salt, or sources of brine, will be well expended. A Calyx drill, to test the presence of salt, is being put down by the Provincial Government in the the vicinity of Fort McMurray and definite information is expected to be obtained early in 1920.

The chapter on iron-bearing rocks disposes of some fairy tales, and indicates that as yet no commercially workable deposits of iron-ore have been found. On the Sheep River, south-west of Okotoks, the presence of billions of tons of iron-ore has been reported in newspapers, but the Report states "not a single ton of rock exposed in this section would be classed as iron ore." Dr. Allan, quite rightly, remarks: "I wish to emphasise this point, that steps should be taken at once to prevent the circulation of such an erroneous report, which is most detrimental to the industrial welfare of the country when the facts are known."

Alberta should be very careful in the matter of iron ore. This material is of all raw materials dependant as to relative value upon location and the proximity of coal. A very lean ore within economically transportable distance of coal deposits is relatively of greater importance than rich ore situated at points remote from coal supply. The iron-bearing rocks of Alberta, so far as now known, are, according to report, disappointingly small in quantity and meagre in content of iron, and it may be that iron ore will have to be imported into Alberta, because one thing is very certain, namely, that wherever there is found a large deposit of bituminous coal of coking quality, there will be brought the ores necessary for metallurgical industries, of which iron smelting and steel manufacture is chief.

The mineral deposits of Alberta have a possible value out of all relation to their present commercial exploitation, and it would seem that there are some local problems that require to be solved before proper use can be made of the minerals of the Province. For example, the clays present difficulties in the drying stage of brick-making, and, as stated in the Report, "further investigation and experimentation on the physical properties of the raw material are urgently required before the manuacturer can be induced to operate on these resources." Similar problems are associated with the utilization of the bituminous sands on Alberta.

The Province is to be congratulated on the publication of this Report, marking, as it does, a stage in the development of Alberta, and that forward step on the historical road of human culture always signalized by the addition of mineral and metallurgical pursuits to agriculture.

Many of the problems of Canada, particularly the apparent conflict between the agricultural interests of the West and the manufacturing interests of the East, will disappear as Alberta comes into her own as the industrial centre of Canada, an evolution of the future that is predestined. As the flower is contained in the bud, so is an industrial dominance in Canada assured to Alberta through the possession of the greatest fuel concentration in North America. Coal she has beyond any doubt, and oil she may have, although that is not yet a demonstrated fact, and, sooner or later, Alberta will become dominant in industry, in population, in finance, in political influence and material power, as is the destiny of any country rich in coal beds and populated by a civilized and virile people, particularly if it is surrounded by a territory unprovided with coal resources.

SILVER IN ONTARIO.

By Dr. W. G. MILLER in "Canada."

The first great precious metal area discovered in North America east of the Rocky Mountains was that of Cobalt, Ontario. Prior to 1903, when this area was found, both gold and silver mines had been worked east of the mountains, but none of the fields were of first importance, and the belief had grown up that the precious metals in quantity were only to be found in the United States and Canada in the mountainous regions of the West.

The discovery of Cobalt has attracted attention to the many little-prospected regions that occupy a large part of Canada in the east and north. Silver veins were discovered at Cobalt in 1903, during the building of the Ontario Government railway—the Temiskaming and Northern Ontario. Owing to the fact that there was little real prospecting in the area at that time the discovery attracted little attention, and although Government officials, through publication, made the discovery known to the world, the public took little interest in it for a year and a half. The belief was strong that Ontario was not destined to become a great precious metal producer. Gradually, however, the value of the area came to be recognised, and by the second half of 1906 Cobalt was the centre of a great mining boom. The companies floated had an aggregate capitalisation of nearly £100,000,000. Of course, many of them were what are known as "wild cats," but a number of them have paid large dividends. Some, indeed, have paid in dividends two or three times their capitalization.

Four Metals.

The veins of cobalt are narrow and contain values in four metals, which, in order of their economic importance, are silver, cobalt, nickel, and arsenic. Since 1907, when mining began, the area, with two or three small outlying ones in the district, has produced about 300,000,000 ounces of silver. The value of the other metals produced there, especially that of cobalt, has also been large.

As regards the metal cobalt and its compounds, the mines of this area now absolutely control the world's markets. It is a curious fact that Ontario should have a monopoly not only of this metal, but practically all of the sister metals, nickel and arsenic. Both are necessities in modern metallurgy, especially in alloy steels.

A striking fact about the production of the Cobalt area is that about one-half of the receipts from the sale of ore have been paid out in dividends to the stockholders in the mines.

The Cobalt deposits, as a whole, require little capital to work them. One of the first men to begin work expended a total of $2,500 on labor, buildings, mining tools, etc., and produced ore that sold for $250,000.

The greatest production in the area was in 1911, when over 31,500,000 ounces of silver were produced. Although the production has declined since then, the value of the output during the last two years, owing to the rise in the price of the metal, has almost equalled that of last year of maximum output.

The silver deposits are not confined to the marvellously rich area in the vicinity of the town of Cobalt is shown by the fact that important discoveries have been made at 12 or 15 miles to the north-west, at Gowganda. In the last-mentioned area a very rich mine is being worked. It is believed that discoveries of silver ore will continue to be made in this part of Ontario for years. When the veins are not exposed at the surface, prospecting is difficult. It is necessary to trench through the soil to the compact rock beneath. Most of the veins have been found by this method. Other veins have been found only by underground workings, as they do not come to the surface of the rock.

Cobalt lies within a few miles of Lake Temiskaming, which has a length of about 60 miles and is an extension of the Ottawa River, here forming the boundary between the two Provinces of Ontario and Quebec. This river was a great route for travel by the earliest explorers and Jesuit missionaries in this part of Canada. On the shore of one of the bays on the north side of the lake is a rather striking outcrop of lead ore. This outcrop was doubtless seen by the earliest explorers as they paddled their canoes northwards, following the shores of the bays for protection from wind and wave. On a French map, published in 1744, and based on a still earlier one, the bay is marked "Bay of the Mine," or "Ance a la Mine." That the Cobalt mines, only a few miles away, were not discovered till the building of the railway, nearly 160 years later, is a striking confirmation of the belief held by many of the best-informed Canadian mining men that great discoveries will be made in the unprospected regions of the Dominion.

An Interesting Speculation.

Had the Cobalt area been discovered during the French period, prior to 1756, the whole political complexion of North America would likely have been changed. The richness of the deposits and their general character would have enabled them to have been worked at a huge profit even in those days. The Ottawa River afforded a fine transportation route, and labor and most supplies were cheaper at that time than they have been during recent years, while the price of silver was high. The discovery of the Cobalt area at the beginning of the eighteenth century would naturally have led to the French coming to Canada in much larger numbers, and the likelihood is that they would not have lost the country in 1756. On the other hand, the New England colonists, with large additions to their numbers from the Homeland, might have swarmed into what is now the Province of Ontario and wrested it from the French at an earlier date. Then, if events had occurred as they did in 1776, when the United States detached herself from Great Britain, Ontario and the surrounding region would probably have become part of the Republic. In either case, owing to the large incursions of French or of English colonists at that early date, it is safe to say that the great riches of Cobalt would have had a lasting influence on the destiny of what has come to be called the Dominion of Canada.

When Ontario's resources become better known there is little doubt that further prospecting will lead to discoveries quite as wonderful as those of Cobalt.

Mr. Harrington, the Fuel Controller of Ontario, recommends as a solution to our national fuel problem that Canadians should dig for coal in Canada. Reams have been written, and many pages will still be written on this question, but when all is said and written, Mr. Harrington's terse advice will be found to point out the only way.

Our Northern Ontario Letter

THE SILVER MINES.

The first half of 1920 closes another favorable period for the silver mines of Cobalt. During the six months, the production of silver, according to preliminary estimates, amounted to around $5,500,000. Added to this is a considerable amount of cobalt-oxide and cobalt metallics which brings the value of the whole up to not far under $6,000,000 for the half year.

During the past week, some 140 members of the National Editorial Association of the United States were the guests of some of the leading mines of Cobalt. They were shown the standard methods of mining and metallurgy, following the silver as found in its native state through the process of treatment until actually run out in bars.

The Nipissing Mining Company has declared a dividend of 5 per cent., payable July 20th and amounting to $300,000. This means a total of $1,200,000 paid so far during the current year, making an aggregate of $21,540,000 since the company first went on a dividend-paying basis in 1906. It is also announced that the cash in bank, Canadian and United States war bonds, ore in transit, etc., amounts to upwards of five million dollars, the highest point so far in the company's history and thus indicating earnings considerably in advance of the present large rate of dividend disbursements. A feature in connection with the standing of the Nipissing is that the 1,200,000 shares issued, are in the hands of more than 13,000 shareholders. This goes to show how widely are being distributed the earnings of the company.

Following last week's announcement in the "Journal" that a re-survey of the geology of the Cobalt silver area would be made this summer by the Ontario Bureau of Mines, it is now interesting to note that Cyril W. Knight, Assistant Provincial Geologist is already on the ground and has commenced this very important work. The task is perhaps one of the largest ever undertaken in this district, in connection with geological survey work and may occupy about six months. When completed, however, it will consist of an assembly of up-to-date data of great value to the owners of property in the district.

It is announced that the capitalization of the Victory Silver Mines, owners of the old Hylands property, has been increased from $500,000 to $2,000,000, being divided into 2,000,000 shares of the par value of $1 each. It had formerly been planned to consolidate the Victory property with the Adanac, but this plan did not materialize, and the Victory Company is now planning to proceed with a comprehensive development program. The geology is favorable, and there appear to be excellent chances of commercial deposits of silver.

The Ruby Silver property, situated near North Cobalt, in the township of Bucke, has commenced work in a small way, having been idle since 1907. The shaft of 56 feet has been de-watered, and arrangements are being made to carry out a limited amount of underground work. A large calcite vein is in evidence, in which medium grade silver values occur, while a narrow pay-streak is found along one side of the vein.

Work has been suspended on the Bartlett property in the Gowganda district, it having been decided to await better transportation facilities. The property has been worked quite steadily during the past several years.

The possibility of work resuming on the Aguinico property in Bucke township is reported. It is thought possible to mine the large deposits of cobalt at a profit, and any work to be done would have this object in view. One of the strongest cobalt veins in the district occurs on the Aguinico.

Criticism of the Ontario Government has been volunteered by mining men interested in the Gowganda district. It arises from the fact that the crushing equipment with which the construction of a macadam road was commenced to the camp last year is now being removed. The equipment was assembled at considerable expense, and work had just gotten well under way when winter arrived. While no official announcement has been forthcoming from the Government, it is presumed that the removal of the equipment is due to a charter having been granted to the Northern Light from Elk Lake to Gowganda. As to this, the mining men point out, that unless the Government has received a guarantee that such a railway will actually be built, the decision to leave the mines of the district at the mercy of the fortunes that are to attend the efforts of the promoters of the light railway project to finance the enterprise is not good business.

An effort is being made to introduce "Thompsonite," a comparatively new blasting powder, into more general use in Cobalt than formerly. Its manufacturers claim the explosive has a greater breaking power and gives off less gas and smoke than other blasting powders in common use.

The Appellate Division of the Supreme Court of Ontario delivered judgment June 25th in the case involving the correct location of the boundary between the Violet property of the La Rose and the O'Brien Mine. The judgment declares the O'Brien is entitled to possession of everything west of a straight line from the No. 4 post of the Colonial property "To Shaw to Earle". An injunction is accordingly given against the La Rose tresspassing past that point, with damages. No costs are imposed against either party.

The judgment is a reversal of the decision of the lower Court.

Ore and Bullion Statement.

During the week ended June 25th, four Cobalt companies shipped an aggregate of nine cars containing approximately 720,723 pounds of ore. The Nipissing with five cars containing 444,304 was the heaviest shipper, as shown in the following summary:—

Shipper	Cars	Pounds
Nipissing	5	444,304
Mining Corporation	2	125,350
McKinley-Darragh	1	84,150
Temiskaming	1	66,919
Totals	9	720,723

During the corresponding period the Mining Corporation shipped 50 bars of bullion weighing 50,509 ounces. It is noted that one large shipment made on June 10th was omitted from previous reports. It was made up of 99 bars containing 100,333 fine ounces. The only other bullion shipped during the week just ended was the Dominion Reduction with seven bars containing 734 ounces.

THE GOLD MINES.

Not a few of the gold miners of Northern Ontario believe they see a solution of the problem of the present shortage of labor. They point to the steady stream of immigrants pouring into Canadian ports of en-

try. Already the operating companies report a change for the better, and, emigration, while still more or less slow, is expected to gain momentum as the year advances.

For the first half of 1920, the preliminary estimates indicate a gold output of over $6,000,000 from the mines of Northern Ontario, the production amounting to more than the value of the silver produced during the corresponding period. It is believed this rate will be still further exceeded during the last half of the year.

On July 20th the Dome Mines will disburse a dividend of $100,000, amounting to 2½ per cent. It is understood to be the intention of the directorate to continue dividends at the rate of 10 per cent. annually, in addition to which a capital reduction may be made at such time as the treasury permits. It is pointed out that a comparatively small treasury of $2,000,000 would make it possible to pay shareholders $5 per share, and would thus reduce the par value of the issued shares from $10 to $5 each, upon which a dividend of $100,000 quarterly would then amount to 20 p.c. annually. Following the recently held annual meeting, the directors of the Dome paid a visit to the mine, and were highly pleased with the general outlook.

Some opposition is developing in connection with the proposal made by the directors of the Porcupine V. N.T. to borrow $50,000 from the Associated Gold mines of Western Australia for the purpose of financing the re-opening of the Porcupine V.N.T. The opposition is based upon the fact that the directors propose to grant a first mortgage against the mine, whereas it is felt that a better course would be to sell a part of the large block of treasury shares remaining in the treasury.

Operations have been indefinitely suspended at the property of the Dome Lake Mining and Milling Company. The small low-grade ore shoots have been found to be too erratic to treat profitably under the present economic conditions. It is believed, of course, that another attempt will be made to operate the property following a re-adjustment of conditions.

In May, according to an official statement just issued by R. C. Coffey, manager of the Lake Shore Mine, that property produced $41,187.62, having treated a total of 1,636 tons of ore and recovered an average of $25.18 from each ton treated. A feature of the monthly statement, is this brief announcement: "Preparations are being made to sink the shaft another 400 feet." In view of the ore treated during the past two years having averages between $24 and $25 to the ton, the decision to continue the shaft from its present depth of 400 feet to a depth of 800 feet is regarded as exceedingly important. Should the bonanza ore a found at the 400-ft. level be found to continue with similar volume and richness at the 800-ft. level the future of the Lake Shore would take on such proportions as to cause the company to greatly increase its milling facilities. The result of work at the 600-ft. and the 800-ft. levels will determine the extent of mill additions, according to a statement made to the "Journal" some months ago by Harry Oakes, president of the company. Now, with preparations actually under way to carry out this work the prospects of greater production from the Lake Shore appear to be extremely favorable.

At the Kirkland Lake Gold Mines, which is controlled by the Beaver Consolidated of Cobalt, the output of $1,200 daily as reported not long ago in the "Journal," has now been exceeded, a record of around $1,400 daily having been established for at least a part of the month of June. It is believed that the mine is now well on its way to earn substantial net profits, and that its large mill with a capacity of 150 tons is about to weigh heavily in its favor.

Shareholders of the Baldwin Gold Mines are reported to ratify an option of the property owned by the company at Kenogami Lake in which the holders of the option would be obliged to carry out a specified amount of work each month, in return for which they would be given treasury shares at the rate of 40 cents each and be permitted in that way to acquire a 51 per cent. interest in the company. The Baldwin property lies about six miles south-west from Kirkland Lake.

Having run out of money, the Bourks Gold Mines, situated at Bourk's Siding has closed down indefinitely. Considerable work was done on the property during the past couple of years, and substantial tonnage of ore was opened up in comparatively narrow ore shoots. The promoters of the enterprise appear to be confident of being able to handle the ore profitably provided the requisite capital were available. No official announcement has been made relative to what methods may be adopted to re-finance the enterprise.

An enthusiastic meeting of about 200 shareholders of the Crawford-Skead Gold Mines was held recently in Chatham. It is announced that subscriptions for shares are increasing and that an aggressive campaign of exploration and development work is now under way.

The work of surveying a route for the proposed light narrow-gauge railway from Swastika to Kirkland Lake has commenced. It is planned to build the line direcly through the proven mining area of Kirkland Lake, thence to pass through the township of Lebel where very favorable results are announced at a number of new properties; after which it would pass through the township of Gauthier to the Argonaut Gold Mine, and, finally to Larder Lake. It is the intention of the builders to continue the line from Larder Lake through the township of Skead and back through the Boston Creek district to the T. and N. O. Railway.

TORONTO NOTES

A prospectus just issued by the King Kirkland Gold Mines, Limited, draws attention to the fact that the company has completed its organization with an authorized capital of $2,500,000 and $1,250,000 in the treasury. Seven mining claims in the Kirkland Lake District have been acquired, which consists of 309 acres in the township of Lebel, with a lake near the centre of the property for milling and mining purposes, and these will be thoroughly developed. It is stated that visible gold is in evidence in a vein which has been exposed for about 150 feet on surface and assay values are stated to be high.

Hamilton B. Wills, stock and bond broker, Toronto, on July 1st turn over the entire business to a company to be known as Hamilton B. Wills & Co., Limited, which will own the entire assets of the organization and assume all its liabilities. Mr. Wills will continue to be the guiding spirit of the new company ad will remain as President and General Manager. The company has branches in Toronto, Detroit, New York, Rochester, Buffalo, Syracuse, Cobalt and Porcupine.

British Columbia Letter

The Metal Mines

Stewart, B.C.

A prospect has been located on Fish Creek about six miles from the town of Hyder in the Portland Canal District, over which Henry Benson, a resident of Victoria, B.C. and his sons are considerably excited. They are of the opinion that there property will turn on development to be fully as rich as the now well-known Premier Mine, situated somewhat further north on the Salmon River. Not enough work has been done, however, to indicate whether there is any justification for this optism. Still there is a good lead and samples taken at the outcropping give returns of $120 a ton in gold, silver and lead. No trace of zinc is shown. The Bensons have organized a company of business men in the cities of Victoria and Vancouver and pro pose carrying on development during the summer.

The definite announcement from official sources that the Provincial Government plans the building of a road from the Premier Mine, to which point there already is a fairly good avenue of transportation from tidewater, as far as what is known as the Joker Flats has been received by mining men of the district with satisfaction. It is indicated that this work will meet the needs of a number of the most important mining undertakings in the Portland Canal District. Among these are the "Big Missouri" Group, on which work has been in progress for over a year and which is being continued extensively this summer, it being the intention to do home 12,000 feet of diamond drilling; "Mineral Hill," on which nearly two years work has been done; the "Hercules," which is to be developed this summer in preparation for which supplies already have been forwarded; the "Silver Tip" and ',Silver Crest" being opened up by Vancouver interests; and the holdings of the Algunican Development Company. Regarding the operations of the latter Company, which is said to be backed by Belgian capital. it controls a subsidiary concern known as the Northern Light Consolidated Group, a group of claims situated adjacent to the Premier Mine and diamond drilling thereon is contemplated this summer. The same Company has the Spider Group under option. This property, on which considerable development is planned, is situated on the west side of Long Lake and is equipped with an air compressor and other plant.

The Monitor Group of Mineral Claims, Salmon River, is reported to have been bonded by Vancouver interests. This is a well-known property having been located for years. Development consisting of surface stripping and some tunnel work has been done.

Alice Arm

The rolling stock of the Alice Arm Railway, running between tidewater and the Alice Arm Mine, Kitsault River, is being augmented materially. Part of a shipment of twenty cars is on the ground and three new locomotives are on order. It is thought that with heavier metal and new equipment not only will it be possible to make regular shipments of ore, but maintain the service for the greater part of the year: Preliminary work relative to the proposed extension of the railway to the Wolf Property, about three miles north of the Dolly Varden, has commenced. Surveyors are busy and it is reported that the contract has been awarded.

Omineca, B.C.

Several of the properties situated on Legate Creek, Skeena section of the Omineca District, are reported to have been bonded and it is stated that there will be much development this year as soon as the snow goes. When that occurs there will be a number of prospectors in the field. The B.C. Exploration Company is one concern showing considerable interest in the mineral possibilities of the region. In the 1918 report of the Minister of Mines, J. D. Galloway, Government Mining Engineer, in describing the M & K. property, Legate Creek, observed that some 130 tons of ore had been shipped in the early months of 1917. This consisted, he explained, of float lying on the surface wash and but little work had been done to ascertain where this ore originated. The float ore occurred in pieces weighing up to several hundred pounds and. Mr. Galloway asserted "it does not seem likely that it has been moved any great distance from the vein in which it was formed. During the slummer considerable work by the owners in prospecting stringers and showings of ore close to where the float had been taken out. Short tunnels have been run and cuts made and ore exposed, but it does not seem probable that the rich float ore came from any of these showings. "Again he explains that this ore consisted of an intimate fine-grade mixture of bornite and galena which was nearly solid mineral. Very little of this type of ore had been found in the ore showings occurring in solid formation. This more or les mysterious find of over two years ago, together with the evident merit of the properties of the creek in question, accounts for the promised activity of this summer both on the part of prospectors and operators.

Sheep Creek, B.C.

A new concentrating mill having a capacity of 50 tons of ore a day, has been completed at the Emerald Mine by the Iron Mountain Limited, operators of the property. This mine has been one of the steady producers of this section of the Province. Dnring 1917 the mine run averaged about: lead, 27 per cent; zinc, 5 to 6 per cent; silver 1½ ounces. As originally designed the mill was to have a capacity of 30 tons, but the addition of an extra set of rolls for the crushing and some alterations in the process, principally in the direction of limiting the percentage of the product sent through the ball mill, makes it possible to run through 50 tons, while the crushing capacity is set at 100 tons.

The Nugget Mines Ltd.

Sheep Creek has its property on a steady producing basis, the Mother Lode Mill as remodelled and extended being in operation. It is giving entire satisfaction. The ore is being taken care of as quickly as it can be brought to the surface.

Nelson, B.C.

The annual meeting of the Californian Mining Company was held recently at Nelson when it was reported that good progress was being made in the development work underway on the California Mine as well on the installation of new machinery in connection with the Athabasca Mill, which is being put in shape for the treatment of the ore. Officers were selected as follows: President J. R. Casin, Spokane, Wn.; vice-

president, J. B. Schieger, of La Crosse, Wis.; secretary-treasurer, W. R. Orndorff, Spokane, Wn.; auditor, John Fraser, Nelson, B.C.; Mine Superintendent, W H. Turner, Nelson, B.C.

Trail, B.C.

The site of the concentrating mill to be constructed by the Consolidated Mining & Smelting Co. for the treatment of the ores of the Rossland Mines has been definitely selected. It is a point between the towns of Rossland and Trail. Being on the hillside and within reach of an adequate and a sure water supply it is in every respect admirably adapted to the purpose in mind. A spur line of railway is to be constructed by the C.P.R. from Warfield to the new mill site, following a line surveyed by one of the staff of the Consolidated Company. This road will be down grade from Warfield, so that there will be no heavy hauling in bringing the ores from Rossland. The arrangement of the Mill will be such that the ore will be unloaded at the highest point into ore-bins and will travel thence downwards through the crushers to the kilns, ball-mills, grinders and classifiers, eparators, thickeners, filters, flotation and table concentrators until finally ready for delivery as concentrates to the smelter. This gravity system, of course, will reduce cost of handling to a minimum. The new wagon road from the smelter to the mill site already is under construction.

Vanvouver, B.C.

The mining camp of Phoenix will soon be no more. It is gradually being dismantled. The Granby Consolidated Mining & Smelting Co., has a crew of thirty or forty men removing its plant and shipping it to Grand Forks and elsewhere, twenty or thirty cars having been forwarded already. This work will not be finished before August when the C.P.R. will remove its steel. Its depot now is being taken away. The Great Northern has been busy in dismantling its railway line for the past month, several buildings in the town also are being taken elsewhere.

H. S. Munroe, newly appointed General Manager of the Granby Consolidated Mining and Smelting Co. in British Columbia, before leaving to take up his work at Anyox made an interesting public statement as follows:

"I have just made an inspection of the Cassidy coal holdings on Vancouver Island. Cassidy is a minature Gary and we expect to continue and expand our coal holdings at that point. The Granby Company has achieved in the mining world under its former management and our policy will continue to be one of progress. We hope to increase copper production at Anyox and to mine more coal at Cassidy.

"As to the general copper situation it is the belief among copper men that the industry today is in the best strategical position since the Armistice was signed and that by January, 1921, copper will have advanced to a price a little below that obtained during the war. Optimism reigns among copper interests. The domestic consumption is the heaviest now that it has been for two years and surplus stocks are less than at any time for that period. Exports to Europe are increasing right along and Japan is a heavier buyer.

"An example for the increased demand for copper is the work of centralization of telephone exchanges in Paris for all Europe. This alone will entail an outlay of $165,000,000. The electrical equipment for this undertaking will make a heavy demand on copper.

"As the Granby operations at Anyox it may be stated that the difficulties at the Coke Plant, incident to new operations of this character, are readily being overcome and in the course of a few weeks a satisfactory solution will be found which will make Granby entirely independent, as far as its coke supply is concerned. Operations at the by-product plant are going right along and inquiries from Great Britain and the Orient have been obtained for all by-products that Granby can furnish. However the home market is attractive just now and we are disposing of benzol, naptha, coal tar and other by-products of coal to advantage.

"The policy of Granby will be to prosecute vigorously exploration for ores in Northern British Columbia which may be tributary to the Anyox smelter and it also will be the policy of the Company to extend smelter operations as tonnage available warrants. We hope to acquire new properties or buy ores from other companies. Granby always is in the market for cuperiferous and silicious ores."

THE COLLIERIES.

The results of examinations conducted by the Board of Examiners acting under the Coal Mines Regulation Act of British Columbia during the last week in May at Fernie, Merritt, Nanaimo and Cumberland have been announced. Certificates of Competency are to be granted as follows:

First Class: Arthur Newbury, Nanaimo.

Second Class: William Beveridge, Cumberland; Michel Donald McLean, Michel; Benjamin Ball, Michel; Louis Francescini, Cumberland; John Gilham, Nanaimo; William Park, Nanaimo.

Third Class: Edward Hardy, Fernie; Robert Taylor, Natal; Robert Clarkson, Natal; Henry Ferryman, Michel; Robert McFegan, Michel; Joseph Travis, Bankhead, Alta.; Josept Lavin, Nanaimo; Robert Drybrough, Merritt; William Ross, Merritt.

Mine Surveyors: George W. Waddington, Merritt; Robert Strachan, Cumberland.

First class certificates qualify the holders to take a position as Manager of an active Colliery in the Province; second class certificates to act as Overman in the coal mines of the Province; and third class to take places in the mines as Shiftboss, Fireboss, or Shotlighter.

The retail price of coal in Calgary, Alberta, has been raised from $8.75 a ton to $10.50 for lump and $8.75 for steam. This action has been taken, it is stated, to meet the wage advances granted the miners recently. No definite word, however, had been received at the time of writing and that the agreement between the Operators and the Men had been ratified, although it is understood to have met with overwhelming approval when put to a vote at Fernie.

It is possible that the City of Vancouver will go into the coal distributing business. The cost of fuel has been the subject of much critical comment of late among the citizens and Mayor Gale has made the statement that, from data gathered, it would appear that the City might purchase and deliver coal from $1 to $5 a ton cheaper than it now costs the consumer. The investigation on the part of the municipal authorities is continuing.

PARTY TO INVESTIGATE PEACE RIVER OIL FIELD.

Arrangements are being made by the provincial government for further investigation, this summer, of the petroleum possibilities of the Peace River section.

The minister of lands has engaged Dr. John A. Dresser, consulting geologist, of Montreal, to head a party which will include Prof. McLean, University of Toronto, and Edmund Speaker, of the department of geology, Johns Hopkins university, Baltimore, Md.

THE YUKON PLACER MINING ACT AMENDMENT

An interesting piece of legislation, and one fraught with noteworthy possibilities as to mining in the Yukon Territory, Canada was recently before the Parliament of Canada, Ottawa. It is termed the Yukon Placer Mining Act Amendment.

On its second reading in the Canadian Parliament its design was explained by Hon. Arthur Meighen, Minister of the Interior, as follows:—

"Its design is to supply additional incentive to placer mining in the Yukon Territory. When the Yukon was opened up, and for many years thereafter, placer mining was vigorously prosecuted because the rewards under the then conditions were ample. They now are not so great as they were at that time, and it is sought by this Bill to amplify them in the following manner:

"To adopt the practice of issuing leases—that is to say lease of territory along creeks where placer mining is carried on of considerable extent—; practically a reservation of that territory for the applicant in order that he may prospect it and if he finds that it is in his interest to stake claims, to do so. The territory proposed to be granted in respect of land already worked over—that is land already taken up, cancelled or abandoned—is five miles in length on any creek, and the time allowed is one year. The prospector is bound to expend at least one thousand dollars in that year on prospecting operations, and if he does so he is entitled to a renewal, if he desires,, for another year, and under similar circumstances for a third. He pays $25 per mile or fraction of a mile rental for that prospecting lease. Then in respect of the class of claim already worked over, he is at liberty to stake within those three years any area he wishes, or rather as many claims as he desires. Each claim is about 23 miles in maximum.

"Now as regards new areas—that is to say creeks not already applied for, forfeited or abandoned, or not worked over—he is entitled not to five miles but to one mile. He is entitled to renewals in the usual way—or rather in the way I have just defined as respects the other class—but he cannot stake the whole thing. He can only obtain a discovery stake—that is to say three times the ordinary stake—the discovery stake being one that has always been given. Where a man is in the position of the discoverer of the area he gets three times the ordinary stake. So in this class of creeks already worked over, that is all he can obtain. He pays the same rental as I stated before for the other class, viz., $25 per mile or fraction of a mile.

Mr. Alfred Thompson, the member for the Yukon, elaborated the above explanation, in the following terms:—

"It is now over twenty years since gold was first discovered in the Klondyke. A very large area of gold bearing gravels has been worked, many creeks have been prospected, and many worked, and others prospected but not worked and subsequently abandoned, which claims have reverted to the Crown. Now we have quite a large area of ground in that containing gold bearing gravels of this character; ground that is not sufficiently rich in gold contents to be worked by the ordinary placer mining methods or by the individual claims."

"But by placing these gravels in larger groups it is hoped that it may be possible to have them prospected by what is known as the core drill method, involving the use of machine drills, as opposed to the ordinary shaft sinking method. These admendments were suggested by a non-partisan organization known as the Yukon Development League and it is hoped that their adoption will prove an impetus to the further prospecting of this low grade gravel on abandoned creeks. So far as virgin ground is concerned the leases cover only one mile for a term of one year, and within that mile the prospector can secure at the end of the term only one discovery claim of the same size as he would be able to obtain if he were to make a discovery on any other ground upon which claims did not already exist."

Answering the question as to whether better results were to be expected by allowing five miles to be included in a claim instead of the smaller area allowed heretofore Mr. Thompson said:—

"This low grade ground can only be prospected by the use of expensive power drills, and the gold contents of any one claim were not such as to warrant their continued operation, otherwise, the claims would not have been abandoned. The idea is to give the prospector a larger claim so that he will be able to secure the necessary capital to embark on this somewhat expensive prospecting."

J. M. Sinclair, of Guysborough, N.S, observed that a prospector in his Province required nothing more than a loaf of bread, a powder horn and a pick, the best mines of Nova Scotia having been discovered by men so equipped. He did not concur with an Act having the effect of shutting out the gold prospector. He wanted to know why it was necessary to confine the application (for leases) to "men of wealth or means.".

To this Hon. Mr. Meighen replied:—

"It does not confine the application of men of wealth, it simply provides that before a man can get a lease he must show he is able to do something on the ground. It would be bad policy to grant to any applicant a lease, thereby tying the territory up, if he has no means at all of utilizing that territory. When the Yukon was new and the mining was carried on under the old method, the prospector did not require any capital, because the gold was there and could be mined by that method. But these worked-over claims can be mined only by the use of these powder drills. It is not we who compel the presence of capital; it is nature; consequently, to avoid tying up claims by those who cannot work them we simply say: Show us that you are able to work them, or show us that you have associated with you men who can work them, and that is sufficient."

NOVA SCOTIA NOTES.

Mine Illumination.

The miners in No. 2 Colliery of the Dominion Coal Company have demanded the replacement of the existing oil-flame safety-lamps by electric lamps of the cap and belt-battery type. There have been a number of instances in Canada where new collieries have been equipped with electric lamps, but few, if any, instances of replacement of existing equipment by them. While there is a growing inclination among colliery managers to recognize the undoubted advantages of the electric lamp, there is not by any means complete unanimity among mining engineers on this question. The doubt which exists in some minds centres chiefly about the problem of gas detection, for which the electric lamp is useless. There is no doubt that this difficulty can be overcome by appointing officials charged with gas detection and provided with oil-flame lamps in addition to an electric light, but, in a large and gaseous mine, the question of entire replacement of oil lamps by electric lamps requires careful consideration and much pre-arrangement. It is therefore difficult to understand the action of the No. 2 workmen in demanding—with the alternative of a strike—the provision of electric lamps within a given time. These lamps are not made in Canada, and the manufacturers in the United States are so full of orders that they do not particularly desire additional business. The cost is excessively high at this time, and the exchange premium adds greatly to that cost, and, what is more important in view of the action taken by the No. 2 miners, delivery is an uncertain thing. No matter how firmly convinced of the advantages of new equipment all parties may be, it is not possible for those who have the direction of collieries to allow themselves to be stampeded into the adoption of untried equipment before they are satisfied as to its wis-

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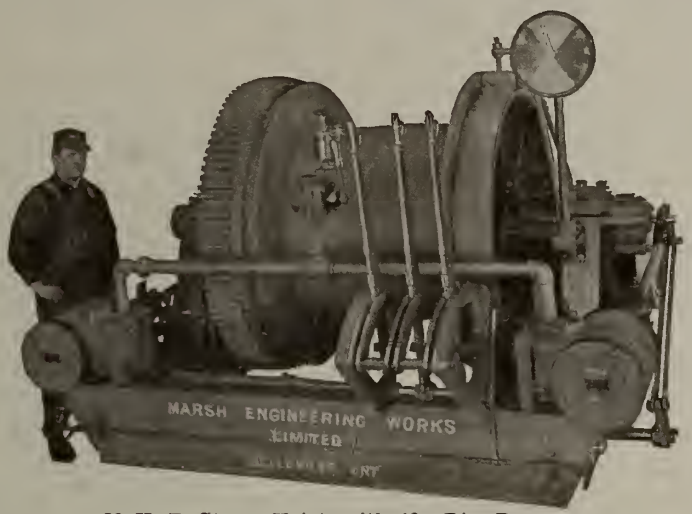

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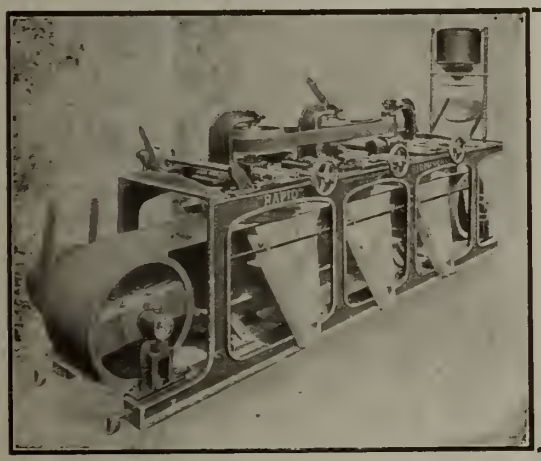

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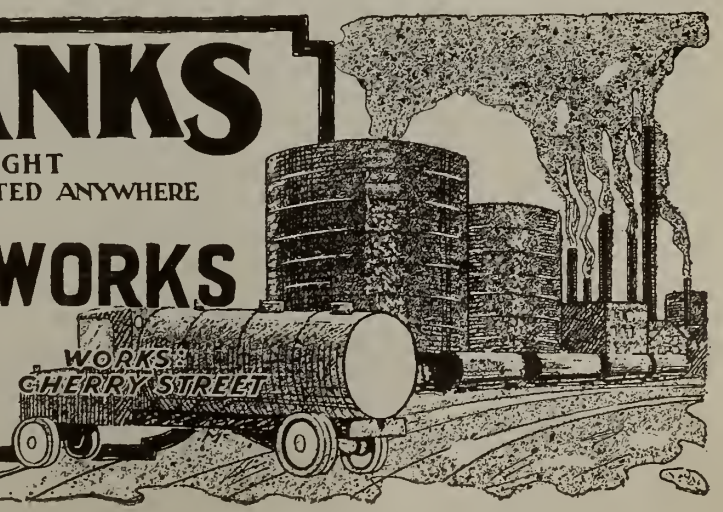

dom, nor is it likely to give the purchasing agent much opportunity for economy unless time is given for the trial of competing types of lamps, for comparison of bids, and for inspection of promises of delivery. The Dominion Coal Company estimate the cost of replacement of the existing equipment by electric equipment at $100,000, and this is a moderate estimate, probably an under-estimate. It would be a pity to spoil the initiation of an advance in underground illumination, which has long been foreseen, by hasty and ill-considered purchases and by insufficient consideration of the large number of arrangements that such a change will require in the interest of safety.

The Rev. John Forrest, for almost thirty years President of Dalhousie University, Halifax, died on June 23rd. Dr. Forrest was well known throughout mining circles in Nova Scotia because of his membership on several Boards of Conciliation having to do with labor disputes. Dr. Forrest's keen intellect was well employed in this work, and he was very successful in adjusting differing points of view. Although 78 years of age, Dr. Forrest's death was unexpected.

The McKinnon Conciliation Board, which was appointed to adjust the differences between the United Mine Workers of Nova Scotia and the Dominion Coal Company, at the beginning of 1920, and was not called upon to sit formally because the two parties got together independently, recently recommended that a Royal Commission be appointed to consider the further request of the Mine Workers for a wage increase effective May first, empowered to deal with the matter as it affected every colliery in Nova Scotia. Such a procedure was, of course, only possible provided all the operators would agree to it, and this has not been the case. The Deputy Minister of Labor has explained the attitude of the Department in the following telegram to the Secretary of the Mine Workers:—"Re differences between coal companies and employees in Nova Scotia. Minister has given careful consideration to question of appointment of royal commission on lines laid down by resolution of McKinnon Board. Such commissions are appointed under the Enquiries Act which makes no provision for procedure on lines suggested. Government alone determines commission membership. It might not however have been impracticable to receive suggestions from parties concerned had companies been associated together as workmen by means of trades union. The minister's efforts to secure joint action by companies has not been successful and if commission is established members must be appointed in usual manner. Minister has understood that renewal of direct negotiations afford some prospect of settlement of grievances without Commission of Enquiry and requests that the latest information on this point be sent him."

The suggestion contained in this telegram that the coal operators should be associated together as the workmen are in a trades union is a singular one considering its source, and the attitude of governments in North America hitherto on the question of joint action of employers. The aim of the United Mine Workers, in which the Minister of Labor apparently concurs, is the establishment of a District Wage Board, upon which operators and union representatives will sit to adjust the whole of the questions affecting the coal mines of Nova Scotia. It is not so very long ago since the coal operators of Nova Scotia were prosecuted at the instance of the present Secretary of the United Mine Workers on an unproven charge of conspiring together to maintain the selling price of coal. It is very difficult for non-judicial minds to see the difference between consultations on questions of wages and questions affecting the selling price of coal, as these two matters are indistinguishable from each other—in their effect at least.

NATIONAL EXPOSITION OF CHEMICAL INDUSTRIES NEW YORK, SEPT. 20-25th, 1920.

The 1920 annual, which is the Sixth National Exposition of Chemical Industries returns to the Grand Central Palace in New York where it will be given during the week September 20th to 25th inclusive.

The Exposition this year will be more pretentious than ever; in fact, it will be the largest distinctly industrial Exposition ever held, and will surpass its own predecessors by one-third.

There are now engaged for the coming Exposition 358 exhibitors which is more than in the last Exposition in Chicago. The growth of this Exposition is remarkable and in a way indicates the growth and development of the chemical industries in America. In 1915 the first Exposition was composed of 83 exhibitors, the second increased to 188, the third to 288, the fourth to 334, and the fifth in which the available space was much restricted and exhibitors were held to a minimum to admit 351 exhibitors, the present number of 358 the managers tell us cannot be much increased in number because of the limited amount of space remaining. Another floor has been added giving four floors of the Grand Central Palace each of which covers a whole square city block so that exhibitors could secure increased space and not suffer the cramping felt in the last Exposition.

This year the Exposition will have three special sections, one, the Electric Furnace Section, another the Fuel Economy Section, and the third a Materials Handling Section, the two latter are new sections; the first will as its name implies be one of electric furnace exhibits; the Fuel Economy Section will consist of exhibits of machinery and apparatus, furnaces, producers, stokers and all devices for the economic utilization or more efficient combustion of fuel. The possible exhaustion of our fuel reserves in the not far distant future and the present high cost of fuel makes this section one of much interest to all industrial plants. The Materials Handling Section will be a series of exhibits of machinery and equipment for the handling of material such as: conveying, transporting, elevating, included in this will be weighing, measuring and power transmission equipment. So important have these mechanical features become for all industrial plants due to the shortage and high-wage for man-power than an unusual interest is expected in this new Section.

? The program for the Exposition will have sessions on subjects the phases of which will be developed in the exhibits of these latter two sections. There will be sessions on chemical engineering for which an elaborate program is planned. Motion pictures which will have a keen interest for technical men will form part of the program, and there will be popular public addresses as well.

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A special general meeting of the Vipond-North Thompson Mine has been called for July 14th for the purpose of authorizing the execution of a first mortgage upon the company's property to the Associated Gold Mines of Western Australia, for a sum not to exceed $50,000.

The last issue of the Ontario Gazette contains the announcement of the incorporation of the Victory Silver Mines, Limited, with head office at St. Catherines. The incorporators are C. E. Ireland and Victor Nash, real estate agents, W. T. Tait, electrical engineer; David H. Tait and E. H. Moyer, all of St. Catherines. The authorized capital is $2,000,000 and the company is empowered to carry on the general business of mining all its branches.

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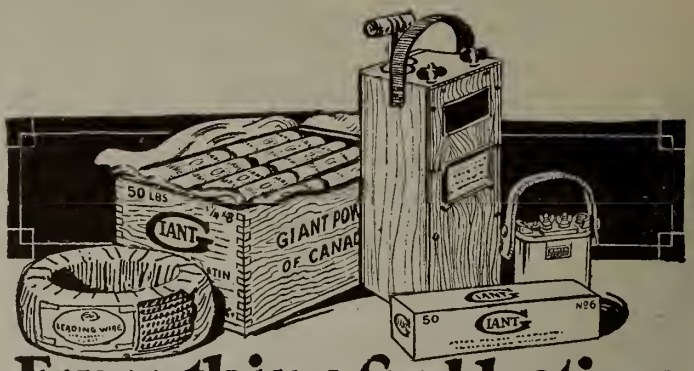

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EDITORIAL

The Secretary-Emeritus of the Canadian Institute of Mining and Metallurgy

The June issue of the "Bulletin" announces the retirement of Mr. Lamb from the active secretarial duties of the Institute, and his appointment by the Council as Secretary Emeritus.

The title is one well earned, and there is no doubt that the necessity for Mr. Lamb's relinquishment of the secretaryship was occasioned by his long and difficult labors in that capacity. The members of technical society are usually vaguely informed in regard to the duties and importance of the work of the secretary, but it will be generally admitted that a society declines or increases in strength and public influence in proportion to the ability of its secretary to be all things to all men. The qualifications required of a secretary, should he attempt to fill all the requirements of the membership of a society, must indeed be as varied and as opposed as the individual characteristics of that membership. He is required to be a good executive, a person of tactful and polite personality, somewhat of a "literary gent," a good "mixer," an eloquent speaker, a financier, a possessor of varied technical qualifications, one who has had the leisure and desire to acquire the social graces and yet feels at home in a mining camp. We are strongly inclined to believe that there "ain't o sick person," but believe further that Mr. Lamb possesses as many of these essential qualifications as it is possible to combine in one who still functions on the terrestial plane, and is limited by mortal inability to be in two places at one time.

If the success of a technical society is to be taken as an indication of the ability of its secretarial direction, Mr. Lamb is entitled to credit for unusual ability. It is to be regretted that the ex-Secretary was unable to make a formal leave-taking at the Annual Meeting of the Institute in March. What was in effect Mr. Lamb's valedictory was given to the Annual Western Meeting in Vancouver last November, and naturally very few of the eastern members of the Institute heard Mr. Lamb record his modest and moving account of the evolution of the Institute from small and unimportant beginnings to its present eminence. The kindly thought which prompted the President of the Institute to suggest to the members assembled at the Annual Dinner in Toronto that a telegram of remembrance should be sent to Mr. Lamb in British Columbia was excellently conceived, but we doubt whether it is sufficient recognition of the ex-Secretary's services, or one that fully expresses the sense of the historical value of Mr. Lamb's incumbency that is felt by many of the members of the Institute.

We endeavored some months ago to express a feeling that the Institute had emerged from adolescence as the result of "many years of hard work, much ex-"perimentation, much vision and tactful organization, "some tribulation, but a far greater sum of good fel-"lowship and a desire to help the other fellow." No person in the Institute can lay just claim to a greater share in its upholding than Mr. Lamb, nor has contributed more of these components of its success.

The work of Mr. Lamb's successor will be lightened by the perfection to which the organization of the Institute and its branches have been brought, but Mr. Lamb has set a pace that will require hard work and unremitting labor to excel.

Labor Shortage at Canadian Mines

Reports from all centres of mining activity in Canada coincide in mention of a shortage of workman-Shortages are reported from the coal mines of British Columbia and Nova Scotia and from the mines of Northern Ontario, and in addition to the actual shortage of workmen statements have been appearing in the newspapers that the miners are not working efficiently. It is not fair to the miner that such statements should be allowed to go on without correction of some evident genuine misunderstanding of actual conditions on the part of the public, which leads to laying unmerited blame upon the miner. The shortage of production at Canadian mines, and at Canadian coal mines in particular, is due first of all to the actual numerical shortage of workmen. At the Nova Scotia collieries, to take a specific case, the shortage of workers is

not less than five thousand men. In the Mines Report the 1919 the number of men "cutting coal", that is, actively producing coal, is given as having averaged during the mines year 2,874 men. This is some 500 men less than the number of men of this class employed in the Cape Breton collieries of the Dominion Coal Company alone before the war. Examination will show that the daily production of the contract workers is equal to, and during the war period, was in excess of the daily production of the same class of workers before the war. It is the excess of non-producers, brought about by the unremedied shortage among the producers, that causes the apparent inefficiency in production when the total production in divided by the total force of workmen employed. This condition of affairs will be found generally true in every mining operation in Canada. The unbalanced and inefficient state of the working organizations at the mines is the cause of the reduction in "Tons per man employed per day,'. Were only one man employed in the actual production of mineral, it would still be necessary, if that lone producer's output is to be marketed, to maintain the whole auxiliary and non-productive organization of the mine. Such a supposition is palpably absurd, but the actual reduction of the productive workers, unaccompanied by the reduction of non- productive workers, has in many instances proceeded almost to the point of practical absurdity, and certainly it has proceeded to the point of financial impossibility.

The productive side of mining employment has always attracted the best class of men, and has paid the highest wages, and, generally, has included the largest proportion of native-born or British-born workers. The sons of these men are not staying at the mines, and it might perhaps be enlightening if employers of labor were seriously to ask why they are not. From observation of a good many mining towns we believe that wages are a secondary consideration, and that it is social and cultural considerations that keep the men at their original vocations. If superior living conditions are to be found elsewhere then men will move to those conditions. As was recently stated most industrial companies "have already passed from the "position of buying labor to selling employment", and it would appear that employment at mines is the most difficult kind to sell. The farmers are asking themselves why farm work does not attract men, and the improvement in farm housing shows that they have found a partial answer to a question that is not less imperatively obtruding itself upon mine executives.

Recently much was made of the abstention of coal miners from work to attend a circus. It was not stated, however, that no circus had visited that mining district for forty-two years previously, or that there is not a free library, workmen's club or public park in the whole radius of the mining community.

VISITS OF UNITED STATES TECHNICAL SOCIETIES TO CANADA.

The present Summer is notable for the number of technical and professional society meetings that are being held in Canada. The societies from the United States that have visited Canada recently include such varied industrial and professional activities as cotton manufacture, paper manufacture, the boot and shoe trade and editorial work, and from Great Britain there is coming to tour Canada probably the most influential group of newspaper men that have yet visited this country. No more important group of technical workers have, however, visited Canada recently than the American Institute of Chemical Engineers, now looking over the more important chemical industries in Ontario and Quebec. The reception given to the Chemical Engineers, so far as a representative of the "Journal" was able to observe it in Ottawa and in Belleville, was unusually cordial, and showed a discriminating sense of the value of the chemist in our day. In Ottawa, the local branch of the Canadian Institute of Chemistry were able to enlist the sympathetic assistance of the Government, and the attendance of Sir George E. Foster at the luncheon, and his speech there, undertaken under the pressure of business attending prorogation of the House, was appreciated as indicating the importance attached by the Canadian Government to the work of the industrial chemist.

In Belleville the visit of the Chemical Engineers coincided with Dominion Day, which was made the occasion for mutual international courtesies at the dinner given by the City of Belleville and the County of Hastings and their visitors. The thorough-going fashion in which the chemists were shown the chemical industries and mineral resources of this rich section of Ontario was we believe good business, both from the point of international amity and the future development of the mineral resources of Hastings County by chemical processes. As the Secretary of the Chemical Engineers well pointed out, the specialized work of this branch of chemistry is necessarily confined to a small number of men, because of the large capital investment necessitated to equip a chemical industry and to perfect its processes. The chemical engineer, therefore, is limited in his usefulness unless he is backed up by public opinion and large capital outlay. The members of the Canadian Institute of Chemistry, which body, together with the Engineering Institute of Canada, have joined to arrange and make pleasant and useful the itinerary of the Chemical Engineers in Canada, are well justified in the importance they have attached to this visit, and are to be congratulated on the manner in which they have succeeded in impressing the general public with this importance. That a good deal of quiet spade work was required to bring about so desirable a result is evident by the meagre

space devoted by the Canadian newspapers to this visit. Among the members of the American Institute of Chemical Engineers that have attended the Canadian visit were men who have contributed much to our civilization, whose names would be recognized in many and varied branches of scientific endeavor as being eminent in chemical work and literature. It is therefore well to know that—despite the small publicity given to the visit—this gathering of scientists was accorded such well-chosen and sincere hospitality in Canada by government and civic officials. Doubtless at Shawinigan the Institute would meet with similar courtesy, for of all places in Canada, Shawinigan understands the usefulness and the profitable uses of chemical engineering.

DIVERSIFIED INDUSTRIES ARE ESSENTIAL

The development of Northern Ontario depends largely on mining and lumbering operations. These are the pioneer industries that quickly and in a large way open up new areas for settlement. They help and are in turn greatly helped by the railroads. Following them comes agriculture, for the mining and lumbering communities afford a nearby market for farm products.

It is not sufficient however that the ore should be mined and milled and the lumber cut and shipped away. The continued growth of these new settlements depends upon the establishment of allied industries.

When silver was first mined at Cobalt the ore mined was all shipped away to southern smelters for treatment. As the industry developed a greater and greater amount of the treatment was done at Cobalt and for some years large quantities of silver bullion have been produced at the mines. This subsidiary industry, the treatment of the ores produced, is now perhaps the biggest industry at Cobalt.

At Iroquois Falls there is a splendid example of an industry subsidiary to lumbering. There is now a thriving community where ten years ago was an almost unbroken forest. If the trees had been cut and shipped away there would be no settlement of note at Iroquois Falls today. But a big pulp and paper mill was built here and a very large production of paper is being made and the plant is now being enlarged. A growing town with many of the attractions of southern towns, and some that many of these lack, has resulted from the establishment of the paper making industry at Iroquois Falls. The town in turn furnishes a market for the farmers who have taken up land in this vicinity.

The manager of one of the large copper mining companies in the United States, where mines have been in operation for scores of years, recently pointed out that mining companies would profit largely by the establishment of other industries in mining communities. Many a miner who likes his work leaves mining districts because his children do not find there employment satisfactory to them. Many miners' sons want to make automobiles and many daughters want to work in offices or manufacturing plants. The miner leaves the work for which he is best fitted in order to afford opportunities to his growing children to take up their chosen occupations.

Mining companies have done much to make mining districts attractive. They appreciate that men must have facilities for amusing themselves and educating their children. Good schools and playgrounds and the encouragement of all forms of healthy amusement are recognized as desirable. The desirability of encouraging other industries to locate in mining districts seems however not to have received the recognition that it should. For many industries the location is not attractive but there are favorable features for certain industries in most mining districts.

MINERAL STATISTICS.

It is understood there is a likelihood that the statistical work of the Mineral Resources Department of the Mines Branch at Ottawa may be transferred to another government department. The re-organization of the work of the Mines Branch that is likely—if for no other reason than the depletion of the staff by resignations—is a matter that is in competent hands, and comment is only proper from those in close touch with the work. We would venture, however, to endeavor to present the viewpoint of those persons outside of the government service who have occasion to study mineral statistics, and who appreciate the years of work, the endless correspondence and the desire to be of service to the mining community of Canada, that have combined to bring the statistics of the Mineral Resources Department to their existing admirable condition, under the direction of Mr. John Mc. Leish.

The object of all statistics is to afford a basis for comparison, and their adaptation to this end is in proportion to the length of time covered by the records and the unchanging nature of the forms of tabulation. Statistics are only useful as they enable comparisons to be made. A change of the form of tabulation destroys its value. It is therefore to be hoped that any transference of the statistical work of the Mineral Resources Division will not lead to radical alteration in the forms of tabulation, or in their scope.

What has given particular value to the Mines Branch's Statistics of mineral production is that the information tabulated year by year has not been confined to actual mineral output, but has followed the mineral product quarried or mined to its sale as a commercial article. It is not desirable, or usefully feasible, that any attempt should be made to separate the processes of mineral production from those of mineral utilization, otherwise incomplete and less useful statistics will result.

As an example, the Deloro Smelting Company purchase high-grade Cobalt ores and recover from them—at a plant quite distant from the mining point—arsenic, silver, cobalt, nickel and other products. Accurate mineral statistics require that in one report, or volume, there shall be recorded both the figures of ore production and the figures of ore recovery.

Compilation of mineral statistics is, we believe, a proper and very necessary part of the work of the Mines Branch. The work can be best accomplished, and will give most intelligible results, if done under the superintendence of persons trained in the technicalities of mining work. If, however, through a desire to centralize statistical work, or to effect economies, it should be decided to relieve the Mineral Resources Branch of statistical duties, we would enter an earnest plea for preservation of the continuity and the comparison value of the familiar tabulations of the Mines Branch, upon which the mining men of Canada have so long placed reliance.

THE EFFECT OF SHORTER WORKING HOURS ON PRODUCTION.

The effect of shorter working hours on production is the subject of a special study by the United States National Industrial Conference Board (Research Report No. 27: Hours of Work Problem in Five Major Industries.) The investigators reach the conclusion that allowing for variations in managerial efficiency a shorter working day increases the efficiency of workers who are called upon to use intelligence at their occupation; but, in factories where the product results automatically from mechanical processes production is reduced in the same ratio as the working day. From this point of view no uniform schedule of hours, equally adapted to all industries, is recommended; shorter hours are conceded to skilled workers to enable them to concentrate their minds with greater efficiency while at work, but efficiency requires no such consideration for "automatic" workers. For example, in the boot and shoe industry, which calls for the exercise of skill, it was found that maximum production could be obtained on a schedule substantially less than 54 hours per week. In the metal-working group it was found that a 50-hour week could be introduced in some trades with no loss to production, but that no such rule could be applied throughout the entire group. Similarly, output in the silk industry was maintained after a substantial reduction of hours. On the other hand, the cotton textile industry of the northern states showed that reductions of the working week to 56 hours involves a proportional reduction of output; while in the woollen manufacturing industry reduction to a 54-hour week resulted in a similar loss, but less marked decline. No definite relation could be traced in any of the five industries under review between changes in wages and rate of production, but the investigators found some evidence of improved efficiency as the result of payment of a bonus, and in the piece-rate as compared with the day-rate system of wage payment. The information secured by the inquiry was not found sufficient to base upon it general conclusions as to the effect of shorter hours on the health of the workers. As to the frequency of accidents the reports state that only 13 per cent. of the employers questioned had observed any noticeable decline, while 85 per cent. had found none and the remainder had even reported a slight increase, which they attributed to the hiring of new men to make up for reduced production due to shorter hours. In fixing the hours of work, however, the investigators point out that there are many other factors besides output and health to take into account and that their present inquiry does not cover the wider social field.

An inquiry lately made by the United States Health Service resulted in the finding that the output of industry was more steadily maintained under the 8-hour than under the 10-hour shift, the pace of work tending in the latter to be set by the less efficient workers, while under the 8-hour day the output varies more nearly according to the industrial capacity of the worker. In regard to the frequency of accidents, a direct relation was traced between fatigue and risk, as a large number of the accidents occur in the last hours of the 10-hour or 12-hour day. If for any reason production was speeded up in the last hours, when the workers were fatigued, the rise in the number of accidents was so rapid as to leave no doubt that the increased rate could only be explained by the decline of working capacity in the employees.

BENTONITE.

One variety of clay which is common in Alberta is known as Bentonite or Soap-clay. It varies in color according to the impurities which it contains, from a dirty white to a creamy yellow. It is exceedingly smooth and fine textured, and when soaked in water forms a soft soapy jellylike mass. It the early days it was used by the employees of the Hudson's Bay Company and by the Indians as a substitute for soap. The main characteristic of the clay is that it absorbs an excessive amount of moisture; this clay will absorb about three times its weight in water.

Bentonite with varying degrees of purity is common in the Edmonton and Belly river formations. As some of the surface clays have resulted from the breaking down of these older rocks, it is not uncommon to find streaks of Bentonite in these clays. When such clays occur on the surface they are better known by the name of gumbo.

Bentonite was previously regarded as unfit for clay products, but experiments carried on by Keele on some of the Alberta bentonitic clays, show that most of them can be made workable by some process of pre-heating, if the commercial conditions in the locality in question allow the use of such a process.

A new use for bentonite has been recently found in the textile industry for the sizing of yarn. If a bed of bentonite of sufficient thickness and purity can be found, the same may be of commercial value if situated conveniently to transportation. Only pure material can be made use of. The quality of the clay can be tested by anyone dropping a lump in a cup of water, if the clay changes to a jellylike mass it is bentonite, and if there is no sediment or dirt in the bottom of the container, the quality is good. A workable bed of bentonite should be at least two feet in thickness.

The foreging account taken from the first Annual Report of Mineral Resources in Alberta is suggestive in view of the recently reported discovery in England of the adaptability of colloidal clay to soap manufacture

Centrifugal Pumps and their Use

Some Notes on Their Design, Application and Installation.

By F. A. McLean, Canadian Ingersoll-Rand Co., Ltd.

Many people erroneously regard the centrifugal pump as a very modern invention, while as a matter of fact it is considerably older than the steam engine. The history of its invention is rather obscure but the credit for it is usually given to Demesne Papin, who lived in Hesse, Germany about 200 years ago. Like many other inventions, little interest appears to have been taken in it and it was allowed to be more or less dormant until Andrews and Bessemer made some improvements on the original designs in the early part of the nineteenth century.

Its first appearance in America was about the year 1819 or 1820 and it was improved by Gwynne and J. P. Appold, in 1848-1851. Appold's improvements were so far reaching that the most modern form retains many of the features which distinguished his design. Appold's pump, which was not affected by solids in the water, was capable of pumping continuously a volume of water equal to more than 1400 times its own weight and was found to be fairly efficient.

Fig. 1—Single-Suction, Belt-Driven, Open-Impeller Type Pump

Centrifugal pumps were for many years considered only suitable for handling water in comparatively large quantities at very low heads and due to poor design and consequent low efficiency, were considered too wasteful to allow their wide adoption. The development of the direct acting steam pump to a higher state of perfection put the centrifugal pump in the background where it remained for a number of years. The ability of the centrifugal pump to operate at high speeds brought it into the lime-light again, due to the rapid advance which had been made in the development of the steam turbine and the electric motor, and the consequent need for a pump which could be directly connected to these types of prime mover, thereby gaining full advantage of the reliability, low maintenance cost and compactness of this method of drive.

It is now possible to secure centrifugal pumps which will give most satisfactory and economical service on nearly all classes of low and high-head installations for which a few years ago only reciprocating pumps would have been regarded as suitable The simple rugged construction of the modern centrifugal pump, its long life and entire absence of trouble from water hammer and shock, naturally appeal to users of pumping machinery. In their simple construction and lack of valves, pistons, rods and other reciprocating parts, they present a radical contrast to the ordinary steam or power-driven reciprocating pump. Due to the fewer wearing parts, they usually last longer, are not so much affected by semi-solids or solids in the liquid pumped, require far less attendance and generally operate with considerably less power.

Types of Centrifugal Pumps.

Present day centrifugal pumps are made in two general classes, known according to the type of impeller used as either open or enclosed impeller machines. The open impeller has a number of spokes or arms which radiate from a central hub like the rotor in an ordinary rotary blower. The sides of the vanes or arms are usually machined to enable them to be run close to the sidewalls of the casing. The closer the blades run to the casing the less is the loss from slippage of the water or otherliquid being pumped.

When well designed and properly built, open impeller pumps will give quite satisfactory results in delivering a large quantity of water at a small head but the large amount of slippage, skin friction and surging or internal disturbance which become worse as the head is increased limit the efficiency of this type of pump. As inherent losses in these pumps are variable quantities, it is impossible for the designer to accurately predetermine the ultimate performance of the pump. Open impeller pumps are particularly adapted to handling gritty or dirty water and semi-solids, and for this reason have been widely adopted in pulp and paper mills and for pumping tailings, slimes, etc. in concentrating plants. The open impeller pump illustrated is made in sizes to handle from 200 to 8000 gallons per minute at heads up to 70 feet.

The enclosed type of impeller consists of a number of vanes or arms radiating from a central hub and enclosed by discs on each side to form walls. In operation, the liquid which is being pumped is admitted at the centre or eye of the impeller and passes around the shaft and through the impeller in channels formed by the walls and vanes. In single-suction pumps the water enters on one side of the impeller only, while

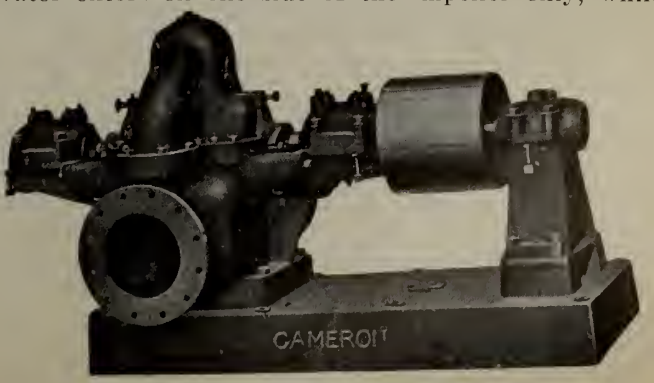


Fig. 2—Belt-Driven, Double-Suction Volute Pump

in the double-suction type it enters on both sides. Double-suction impellers, which are subject to an equal pressure on both sides are therefore self balancing against thrust along the centre line of the shaft when operating at ordinary heads. Single-suction pumps do not have this self-balancing feature and consequently require thrust bearings.

With the enclosed-impeller type of pump the liquid being raised passes through passages, or channels of fixed form with a limited amount of leakage and considerably less disturbance than is the case with open impellers. The designer can thus quite accurately determine and control the perfomance of the pump over a broad range of requirements such as are met with in different classes of service. For this reason the enclosed-impeller pump will suitably meet all medium and high-head pumping requirements where efficiency is essential.

Single and Multi-Stage Centrifugal Pumps.

Single-stage pumps contain usually one impeller and are built for almost any capacity and will operate efficiently on moderately high heads, the larger sizes naturally being more efficient that the smaller. Single-stage pumps are somewhat limited by the pressure existing between the suction and discharge chambers of the pump; the higher the head the greater the difference in pressure and the larger the loss from internal slippage and leakage and the more rapid the destruction of the internal parts. These factors reduce the head or pressure allowable per impeller or stage.

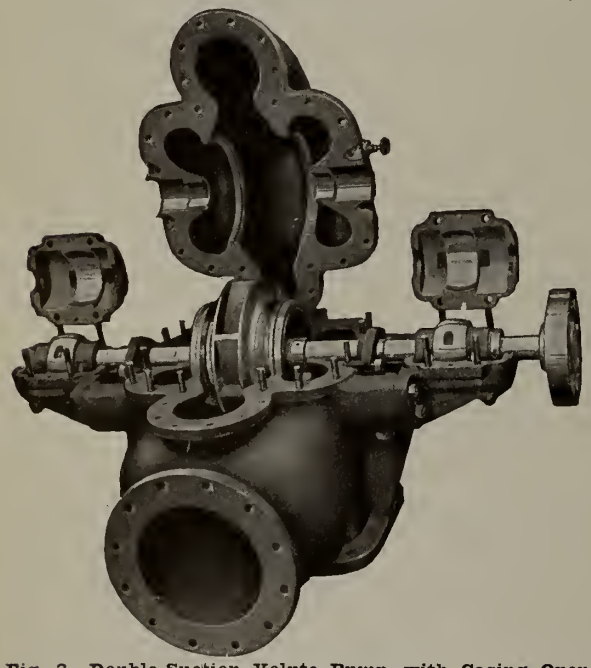


Fig. 3—Double-Suction Volute Pump, with Casing Open Ready for Inspection

To overcome this drawback and permit the use of centrifugal pumps on higher heads and higher pressures the multi-stage types were produced. These consist of two or more impellers mounted on one shaft and running in a casing with passages arranged in such a way that the liquid is led through the impellers in succession, each one adding its share to the total pressure required. By this arrangement pressures of several hundred pounds may be obtained from a single unit, the exact limit depending on the strength of the materials from which the pump is constructed and their resistance to the wearing or abrasive action of the liquid at high velocity. In pumps of the multi-stage type the liquid is discharged from all but the last impeller at a very high velocity and must be turned through a half circle or 180 degrees in order to enter the succeeding one, and this necessitates the use of baffle plates or vanes to reduce the speed of the liquid and convert it into pressure as soon as it leaves the impeller, so that it will pass to its successor with a minimum amount of disturbance and shock on the walls of the casing. These vanes or baffles are called diffusers.

In all multi-stage pumps some means of maintaining the correct alignment of the passages of the rotating impellers with those in the casing, and equalizing any end thrust that may take place is necessary. This is often accomplished by means of a hydraulic device in which the end thrust is absorbed by a body of water acting against a diaphragm or piston on the pump shaft.. This device is only applicable when the pump is used with clean water and is very simple in construction, automatically and quickly adjusting itself to the variations in the load with practically no friction or loss of power. Sometimes it is necessary to pump liquids which contain grit or solids which would wear out the hydraulic balancer very quickly and in such cases a marine or Kingsbury type of thrust bearing is used.

General Design.

To be successful a centrifugal pump should be well constructed mechanically. Its performance should comply with all of the requirements of the particular class of service under which it is to be used, and should show the highest possible efficiency when in use on that service. It should be of simple and substantial construction in all its parts and the rotating elements should be accurately balanced in order to reduce vibration. The bearings should be of ample size and accurately fitted, and provision should be made for their proper lubrication, in order to preserve the alignment and small running clearance between the rotating element and its casing which serve to prevent leakage between the high and lower pressure portions of the pump. As with other classes of machinery, centrifugal pumps are no better than their bearings, from the standpoint of continuous operation, and the better proportioned these parts are the longer the life and the lower the maintenance cost.

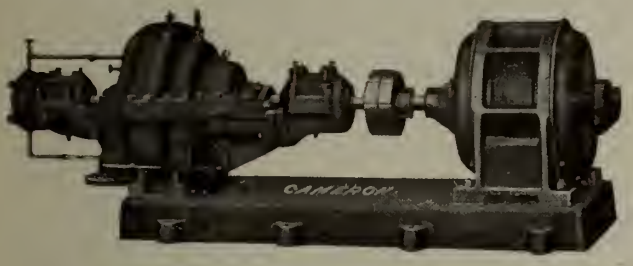
All materials entering into the construction of the pump should be carefully selected in view of the duty to be performed, and care should be use in the various manufacturing and machining processes. The general design of the machine should be such as to allow ready accessibility to all parts without difficulty.

Fig. 4—Motor-Driven Double-Suction Volute Pumps in Series

Principle of Operation.

The principle on which the operation of the centrifugal pump is based is quite simple and easily understood. The liquid to be pumped is speeded up or accelerated by passing it through the revolving impeller; energy received from the vanes resulting in an increase both in pressure and velocity, the velocity being subsequently converted into pressure in the stationary discharge passages. It is however, a very complicated problem to design and construct pump to deliver a definite quantity of water against a given head at a certain fixed speed, with the highest efficiency. An experienced designer can, however, predict within a very small percentage of error on either side, both the capacity and brake horse-power required at the normal operating point as well as over a wide range of variation from such conditions as free discharge against little or no head to a closed discharge with no liquid flowing. The solution of problems of this nature, of course, requires a thorough theoretical knowledge of centrifugal pump design and the examination of a vast amount of data obtained experimentally from pumps intended for similar service conditions. For this reason, the volume of output and reliability of the pump manufacturer, other things being considered, may be regarded as pretty good indications as to whether the pump will fulfil the requirements to the degree claimed by its maker or not.

To produce an efficient and satisfactory pump requires not only a correctly designed impeller, but the casing itself must be so made that changes in the velocity of the liquid will take place gradually without undue shock and disturbance. To put into practice all of the little details which are carefully worked out by the designer requires careful and accurate shop work of a high order, with rigid supervision and inspection throughout the various steps of manufacture. As an assurance against defects in material and workmanship, it is also essential that finished machines should be subjected to a thorough test under conditions like those which will be met in the field, or even more stringent if possible. When this method is thoroughly carried out any mistakes or discrepancies are detected and properly corrected before the pump leaves the shop, and where this testing is not properly carried out, it is impossible for the manufacturer honestly to guarantee the performance of the pump when it is finally put in service. To get the very best results each installation should be treated as a problem by itself as in this way it is possible to obtain far higher efficiencies than if the equipment is chosen haphazardly on a shelf hardware basis, on the recommendation of a small dealer or jobber.



Two-Stage Motor-Driven Turbine Pump

(To be concluded in next issue.)

THE "SINGING FLAME" LAMP FOR DETECTION OF METHANE.

Discussing the Fleissner Singing-flame Lamp at the June meeting of the Institute of Mining Engineers, Mr. William Manrice observed that it is known that the detection of very small quantities of methane by means of the safety-lamp requires the greatest attention, and a certain degree of practice, and that errors of observation are easily possible. In the lamp under consideration advantage is taken first of the means of methane detection by the phenomenon of the **explosive limit**—that is to say, by observation of the "cap" or "halo," and, secondly, by sound. It is to be noted that the observations are by no means final, and that only the first rough models of testing-apparatus are yet available. The experiments already carried out have, nevertheless, sufficed to establish the usefulness of the principle. The device has its origin in the phenomenon of the "chemical harmonica" or the "singing flame." The "chemical harmonica" effect, otherwise known as the "gas harmonica," results when a vertical tube, open at both ends, within which a flame is burning, produces a powerful resonance of the tube. The phenomenon was noticed as early as 1777 by B. Higgins, who, however, only published his observations in 1797, so that others (Deluc, 1787; Hermbstaedt, 1793; Tromdorf, 1794) preceded him in publication. At first the experiment was always made with hydrogen, which was allowed to escape through a tube with a narrow jet. The gas was lighted and another glass tube placed over it in such a manner that the flame was in the lower third of its length. Later, it was discovered that any other combustible gas could be used, and with acetylene-gas especially Dr. Fleissner had been able to produce exceptionally powerful tones.

MINERALS OF HASTINGS COUNTY, ONTARIO.

On the occasion of the visit of the American Institute of Chemical Engineers to Belleville, Mr. J. W. Evans, who is the Vice-Chairman of the Hastings Branch of the Canadian Institute of Mining and Metallurgy, and who it will be remembered gave a paper at the last annual meeting of the Institute descriptive of the mineral occurrences of Hastings Co., had on view a number of mineral specimens. The most striking was a large piece of iron pyrite from Queensboro, said to be representative of a vein running five feet wide. A specimen of green fluorspar from the Bailey Mine, and a smaler piece of transparent white spar were shown. Samples of the talc from the Henderson Mine at Madoc were exhibited showing the material in various stages of density. Gold ore from the Belmont Mine, and specimens of molybdenum and galena were also shown. A fine sample of iron ore together with tool-steel made direct from this ore in the electric furnace was the occasion of much interestd comment. This ore is stated to contain 53 percent of iron, 7.5 percent of titanium and .41 percent of vanadium.

Mr. Evans is an enthusiastic believer in the mining and metallurgical possibilities of Hastings Co., and is doing good work in bringing them to public attention.

Gold-bearing quartz is reported to have been found on the Boisdale Hills near Sydney, Nova Scotia.

The Canadian Visit of the American Institute of Chemical Engineers

By the courtesy of the Secretary of the Institute a representative of the "Canadian Mining Journal" was enabled to accompany the visit of the Chemical Engineers to Ottawa and Belleville, and the following notes upon this portion of a notable gathering are necessarily confined to the events of two days and do not deal with the itinerary of the Institute, which covers a fortnight's travel in Eastern Canada. After spending two days in Montreal, where papers were read during a two days meeting and courtesies were extended by the Montreal branches of the Canadian Institute of Chemistry and the Engineering Institute of Canada, the visitors arrived in Ottawa at noon on June 30th, and were entertained at luncheon in the Chateau Laurier by the Ottawa members of the C. I. C. The Chairman of the local branch, Mr. Edgar Stansfield presided over the luncheon, and, in addition to the visitors there were present representing the Canadian Government and the City of Ottawa, Sir George Foster and the Mayor and President of the Board of Trade. Among those at the speakers's table were noted the Chairman of the Hon. Advisory Council and the Deputy Minister of Mines.

Carbonized Lignite Briquettes.

The speeches turned largely on the contents of a small cardboard box placed by the plate of each visitor, which on examination proved to be a small briquette of carbonized lignite presentd with the compliments of the Lignite Utilization Board. The President of the Chemical Society remarked that the researches of the L. U. B. in Canada were being watched with much interest by the neighboring states of the Union, such as Dakota, where there existed the extension of the same lignites that Canada is seeking to utilize in Saskatchewan and Alberta. The speeches made in regard to the lignite briquette by Sir George Foster and the Chairman were in jocular vein, but underlying was serious purpose, and the exhibition of a briquette—which presumably the Lignite Utilization Board is satisfied with—to the visitors, was understood to signalize substantial progress to meet the most pressing material need of Canada, that of internal fuel supply.

After the luncheon, the visitors were shown over the plants of the E. B. Eddy Co. at Hull, and witnessed what to a miner is always a sight for lugubrious reflection, namely the conversion of good mine timber into newspaper print.

Leaving Ottawa at six in the evening the Chemical Engineers arrived at Belleville shortly before midnight, and were greeted at the station by a brass band, much to tehir pleasurable astonishment, and under the guidance of the local member of the A.I.C.E., Capt. Lucius Allen, paraded to the Hotel Quinte.

Visit to Deloro Smelter.

On Thursday morning, Dominion Day, automobiles took the visitors 40 miles by road through a picturesque and opulent countryside to the works of the Deloro Smelting and Refining Company, being greeted en route at Marmora by the local band. At Deloro, the manager, Mr. S. W. Wright, presided at a luncheon provided by the Deloro Company, served in the local church hall with the assistance of the ladies of Deloro, after which the engineers were shown over the plant, the technical operation of which was explained at the luncheon by Mr. Wright, who said that his directors desired to withhold nothing from the visitors.

At the Deloro Plant high-grade silver-cobalt-nickel arsenides from Cobalt are treated, recovering silver, cobalt—as oxides and in metallic form—arsenic and nickel. Paris green is also made in a neighboring plant. The making of the alloy "Stellite" was seen in process, and particular interest was taken in Mr. Wright's announcement that machinery was approaching completion for the manufacture of table-knives in "stellite". The equipment for making blades was shown, and it was intimated that later the manufacture of forks was to be undertaken. "Stellite" does not lend itself to forging, and, after being cast, the blades are ground to shape, sharpened and polished. As the alloy is much harder than anything it is likely to come into contact with in domestic use, and quite stainless, there is no necessity for sharpening of the blade or the polishing that is required to keep ordinary steel knives in good order.

The Talc Mine, Madoo

From Deloro the party went to Madoo and looked over the Henderson talc mine and the grinding plant of the G. S. Gillespie Co. Practically all the talc produced in Canada comes from the Madoc mines, the production in 1919 amounting to over 18,000 tons.

From Madoc the visitors returned to Belleville, calling on the way at the Corbieville distillery, now operated by the Industrial Alcohol Co., for the production of denatured alcohol from molasses.

In the evening a Dominion Day Dinner was given to the guests by the City of Belleville and the County of Hastings. During the course of the dinner announcement was made that Dr. C. K. Moore of Berlin, N.H., had been chosen as the recipient of the Institute medal for the most valuable contribution to chemical literature among the members of the Society during the year. The international felicitations which are usual upon an occasion such as this dinner were given unusual interst by its occurrence upon Dominion Day, and the fact that it was the first time that many of the visitors had been in Canada.

After the dinner the Institute resumed its itinerary and left for Shawinigan Falls, the most important centre of the activities of the chemical engineer in Eastern Canada.

METAL QUOTATIONS.

Fair prices for ingot metals at Montreal, 8th July 1920:—

	Per lb.
Electro copper	24c
Castings copper	23½c
Lead	10c
Zinc	10¾c
Tin	57c
Antimony	10c
Aluminium	37c

Dr. Michael Clarke says that war in the immediate future is an economic impossibility. So they said in June 1914. And can anyone say how many wars were going on in July 1920?

A Review of the Gold and Silver Production of Northern Ontario During the First Half of 1920

(By J. A. McRAE, Cobalt).

A mid-year summary, based upon preliminary estimates from the mines, for the first half of 1920, would indicate a total production of silver and sold from Northern Ontario of approximately $12,500,000; made up of a little over $6,000,000 from the gold mines and approximately the the same amount from the silver mines. The production of gold appears to be likely soon to definitely assume the lead, the only visible likelihood of the situation being reversed hinging upon the possibility of a big rise in quotations for silver.

The fixed price of gold, however, has prevented the gold from yielding profits equal to the silver mines. Verification of this may be gathered by turning to the annual statements for 1919 in which it is shown that the leading silver producer, the Nipissing, produced $3,752,083 during the period and made $2,717,311 net profit, while on an output of $6,722,266 the leading gold producer, the Hollinger, realized only $2,321,290 net profit. A re-adjustment of economic conditions appears to promise equal relief to both the silver and the gold mines in so far as material and supplies are concerned, while it promises greater relief to the mines in regard to labor supply in that during the past three years the silver mines have been fully manned, while the gold mines have only been able to procure a little under two-thirds of full requirements.

Paying Big Dividends.

During the first half of 1920, the silver-mining companies paid $2,237,905 in dividends. During the corresponding period, the gold-mining companies paid $1,442,048, making an aggregate of $3,679,953 for the half year.

For the last half of 1920, the present rate of dividends will probably continue at all the dividend-paying mines, disbursements for the year amounting to close to seven and a half million dollars. With dividends paid to the middle of 1920 having reached a total of $99,437,321, the grand total up to the end of the year promises to amount to approximately $103,-117,274.

Over Quarter Billion Produced.

The silver mine up to the end of July, 1920, have produced approximately 309,010,836 ounces valued at $188,411,972. The gold mines of this part of Northern Ontario have produced approximately $65,591,614. The aggregate output of silver and gold, since the discovery of silver in Cobalt in 1903 and the discovery of gold in Porcupine and Kirkland Lake in 1909, amounts to $254,001,586.

Nor does the peak appear to have been reached in the production of precious metal from this field. The total ore reserves of the present actually exceed the total in sight at any previous time in connection with the industry in this country. This state of affairs offers at least the suggestion that production will increase to a corresponding degree.

Figures which show the total output of silver since the first discoveries in Cobalt is somewhat remarkable that from 1904 to 1911, both years inclusive, there was an increase each year in the number of ounces produced, while from 1911 up to the present there has been a decrease each year. Not in a single case was this rule broken, showing the uniform manner in which the silver deposits have been mined. The value of the output, however, fluctuated. This was due to the rise and fall of quotations for commercial bar silver.

In reviewing the figures presented below, as representing the silver production, it is necessary to keep in mind the fact that cobalt metallics and cobalt oxide now play quite an important part in the output of the silver mines and the returns for this mineral are not included in the figures given. With cobalt valued at from $2.00 to $2.25 a pound at present as compared with very little value in the early years of the camp, the income is enhanced considerably.

New Mines Developing.

While the Gowganda field appears to offer possibilities of stemming the tide of declining silver production from this province, yet in Cobalt, too, there are possibilities of new developments altering the situation for a time. During the last half of 1920 the Bailey Silver Mines and the Colonial Mine both of which have been idle for years promise to be added to the producing list. In addition to these are new properties opening up on which are encouraging possibilities, such as the Victory Silver Mines and the Oxford-Cobalt.

The Nipissing Mining Company continues to produce silver at a rate between $4,000,000 and $4,500,000 annually and is easily the leading silver producer in Canada.

Following is a table showing the silver output from the mines of Northern Ontario:—

Silver Production.

Year	Average Price cents Per ounce	Ozs. Produced	Value
1904	57.02	206,875	$ 111,887
1905	60.4	2,451,356	1,360,503
1906	66.8	5,401,766	3,667,551
1907	67.5	10,023,311	6,155,391
1908	52.09	19,437,875	9,133,378
1909	51.5	25,897,825	12,461,576
1910	53.5	30,645,181	15,478,047
1911	53.3	31,507,791	15,953,847
1912	60.8	30,243,859	17,408,935
1913	57.8	29,681,975	16,553,981
1914	54.6	25,162,841	12,765,461
1915	49.69	24,746,534	12,135,816
1916	65.66	19,915,090	12,643,175
1917	81.41	19,401,893	16,121,013
1918	96.77	17,661,694	17,341,790
1919	111.12	11,224,970	12.747,621
1920 (first half)	118.03	5,400,000	6,372,000
Totals		309,010,836	$188,411,972

The Gold Mining Industry.

Figures were presented in the "Journal" two weeks ago, showing the gold production from this district from the time gold was first discovered in Porcupine in 1909 up to the end of 1919. They may be brought up to date as of June 30th, 1919, by the addition of a little over $6,000,000 for the first half of this year.

The mining situation in all its phases is sound. It finds no artificial support; but, instead, is standing on its merit alone. Over-enthusiasm is playing little or no part, even among the smaller and new enterprises, and the foundation of the industry is such as to assure longevity.

Our Northern Ontario Letter

THE SILVER MINES.

With the world output of silver estimated at about 180 million ounces annually, and the United States Government prepared to purchase at $1 an ounce all the current output of that country, which amounts to 60 million ounces a year, it is obvious that only 120 million ounces are left to meet the demands of all the other nations of the world. Not only that, but the consumption of silver in the arts in the United States must be cared for out of foreign silver as it is only natural that silversmiths will turn to the foreign market for the metal just as long as it remains below the fixed price of $1 as provided in the Pittman Act.

It is for these reasons, among others, that silver producers are resting easy in the belief that prices will again rise.

A notable instance of confidence in higher prices is the fact that the Nipissing Mining Company as of June 22, had $1,685,406 in silver on hand or in transit. More than a million of this, in fact close to one and a half million is understood to actually consist of silver bars stored in the local vaults of the mine. In addition to this large liquid asset are $3,376,497 in cash and war bonds, making a total net quick asset of $5,061,903.

Another rich shoot of ore has been encountered on the Beaver Consolidated mine, making a total of six more or less important finds on this property since last Autumn. Current production is said to be running comparatively high, and the physical condition of the mine has been materially strengthened. This condition lends weight to current reports that dividend disbursements may be made at regular intervals of every three months from this date forward.

Output from the Kerr Lake mine is gradually declining, the May report showing a production of 48,834 ounces as compared with 61,512 ounces in April and 99,398 ounces in March. This falling off was expected, as intimated in recent weeks in the "Journal." It is due to the exhaustion of the high-grade ore, and signalizes a turn to lower-grade ore and consequent lower production. While a still further decline is expected, yet a uniform rate may soon be established, and it should perhaps be kept in mind that in low-grade are resources, inclusive of the large dumps which may be worked over, the Kerr Lake has an asset of big proportions. Also, the extent of the company's holdings in other countries lends added stability to the Kerr Lake.

In the boundary dispute between the O'Brien and the La Rose, the former company is favored in a decision just handed down. The judgment specifies that the O'Brien is entitled to possession of all that territory lying east of a straight line between the No. 4 post of the Colonial mine to the "Shaw" post, and is granted an injunction against the La Rose for trespass beyond that point with damages, if any. The text of the decision leaves cause for believing that O'Brien may enter some specified claim for damages, in which case in the event of the contestants failing to agree upon the amount the point would have to be determined by the Master at Haileybury.

Arrangements are being made to explore the Mohawk-Cobalt property, situated near Mud Lake a few miles from the producing Cobalt area. In 1907 a shaft was driven to a depth of 200 feet at which point developments were suspended without doing any lateral work. In 1919 about 103 feet of cross-cutting was done, during the course of which three fairly wide veins were opened up in each of which heavy cobalt mineralization is said to occur.

Rich samples of silver have just been brought out from the Thompson claims, situated in the township of Van Hise in the Gowganda silver district. The deposit is said to be exceedingly rich and is attracting attention of the leading mining companies in other fields. It is intimated that the proposition has been placed before the McKinley-Darragh Company of Cobalt, and that the Temiskaming Mining Company is also desirous of making an examination of the property.

A deal is pending on the Cane Silver Mines, a property situated in the township of Cane in the Montreal River district. The object in view is to enlist the finances necessary to carry out a comprehensive exploration and development program. A number of veins on the property contain short but quite rich shoots of ore at surface.

During the past few days, prospectors in Haileybury have become more or less excited about a newly discovered silver deposit the location of which is as yet kept secret. Quite a number of prominent prospectors have disappeared as though by magic, leaving behind them among their intimate friends the mere suggestion that they are on the track of something new. The element of mystery surrounding the matter has created an atmosphere very similar to the early days when rushes of the kind were quite frequent occurrences. Whether or not anything of value will merge from the present mystery cannot be predicted at this time, but that it will become public information within a short time seems certain as recording will be necessary and will offer a "tip" to those now on the outside but with "their ears to the ground," so to speak*.

*A newspaper dispatch from Haileybury under date of 4th July states that bismuth, not silver, has been found in the town ship of Rattray by the rush of prospectors to the supposed new silver fields, and as bismuth is regarded as of no commercial value, the rush of prospectors has suddenly ceased. Men working on a lumber camp were supposed to have discovered a vein of almost solid silver.

Bismuth is quoted at from $2.70 to $3.00 per pound in New York but the dispatch does not state the extent or nature of the occurrence. The commercial production of bismuth has not yet been recorded in Canada. During the war the price of bismuth was increased owing to the shutting off of customary European sources of supply.

Important bismuth ores occur in Bolivia and Peru (where the San Gregorio Mine, east of Hauraucaca is stated to have sufficient ore in sight to supply the world's demand for many years (see Miller and Singewall "Mineral Deposits of South America")., In several instances in South America the bismuth ore occurs in association with tin ores.—Ed.

In view of the Nipissing not having included a bonus with its July 20th dividend disbursement, and in view of the current quick assets being now over five million dollars, the highest in the company's history, it is believed that it is not the company's intention to yield to the request of shareholders to increase the rate of dividend payments, but, instead, to make a substantial capital reduction by perhaps paying the shareholders $1,200,000, an amount equal to $1 per share, thus reducing the par value from $5 to $4 per share. This would appear to be a popular move for the company at this time.

Ore and Bullion Report.

During the week ended July 2nd, three Cobalt companies shipped an aggregate of four cars containing approximately 281,012 pounds of ore. The Mining Corporation with two cars was the heaviest shipper, as shown in the following summary:—

Shipper	Cars	Pounds
Mining Corporation	2	129,370
Temiskaming	1	65,584
Nipissing	1	86,058
Totals	4	281,012

During the corresponding period, no bullion shipments were made, the tendency still being to await higher prices for the metal.

THE GOLD MINES.

The greatest confidence is expressed by careful observers that the supply of labor for the gold mines will become adequate in a reasonably short time, on account of the great tide of men moving to this continent from the nations of Europe. This would eliminate the chief obstacle to maximum production and would probably result in all the leading mines increasing their net earnings.

In regard to the Porcupine V.N.T., concerning which there is a proposal to borrow $50,000 with which to start work, and to grant a first mortgage against the mine, strenuous opposition is developing. It is pointed out by shareholders that the Porcupine V.N.T. has 750,000 shares still in its treasury, that the mine is well thought of and that with a small advertising compaign the money could be raised by selling only a small block of shares. General resentment is made manifest in connection with the mortgage proposal which is contended to be entirely uncalled for.

The head office of the Hollinger Consolidated has been changed from Toronto to Timmins, as provided for in a by-law passed at a meeting held in Toronto on June 29th. A number of other companies are reported to be preparing to take similar action.

At depth on the McIntyre-Porcupine, the result of operations continue extremely favorable, according to latest advice, and the year just closed on June 30th is understood to have been the most favorable so far in the company's history. It is intimated that total income exceeded $2,000,000 and that net earnings amounted to well over $1,000,000. This earning power is large as compared with the issued capital of $3,600,000 made up of 3,600,000 shares.

In regard to the Lake Shore Mine at Kirkland Lake, it is officially announced to the "Journal" that the main shaft is to be continued from the present depth of 400 feet to a depth of 800 feet. In view of nearly a million dollars having already been produced by using the small mill of 60 ton daily capacity on ore between the 400 ft. level and surface, chiefly from between the 400 and 200-ft. level, and with several years' ore still in sight at this horizon, it is quite evident that very considerable importance attaches to the announcement of the intention to get another 400 feet deeper. Success at the 800-ft. level would tend to the present mill being enlarged to double or perhaps treble its present size, according to official advice.

Owing to further delays in connection with the consolidation of the Tough-Oakes Gold Mines with the Aladdin-Cobalt and the Burnside, the belief has taken form that a situation has developed which is more serious than was at first supposed. It is believed the difficulty is in part at least due to a satisfactory arrangement in regard to the disposal of the treasury of one of the participating companies.

It is learned that a plan is being arranged with the object in view of working the Orr Gold Mines. The Wettlaufer interests of Buffalo and Hamilton B. Wills of Toronto, are said to be negotiating along lines mutually satisfactory. The plan includes arrangements to construct a mill so as to place the mine on a self-supporting basis as quickly as possible.

The main shaft on the Bidgood property at Mud Lake in the township of Lebel has reached a depth of 200 feet, and a cross-cut is being driven to the downward continuation of the vein. This was expected to be cut today, July 5th. At the first or 100-ft. level, the Bidgood vein had a width of about 12 feet, about eight feet of which was medium grade ore. After intersecting the body it is planned to continue the shaft to the 300-ft. level at which point extensive lateral operations will be carried out.

Good progress continues to be made at the Argonaut Gold Mines in Gauthier township, lying East from Lebel, and the belief has taken from that this is the eastward continuation of the auriferous zone along which the mines of the Kirkland Lake field are located.

During the course of performing assessment work on the claims owned by the Kirkland-Porphey company (now in voluntary liquidation), a wide vein had been opened up. The claims are situated in Teck township, south from the producing area. Whether or not the gold content of the vein is such as to offer more than ordinary encouragement is not yet announced.

A vein about ten feet in width has been opened up on surface on the Wood-Kirkland property in Lebel township. Gold tellurides are said to occur in the newly discovered vein.

A contract has been let to diamond drill the Porcupine-Miracle property in the Night Hawk Lake section of the Porcupine district. It is planned to cut the main vein at a depth of 300 as well as 500 feet. Former underground work was carried to a depth of 86 feet at which point some shoots of high grade ore are reported to have been found. The property is equipped with a mining plant as well as a small mill.

A good deal of interest appears to be developing in connection with the occurrence of oil shales in the vicinity of Long Rapids on the Abitibi River, and considerable local support may be given to enterprising individuals who propose to investigate the possibilities of the deposits.

In connection with the lack of a highway between this part of Northern Ontario and the older parts of the province, a proposal has been made by the Associated Board of Trade of Temiskaming suggesting that the government set aside ten townships, each six

miles square, the timber to be sold by tender and the proceeds to go towards paying for the construction of a macadam road from North Bay to Cochrane with branches to Porcupine and to Iroquois Falls. The road would be about 300 miles long and would cost at least $3,000,000. It would link up the entire district of Temiskaming as so far developed, with the roads connecting with old Ontario.

Manitoba Letter

C. S. MILLICAN.

Pas Mineral Belt.

At the Flin Flon Property work is going on rapidly and the shafts have reached a depth of 100-ft. and 70-ft. respectively. Some trouble was encountered with water in one shaft, but that has now been overcome. In the more northerly shaft where the ore-body was struck native copper was found at the contact between the ore body and the country rock—apparently a concentration product. Drifting and cross-cutting will take place either at the 200′ or 400′ level in order that the whole ore-body may be fully prospected at one definite horizon during the summer. The total number of men in camp is approximately one hundred. Investigations are being carried on in the field with reference to fluxes and the development of the water power necessary for the operation of the property.

Big Island Lake District.

Considerable interest has been aroused in this district which lies directly east of the Mandy Property owing to the occurrence of cobalt bloom over what is apparently a fairly wide zone of country rock. It would seem that the country rock at this point is mineralized with fine-grained smaltite in a zone closely connected with copper-sulphide mineralization. Not much work has yet been done to determine whether there is a possibility of silver mineralization connected with the cobalt but the ground is looked on as one of the best areas for prospecting in the territory.

Copper Lake District.

Diamond drilling is proceeding on Gordon's Big Lode. The results of the assaying of the cores are not yet to hand. It is understood the mineralization at depth is heavier than on the surface. The total width of the lode as ascertained by diamond drilling is approximately forty-five feet. If the values are found to continue at depth this property will hold out great promise.

Elbow Lake District.

In the district there has been considerable interest taken this Spring. A discovery made by T. Webb (an old-time prospector in the field) of very spectacular gold in quartz near the mouth of Webb Creek was followed by other discoveries by Forrest and others of fairly extensive lodes carrying apparently good values. These discoveries have caused an influx of prospectors into the territory north of Elbow Lake where there is likelihood of other discoveries of value yet being made.

Second Cranberry Lake.

North-east of the Lake, work has ben done by Rosen who is responsible for the discovery of cobalt bloom on Big Island Lake) in chalcopyrite bands which show promise of giving workable values. This ties on the same belt of mineralization as the Copper and Brunre Lake territory. The whole field between Elbow Lake. the Cranberries and the east side of Athapuskow Lake is still open for prospecting and forms one of the most attractive areas in the whole belt.

Herb Lake.

The Rex Mine is again in operation with some 20 miners under J. R. Campbell. Additional capital has been obtained to place the property on a working basis and careful management is assured. On the Bingo property there are some 12 miners. On the Northern Manitoba, work is being done preparatory to opening up the property again. Before the end of the Summer it is expected that there will be much further development in this area. The wagon roads from Sturgeon Landing to Lake Athapapuskow, leading into the copper belt, and from Mile 82 to the south end of Herb Lake, leading into the eastern part of the gold territory, are being kept in repair by the Provincial Government.

The following names of mining companies having headquarters at Winnipeg, were omitted from the list that were given in this letter in the issue of the "Journal" of June 11th, (see page 486.)

Bingo Mines, Ltd., 315 Paris Bldg., Winnipeg.

The Pas Consolidated Mines, Ltd., 315 Paris Bldg., Winipeg.

Northern Manitoba Mining and Development Co., Ltd., 711 Paris Bldg., Winnipeg.

SILVER ISLET MINE.

Geological Survey of Vicinity Required.

By J. J. O'Connor.

The Silver Islet Syndicate are meeting with most satisfactory results in their investigation of the roof of the Silver Islet Mine. All reports indicated large bodies in the roof, and so far as the operations have proceeded, everything has been found as indicated. Another body of high grade ore has been uncovered in the east stope, above the first level. A few shots put in show it to be very rich, and of considerable extent, as yet not fully determined, but such as to be very gratifying to the operators.

Dr. T. L. Tanton, of the Geological Survey, Ottawa, has strongly recommended that a complete geological survey be made of the "Wood Location" (Silver Islet) together with the adjoining territory north and west. to Sawyer's Bay, including Thunder Cape.

The "Wood Location" comprises ten square miles. The adjoining territory recommended for survey, embraces and are of fifteen square miles, making twenty five square miles in all. If this survey be carried out, it will enable systematic prospecting of the area to be done in an intelligent and effective manner. This bit of ground has been too long neglected by the Survey, considering the large amount of silver it has produced in the past from one small speck of rock in Lake Superior on the "Wood Location". The whole area is cut by a series of dykes, and it does not seem reasonable that the only place silver will be found, is at the point where one of these dykes cut the Silver Islet vein. There are many such intersections known, and a survey would doubtless throw light on others, and place in the hands of prospectors the necessary information for opening up a prosperous silver-mining field. In any case, the dyke zone should have a thorough geological survey made of it. The necessary capital is at hand, on the ground, and immediate advantage could be made of any discovery resulting therefrom. It is hoped that the Geological Survey will accede to the recommendation.

Nova Scotia Notes

The Minister of Labor announces that a Royal Commission will be appointed to enquire into and if possible adjust the questions connected with the demand of the United Mine Workers in Nova Scotia for an increase in wages effective May 1st. The Commission will presumably hold separate sittings to consider the wage question as it affects the several companies.

The Dominion Coal Company is making preliminary inspection of several mooted sites for new collieries to win the lowest seams in the Glace Bay district, but no definite announcement of the chosen locations has yet been made. Work is rapidly proceeding on the re-opening of the Morien seams.

The production of the Glace Bay collieries during June totalled 281,000 tons, which compares with 256,-874 tons in May, and is 57,000 tons larger than the output of June 1919. The production for the first six months period of the past two years compares with 1920 as follows:

	Tons
1918	1,685,432
1919	1,539,328
1920	1,615,713

The production from the Glace Bay collieries in the first six months of 1914 was 2,254,043 tons, and in June 1914 was 452,279 tons, so that present production is approximately thirty percent below the pre-war rate.

The output of the Springhill Mines during June was 35,743 tons. The production rate at these collieries has changed very little from pre-war figures, the output for the first six months of the years noted below being as follows:

	Tons
1914	199,961
1918	201,852
1919	187,690
1920	220,000

An output at the tonnage rate exceeding that of 1914 is unique among the operating collieries in Nova Scotia—except for some recently commenced small collieries.

The production of the Acadia Coal Company for the first six months of 1920 was approximately 250,-000 tons, comparing with 190,000 tons in the first half of 1919. An output increase of 25 per cent is notable.

The Intercolonial Coal Mining Company at Westville had a production during the first six months of the year of about 81,000 tons, comparing with 89,-000 tons in the corresponding period of 1919. Production has been hindered by fire in a portion of the underground workings, necessitating temporary walling-off of the affected area.

Greenwood Coal Co. produced some 28,000 tons in the first half of the year, comparing with 17,770 tons in corresponding period of last year.

The Nova Scotia Steel and Coal Co. report output during June of 56,307 tons, about one thousand tons in excess of May production.

A well-known financial bulletin contains an article headed: "The Hope for Price Maintenance." This betrays one point of view, but it is not a general one. Hope in this instance is commingled with fears that prices may not come down yet awhile.

British Columbia Letter

THE METAL MINES.

Stewart, B. C.

The mining communities of Stewart and Hyder, as well as the scattered mining population of northern British Columbia and Alaska, were alarmed by a hurricane which swept up the Portland Canal about two weeks ago. Trees were torn up, houses were shaken, and small craft along the water front were swamped. There were no fatalities and not a great deal of material damage on which residents of the town are congratulating themselves.

Diamond drilling has been commenced on the Province Claim of the "Big Missouri" Group. Boyle Bros. have the contract. Last year the same form of development took place on the E. Pluribus Claim of the same Group. This property is one of the most extensive of the low grade prospects of the Salmon River Section, Portland Canal District.

Col. T. A. Hiam, the representative at Stewart of Sir Donald Mann, expects the Northeastern Railway up the Bear River, to be in operation this season. The bridges and right-of-way are being repaired and the gasoline locomotive to be used has arrived. As there are a number of properties up the valley to be developed Col. Hiam is confident that the road will be kept very busy.

Alice Arm, B. C.

The Taylor Engineering Co. is reported to have awarded a contract for the installation at the Dolly Varden Mine of a hydro-electric power plant. The cost is put at $65,000.

Hazelton, B. C.

The Kitselas Mountain Copper Co.'s concentrator at Usk B. C. has been in operation for about a week, having started early in the month of June. It is giving satisfactory results. A considerable quantity of ore is being treated and development is in progress at the mine. The ore carries values in gold, silver and copper.

The Silver Standard Mine, New Hazelton, B. C., has been shipping steadily this year and important development is also in progress on the property. A new tunnel is being driven which has reached two veins and will continue until it crosscuts the main lead. Transportation to the concentrator is furnished by a large motor truck. It is used both summer and winter. Travelling in the winter is good after the snow becomes hardened, wires being wound about the truck wheels to ensure traction. Considerable high grade ore is being shipped direct to the Trail Smelter. Although the property is very promising it admittedly is yet in the development stage. The utilization of some of the water-power possibilities of the district is planned and with such a facility to hand the management look forward to placing the mine on a more productive basis.

Barkerville, B. C.

Placer miners are preparing for the season's work in the Cariboo District. John D. Galloway, government mining engineer, recently made a trip through a part of the section and, while it is impossible as yet to estimate the extent of the hydraulic mining to be

undertaken this year, the prospect generally is good. Owing to the unusualy late spring and the heavy fall of snow there should be a plentiful supply of water and fall operations appear assured. The old channel on Grouse Creek, where the values are reported to be good, will be piped by the Waverly and there will be operations at Lowhee and Stout's Gulch. Generally it is expected that most of the old companies will be on their ground again and that some new leases will be worked. Notwithstanding lack of labor and high costs it looks as though the old Cariboo would seem more placer mining, both hydraulic and individual, than it has for some years and that the gold output will show an increase as a result.

Nelson, B. C.

Preparations are in full swing for the International Mining Convention to be held at Nelson from July 20 to 24th inclusive. Fred S. Starkey, Commissioner of the Associated Board of Trade of Eastern B. C., again is in charge of the arrangements. He proposes placing on display a representative exhibit of the ores of the Kootenays as well as outlining a programme that will furnish visitors both mental stimulation and diversion. One of the special features, it is understood, will be a trip through the mining sections of the eastern part of the Province for those of the delegates who care to make it.

The Mandy Mine, of Le Pas, Manitoba, is resuming shipments to the Trail Smelter according to authentic word received at Nelson. The first consignment for the year consists of 30 cars. Ten cars are to be shipped every two days throughout the season. It will be transported by water to Le Pas, by the Canadian National Railway to Calgary, and thence by C. P. R. to Trail. The Mandy last year shipped 8401 tons of ore to the British Columbia Smelter.

Rossland, B. C.

The faith of the old-time residents of Rossland, B.C., one of the oldest camps of the Province, that prosperity, which momentarily passed away when the mines of the Consolidated Mining & Smelting Co. were practically closed down, would return is about to be justified. At least such are the indications. The company's mines, it is stated, are to be put on a producing basis very soon, it being expected that shipments will be resumed early in July. The ore bunkers have been repaired, ore from the Mandy Mine, Manitoba, which the smelter management like to handle with the Rossland mineral, is coming, and all other conditions are satisfactory. The only element of doubt lies in the labor shortage. If the men are available there is no doubt that the mines will be made to yield without delay and that Rossland once more will take her accustomed leading place among British Columbia mining centres. That this will come about eventually is certain because the improvement of metallurgical methods of treatment of Rossland Ores and the construction of a concentrator for the application of these improved methods assures it. The Consolidated Mining and Smelting Co. will start work on this Mill shortly.

Trail, B. C.

Ore receipts in gross tons at the Trail Smelter of the Consolidated Mining & Smelting Co. for the week ending June 14, totalled 6,913. For the week ending June 21 there were received 6742 tons. Two new shippers appeared in the latter list, namely, the old Whitewater Mine, of the Slocan, and the Sunnyside, Rock Creek. The total ore receipts at Trail Smelter for the year up to date are 135,068 tons.

Princeton, B. C.

W. P. Tierney, the contractor in charge of the construction of a railroad to connect the Copper Mountain Mine of the Canada Copper Co. and the Kettle Valley Railway, has stated that rails will be laid within 30 days. This 15-mile stretch of steel probably represents the hardest and roughest piece of construction undertaken in western Canada in recent years. The only work comparable to it is the road to the Dolly Varden Mine. The contractor states that the cost totals $1,500,000. It describes it as having been heavy rockwork, bridges and trestles all the way.

Invermere, B. C.

Interest is keen in the work of the Toby Creek Mining Co., of Vancouver, B. C., in the opening up of their property, the Maple Leaf and Silver King Groups, situated on the Jumbo Fork of Toby Creek. On these claims is a large ledge of silver lead ore upon which there is active development. A 121 foot tunnel has been driven and it is to be extended. There is a quantity of concentrating ore already on the dump awaiting shipment. The government is constructing a road and with the completion of this work it will be possible to reach the properties by automobile.

Cranbrook, B. C.

With reference to the revival of placer mining activity on Wild Horse Creek, to which reference already has been made, it is interesting to note that the annual meeting of the Wild Horse Creek Gold Mining Co. was held recently at which the manager reported that the pipe line had been completed and that water would be turned on immediately. Officers were elected as follows: President, Lester Clapp; vice-president, A. Raworth, Secretary-Treasurer, W. D. Gilroy; Directors, C. R. Ward, Gustave Nelson, F. M. McPherson, F. A. Russell, and L. P. Sullivan; auditor, F. W. Burgess; Manager, A. J. Pamquist.

Victoria, B. C.

W. E. Ditchburn, Chief Inspector of Indian Agencies for British Columbia, reports that there have been a number of applications for permits to prospect on Indian reservations in this Province for the precious metals. This is allowed under an Order-in-Council passed by the Dominion Government giving effect to certain amendments passed by the Provincial Government to both the Mineral and the placer Mining Acts. While mining men consider the action of the authorities in throwing open the reserves for this form of mining a step in the right direction they do not consider that it goes far enough to do much good. A prospector may get a permit and may locate a claim on an Indian reserve but he cannot remove more than the gold and silver. These two minerals in British Columbia are usually found with other minerals so that the problem that the Dominion and Provincial Governments have left the miner to solve is easily appreciated.

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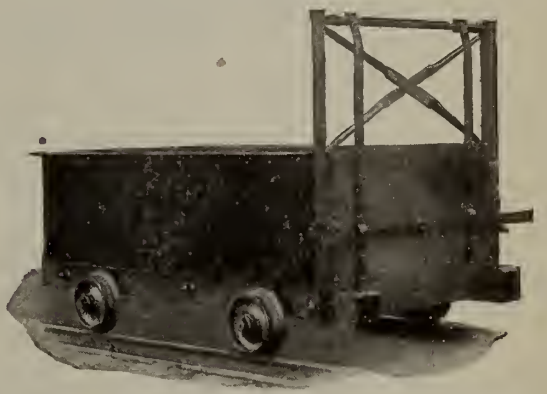

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Vancouver, B. C.

Dr. Edwin T. Hodge, formerly of the mining branch of the British Columbia University and who has accepted a lectureship on the faculty of the Oregon University, has bonded the Emancipation Group of Mineral Claims, situated on the Coquahalla river, near Dewdney Creek, about fifteen miles from the town of Hope. Some development has taken place on this property and ore has been shipped containing gold and silver values. Dr. Hodge is impressed with the possibilities of this property and, it is said, proposes giving his personal attention to its development.

That the sourdoughs of Dawson, Yukon Territory, scorn to permit, as far as it is in their power to prevent, the circulation in that part of Canada of dimes, nickles, and pennies is the purport of an interesting newspaper dispatch from the north. These old-timers, as well as those who date the commencement of their residence in those parts to more recent times, held fast to the principles laid down in the rush of 1898. The least that will be accepted in Dawson is a twenty-five cent piece and one grizzled old prospector thought the limit should bet set at a dollar "as the dollar buys no more now than a nickel did a few years ago."

The Coal Mines.

In view of the alarming reports in circulation as to the increasing shortage of fuel oil, and the possibility of important industries being forced to close down, at least until coal-burning appliances can be installed, anything bearing on coal production is of interest in the Canadian West. As it has just been stated that there is a likelihood of the several pulp manufacturing plants of this province being compelled to cease operations for a considerable period because of lack of oil, a contingency that will have to be met by substituting coal as a fuel, it is especially noteworthy that the collieries of British Columbia are at present handicapped in their operations through difficulty in obtaining an adequate supply of labour. If the threatened added demand develops, while there is no doubt that there is plenty of coal to be got in this Province for all requirements, the problem of securing miners would assume a more serious aspect. As it is it is serious enough. Neither the Canadian Collieries (D), Ltd., nor the Canadian Western Fuel Co., the two large operators of Vancouver Island, have as many men as could be taken care of and the Pacific Coast Coal Company, which is under the new management of George Wilkinson, formerly Chief Inspector of Mines, is commencing extensive development both of its fields at Extension and at Suquash is advertising for men in Victoria and Vancouver. The idea of inviting applications for employment from coal miners in the cities is sufficiently novel to furnish a striking indication of the conditions. The explanation is hard to find as the miners are highly paid unless it be that they no longer have the advantage of workmen of other crafts as to hours of labour, the eight hour day now being general. The suggestion has been made that coal miners who went overseas have not returned to their work underground. In the majority of cases, it is said, they have sought employment elsewhere. Whatever the cause there is no doubt that qualified coal miners are hard to find in such numbers as is necessary to place all the mines of the Coast and of the Interior on a basis of maximum production.

PEAT AS A FUEL.. A BRITISH INVESTIGATION

The Department of Scientific and Industrial Research has published the lecture delivered before the Royal Dublin Society by Prof. Pierce F. Purcell on the Peat Resources of Ireland, as the second of the Special Report Series of the Fuel Research Board, the first being Mr. Leonard C. Harvey's report on Pulverized Coal Systems in America. The peat problem, although of venerable antiquity, becomes periodically rejuvenated in times of fuel scarcity. But the present virile phase of this much-debated question seems to present some points of difference, as compared with former waves of public interest in the subject—partly because the advance of knowledge has opened up new channels for its prospective utilization, but mainly because the pressing needs of land reclamation for agricultural purposes in certain countries has made it inevitable that many peat-covered areas should be stripped and made available for cultivation. From this standpoint peat has in some cases become a by-product of agricultural development, and its utilization for some purposes or other has therefore become an essential factor in the economy of these schemes. To cut peat for its own sake and to find a use for a secondary product are totally different questions; and it is necessary to bear this fact in mind when estimating the commercial value of some modern methods of utilization.

The Fuel Research Board have therefore been well advised to consider the peat problem in its present-day aspect, and no better exponent than Prof. Purcell, could have been found to expound it. At the same time, the old economic difficulty still remains that, compared with coal mining the working of a bed of peat 20 ft. thick, as Sir George Beilby reminds us in a prefatory note to this report, is somewhat like developing a 15 in. seam of coal. The labor involved in procuring one ton of dry peat involves handling once or oftener, at least ten tons of raw material, and this fact alone would seem to militate against any prospect of success in working peat deposits on a large scale.

The question arises, therefore, whether it is possible to overcome the labor difficulty in peat production to any extent, and this is answered by Prof. Purcell somewhat hopefully in the light of experience gained in Canada and in Germany of the application of mechanical methods of extraction of this extremely low grade fuel. The nature of the problem is aptly illustrated by the fact, pointed out by Prof. Hugh Ryan of Dublin, that there is a greater percentage of solids in milk than than of peat in a drained bog. Air-drying can never by itself be an entirely satisfactory solution of the difficulty because of the hygrometric property of peat, which limits the final water content to about 16 per cent in theory, but to a much larger figure in practice, and so far no really economic process of artificially dehydrating it has been proved to be entirely successfully, although the Ekenberk system, still in an experimental stage, is claimed to have given promising results.

It is not necessary to follow Prof. Purcell in his admirable survey of the area and fuel content of the countries. Neither do we need to dwell upon the many uses to which peat has been put apart from its value as fuel. It will be more to our purpose to follow Prof. Purcell in his remarks upon the utilization of this substance for power purposes. To this end, the gas producer certainly promises the best results, because the presence of 60 to 70 per cent of moisture may not in this case prove to be prohibitive, since some manufacturers of gas producer plants already claim that this can be achieved. With regard to this point, however, Prof. Purcell is of opinion that the Italian practice, whereby the peat is first dried by exhaust gases to a moisture content of 33 per cent, is probably more economical, and in this view he is supported by Haanel, of the Canadian Departments of Mines, who maintains that with a moisture content of 60 per cent the quantity of heat generated is not enough to enable the producer gas reactions to take effect so as to enable power gas of the necessary heating value to be formed. But even when these criticisms are admitted it still remains true that peat with a moisture content of about 40 per cent can be effectively used in a specially constructed gas producer—a result which could scarcely be expected by direct combustion under a boiler.

Prof. Purcell examines in some detail the various ways in which the power gas from a producer could be used. It can be used in a gas-fired boiler or used in a gas-engine. Of these the latter is shown to be the more efficient in theory, but it is doubtful whether it can be employed on a large scale. As a matter of fact the best way of utilizing energy from peat remains still an unsolved problem, and it is hoped that the elaborate series of experiments about to be undertaken by the Fuel Research Board at the new research station in East Greenwich will definitely settle the question. There are many factors to be considered besides the over-all efficiency of any particular process. Questions of labor, depreciation, maintenance, capital charges and profits from by-products should also be taken into account, and in this connection it is a somewhat debatable point whether the end in view should be the maximum production of by-products or the greatest development of power gas, both of which cannot be achieved at the same time. It must also be remembered that the yield of sulphate of ammonia depends upon the percentage of nitrogen in the peat, which is by no means a constant quantity; so that while by-product recovery on one peat bog might be a payable proposition, on another it might prove a failure. Thus, as Prof. Purcell truly remarks, the problem is very complex. Hitherto, attempts to run peat power in Ireland have been limited to two only, one being in use at Clifden in Galway by the Marconi Company, and another, a producer plant, at Portadown, Co. Armagh, but these are on too small a scale to enable any general conclusions to be drawn from them. The wet-carbonising plant at Dumfries, run by the War Department for the production of briquettes during the war, furnishes another object lesson in the possibilities of peat utilization; and other projects have been under contemplation, nothing so far has been attempt in this country at all comparable with the work done in this direction in Canada, Sweden, Germany and Russia, where large scale plants, both experimental and commercial, have been installed, but for various reasons it is necessary to suspend judgment as to the results achieved. The largest peat power plant in the world, that of Bogerodozk, near Moscow, only began work in 1914, and its subsequent history is naturally obscure; and the great Fidesland project has been too intermingled with political considerations to be a trustworthy example of economical working. Moreover, in both these cases the peat is burnt direct under water-tube boilers.

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PAPER AND COAL

A Curious Parallel to Our Newsprint Situation

(From the "Colliery Guardian")

Most of our readers have had so many worries of their own during the past few months that we have foregone the temptation to ventilate a trouble that has afflicted ourselves in common with all other periodicals. We refer to the shortage and high cost of paper. Modern industrialism, however, is so compacted that no trade can remain indifferent to the woes of its neighbors. Thus, when we called for an increased output of coal we were not entirely disinterested, for paper mills have been stopped for lack of fuel, and pulp boats from Norway have been detained for similar reasons. The prospect of a reduction in exports we view with the same mixed feelings. It shipments of coal are to be limited to 20 million tons, and 65 per cent of these are embarked from France and Italy, it will be possible to spare very little for our Norwegian friends, in return for their iron ore, timber and pulp, and the pits and the papers are, to that extent, in the same boat.

A short time ago one of the news agencies told us that the Norwegian Government were requiring makers of newsprint to supply Norwegian newspapers with their full needs of paper at a price below cost, otherwise they would not be permitted to continue their export business.

The Anglo-Norwegian Trade Journal characterises the whole story as a warped representation of the facts. The official organ of the Norwegian Chamber of Commerce in London says:—

By an Order in Council, in November 1919, the Government fixed the price of paper for home consumers at 55 ore per kilogramme. The price is due for a period running till the end of this year. At the time of the Order the price was quite sufficient to cover the cost. Since then the cost has increased, owing, particularly to dearer coal, and the mills, of course, have had to make good the loss by increasing the prices for later sales abroad. If paper contracts cannot be carried out at the originally agreed prices, the real cause is the increased coal prices. About the same time as the Norwegian Government, in November, fixed the price of paper for Norwegian consumers, the British Government in December, took off 10s. per ton of coal for British consumers. The loss was made good by enhanced coal prices for foreign consumers. The coal prices up till recently paid by British consumers are very much below cost price, so much below that if only 10s. had now been put on again the British consumers would still have had their coal below cost. Norway is one of the foreign consumers who have to pay the enhanced coal prices and the British Press is one of the home consumers who benefit thereby. No Norwegian news agency was stigmatised the British Press as being for this a "subsidised" Press. What moral difference is there between Norwegian paper and British coal? . . . . . One can understand the feelings of British consumers paying the high paper prices, but what about the unhappy paper mills and other consumers in Norway paying the prices of British coal? In addition to the soaring prices there is the expensive delay of coal ships and the deficient delivery. As a typical instance can be mentioned that a Norwegian steamer, 3,000 tons arrived in the Tyne on January 31, and only on April 24 could she sail with a cargoe of coal for one of the principal paper mills in Norway, and what stuff, at crying prices, can they get, these three months delayed steamers? They take small coal and duff and such inferior coal as the Coal Controller has no use for How can anybody under such circumstances expect cheap paper from Norway?.... It is just coal that can speed up production in Norway, but as a matter of fact, she gets even less coal from Britain this year than last year.

The argument is unanswerable. It little becomes us to sneer at a friendly nation, which has grave troubles of its own, for doing things which we have done much more extensively and masterfully ourselves. Moreover, from the economic standpoint, these fiscal reprisals are deadly—to those who set them in train!

TIME APPROACHING WHEN OIL-SHALE DEVELOPMENT WILL BE REQUIRED.

Pres. Alderson, of Colorado School of Mines, says the time has come when production of crude oil wells must be supplemented by production from oil shale. Position of the shale industry has been essentially changed in the last few years because of pronounced advance in crude oil. At present prices of crude oil, it is possible for oil from shale to compete profitably with oil from wells. This was not the case a few years ago, when oil in Mid-continent sold for as low as 40 cents a barrel, against present price of $3.50. He says:

"Crude oil can be produced from shale under present costs at $1.85 a barrel in Colorado and Utah. Crude oil in Wyoming, the nearest big field to Colorado and Utah shale supplies, is selling at $2.75 a barrel. Pennsylvania grade oil is quoted at $6.10.

"The oil shale industry in relation to the oil business is similar to position of the porphyry companies to the copper industry. In Colorado and Utah there are 5,500 square miles of oil shale, which, with a yield of one barrel of oil to one ton of shale, will produce a practically unlimited supply of oil.

"Production of petroleum from wells in this country to date has been obtained from 4,109 square miles with estimated yield of 2,280,000 barrels to the square mile. One ten-foot seam of shale, yielding one barrel to the ton, will give 15,488,000 barrels of oil, or seven times the square mile output from wells. The 5,500 square miles of oil shale in Colorado and Utah will produce 255,000,000,000 barrels."

In his opinion the desirable minimum investment for the best operation of oil shale retorting plants is $500,000. Under more favorable conditions in Colorado and Utah fields, as compared with Scottish fields, return on capital investment will be substantial.

Dr. Alderson points out that several oil fields in this country have passed their peak and are steadily declining in output. Fields in Wyoming, however, are still capable of greatly increased production, and the same is true of fields in Kansas and Oklahoma.

Scottish shale oil industry has been profitable over a long period and its record should be improved by the shale industry in this country, especially in Colorado and Utah, because of greater richness of shale strata and their more easily workable surface location.

Dr. Alderson will sail for England shortly, where he will investigate oil shale conditions—"Boston News Bureau."

Labor politics in Australia seem to be accompanied by much bitterness. The "Industrial Australian and Mining Standard" last to hand contains a sardonic cartoon, in which a gentleman of the traditional "capitalist" type as portrayed in American lampoons, is shown addressing an audience of apparent jailbirds as follows:—"Now boys, I will put the motion, Hands "up the b..... scabs and traitors who want to con- "tinue doing a fair day's work for a fair day's pay. "Thank you, boys, not a single hand raised: I declare "the resolution to strike carried unanimously."

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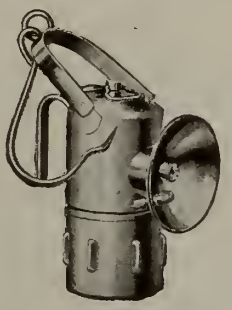

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EDITORIAL

A Second Industrial Conference

Announcement is made that a second Industrial Conference is called by the Minister of Labor at Ottawa in the ensuing Autumn, provision for the expenditure which will be entailed having been provided in the parliamentary estimates. Complete unanimity of opinion regarding the necessity or the useful purpose to be served by a repetition of last year's conference is unlikely. The encroachment of the decisions of such a gathering upon provincial rights, and the tendency it fosters to the over-riding of local and provincial considerations by federal measures is something that politicians doubtless do not overlook.

The composition and form of procedure of the Industrial Conference of last Autumn were such as to place the representatives of employers at a disadvantage, and the spokesmen of organized labor were advantaged thereby. Employers in Canada are unorganized and lacking in cohesion, whereas the labor organizations are a unit.

The Canadian Manufacturers' Association is a powerful and necessary organization, but its usefulness lies altogether in caring for the commercial side of industry, which includes a careful watching of tariff and fiscal policies, imports and exports and judicious publicity. The Association is treading on dangerous ground when it becomes the representative of the employer in matters pertaining to labor and wages legislation, nor can it hope to adequately represent the individual employer so long as the laws of Canada permit—and encourage—the complete organization of trade unionists, and forbid similar organization of employers.

The union leader achieves his leadership through possession of oratorical and analytic gifts. His mind is saturated with facts, and apt phrases, regarding questions of which he has made a concentrated life study. As a platform speaker he is at his best, having arrived at leadership through a process of natural selection from amongst his fellows by virtue of ability to impress his sentiments upon others.

The employer represents the evolution of very different experience. Taciturnity has been praised as a business asset since the days of Solomon, and many successful executives suspect the man who can talk well, or is given to putting his thoughts on paper. Facts and figures are doubtless impressive, but they lose their influence in the presence of a smiling union leader particularly when he jocularly impugns their accuracy.

If the Industrial Conference is to be repeated, and the employers wish to appear at less disadvantage, it is suggested that the employers should be represented by those managing and operating executives that have to deal day by day with their men, and that less reliance should be placed upon ponderous briefs dealing exhaustively, but unconvincingly, with academic phases of employment.

At the Conference last Autumn, the employers fought, on questions of academic principle, the introduction of changes that were accomplished facts of long standing in many industrial establishments in Canada, and in some instances were already incorporated in provincial statutes. In too many instances it was apparent that the employers were unacquainted with contemporary developments in labor matters, whereas the representatives of the men were posted up to the minute.

It should also be mentioned that there is today in the possession of the Department of Labour a mass of statistical information, representing the essence of a voluminous literature upon labour questions, most of which has been compiled and conceived from the natural standpoint of a department, instituted to care for the interests of Labour, as its name sufficiently indicates. The ammunition provided by the publications of the Department of Labour was skilfully used at the last Conference, to the discomfiture of speakers on the employers' side.

The useful work that was accomplished by the Conference of last Autumn could equally well, and with more expedition, have been achieved by a smaller gathering, and, as a matter of fact, any definite results obtained were got in committee. The desired end, namely, the mixing of employer and workman on a mutual footing of equality and tolerance, was not markedly achieved, and the rigid division of the two parties to the Conference, both in regard to seating and ideas was obvious, and had some element of humor, seeing that there were many on one side, who, but for the wheels of circumstance, might have well been upon the other side. The caste distinction between master and man in Canada is new, and fortunately not yet rigid, but that any amelioration of the

distinction was effected by the Industrial Conference last year is open to doubt.

If it is decided to assemble the Conference again this year, the public sessions should be reduced to a minimum length, and should be confined to little more than the appointment of committees. The average executive can ill spare the time necessary to travel to Ottawa and attend a lengthy and exhausting series of conferences necessarily wordy and argumentative, and dealing more with ethics and principles than with economic working conditions.

ONE PITFALL AVOIDED.

The Toronto "World," commenting on the Nova Scotia election shortly to take place, states that the

> "Liberal administration has been cautious
> "and economical rather than progressive; all
> "the mineral wealth of the Province, including
> "the vast deposits of coal, are vested in the
> "Crown, but no effort has ever been made to
> "operate any coal mine by the Government.
> "The result has been high-priced coal to con-
> "sumers in Nova Scotia, and an absence in
> "the mines of up-to-date machinery."

The Conservative newspapers in Nova Scotia say nasty things about the Liberal Government there, as is the wont of opposing political parties, but no one ever accused the Murray Government of sufficient lack of sense to undertake the operation of a coal-mine. If the opposition could by any means have inveigled the Nova Scotian administration into such an adventure it would have provided them with much campaign literature, and, if it should be regarded as a mark of progress for a local government to undertake coal mines operation, then Nova Scotia has much to be thankful for that the Murray Government has not progressed in this direction, but has preferred to be "cautious and economical rather than progressive." Governments have their uses, but coal-mining is not one of them. The foresight and fostering of coal mining is another story.

GOLD PRODUCTION IN CANADA.

In 1919, Canada was one of the few countries, if not the only country, in the world to increase its gold output, and, so far, the returns for 1920 indicate that the figures of last year may be exceeded. By far the greater part of the gold comes from Northern Ontario, and a very small part of that district. At a time when economic causes are causing shrinkage of gold output in other countries, it is significant that in Canada—where these same economic deterrents are not less active—an increase in production of gold should be found possible. This fortunate condition suggests that physical conditions under which gold is mined in Northern Ontario are conspicuously favorable to production at a profit.

MORE MEN NEEDED AT ONTARIO MINES.

Northern Ontario metal mines made a very good showing in 1919 and are capable of making much larger production this year. Ore has been developed and mining plant is installed for much larger than present output. This year's results will depend largely on the number of workers available and their willingness to work steadily. Wages are high, but the mines are not sufficiently supplied with labor to permit full utilization of the plant.

It is in the interests of the workers as well as of the shareholders that mines should be operated efficiently. Plants operated at full capacity make much larger profits than when producing smaller quantities. As wages paid to miners cannot be allowed to consume all the profits, the shortage of labor at our gold mines is a matter of concern to all interested in the industry.

ONE MAN TO CUT COAL, BUT TWO MEN TO HANDLE IT.

In our British Columbia letter some statements are quoted from Mr. G. W. Bowen, Managing Director of the Western Fuel Co. of Nanaimo, Vancouver Island. Mr. Bowen says with regard to the collieries in the Nanaimo district that "not more than 25 per cent of those employed were actually engaged in the production of coal," and states further, "The profits of the mines are not now so great as they were some years ago, when coal was cheaper on the market." Mr. Bowen's remarks are really a statement of cause and effect, and might with equal accuracy be applied to most coal-producing districts in Canada. The number of men engaged in cutting coal is too small in proportion to the number of men engaged in handling that coal. This unbalancing of the underground organization is the cause of that decrease in production which has as its effect the increasing of the unit cost of mining.

Commenting on the decision of Australia to use nickel for the penny and halfpenny coins issued in future, the "Engineering & Mining Journal" says that incidentally this will increase the demands on New Caledonia and "British America nickel mines." Does the term "British America" mean Canada? If so, there are many reasons to prefer the use of a correct territorial designation. "British America" is correctly used to cover Canada, the British West Indies, British Guiana and Honduras, from a geographical point of view, but applied to Canada today the term is archaic, if innocently used; and, if deliberately chosen, it is not well chosen.

CORRESPONDENCE.

Toonto, July 8, 1920.

Dear Mr. Editor:

I have read with great interest your article on page 538 of the issue of July 2nd on "The Unionization of Technical Men." I am in general sympathy with the ideas expressed in that article as far as I was able to understand them, but a passage that stuck me was as follows:

"We believe the safeguard against such dangers lies in the emanaccompaniment of class legislation and a too processes, and would therefore endorse the recommendation already referred to that technical men should join their own organizations and assist in guiding along proper lines," etc.

Yours very truly,

WAKEFUL READER.

Note:—The passage to which "Wakeful Reader" properly calls attention should have read:

"We believe the safeguard against such dangers lies "in the emancipation of the scientific worker's mental "processes, and would therefore endorse the recom- "mendation already referred to that technical men "should join their own organizations and assist in "guiding along proper lines a movement that is al- "ready important, and bids fair to become much more "influential and widespread."

The error arose through editorial correction of a line which contained a mis-spelling, but the printer inserted the corrected line in the wrong place, throwing out the wrong line and retaining the original error (see fifth line from top). As printed, the sentence is, of course, meaningless. We apologize for the mystification of readers of the "Journal," whose annoyance is not unshared.—Ed.

BRIQUETTE PRODUCTION EXPECTED AT BIENFAIT, SASK. BY SEPTEMBER—WILL NOT ASSIST FUEL SUPPLY GREATLY THIS YEAR.

Output of briquette fuel from the Lignite Utilization Board plant at Bienfait, Sask., will have little effect this year on the coal market. The plant, which will be completed by the end of August, will have an output of 100 tons per day. Production will be continued for 90 and possibly 100 days during the present year, according to J. M. Leamy, power commissioner and a member of the board. Next year the production of fuel from lignite will be a real factor in the coal market, he stated. The briquettes will be sold at from $12 to $13 a ton, he said, and the price will at all times be as low as production costs permit.

Fuel sold this year, will be, as far as possible, distributed among representative dealers and a careful check will be kept to determine the actual value as fuel when put up to a variety of uses, according to Mr. Leamy.

THIRD INTERNATIONAL MINING CONVENTION AT NELSON, B.C.

From July 20th to 24th this now well established annual gathering of miners from British Columbia and the North Western States will hold meetings at Nelson. The Minister of Mines will open the Convention and in addition to addresses and papers, excursions through the neighboring mining centres will be arranged.

THE WORLD'S PRODUCTION OF GOLD.

Estimate for 1919 and 1920

The United States Geological Survey, Department of the Interior, has given out some preliminary figures showing the production of gold throughout the world in 1919. The production in the United States was $58,285,196; Canada is reported to have produced $14,687,000; India $10,028,000; Australia (not including New Zealand or the Islands), $29,268,000; the Transvaal, $171,640,123; Rhodesia and West Africa, $18,631,070. There was a probably large decrease in the production of gold in Russia and Siberia in 1919. Some increase was probably made in the output of Central America and South America, which, however, was doubtless offset by decreases in the output of other countries. The incomplete returns now available indicate that the world's production of gold in 1919 was between $345,000,000 and $350,000,000. The world's production in 1918 amounted to $380,924,500.

The Geological Survey further states that information received during the first six months of 1920 indicates a still further decrease in the production of gold in the United States and that the output for the year will probably be less than $50,000,000. The production in Aalaska, Colorado, California, Oregon, and Montana will be much less in 1920 than it was in 1919, because water is very short for placer mining and many stamp mills are closed. Canada as a whole may increase its output, although the production of the Yukon districts will be smaller than last year. The output of Russia cannot be estimated. That of Australia will show a decrease. That of South Africa and South America will probably show no radical decrease. According to the Geological survey the indications are that the decrease in the world's production of gold in 1920 will not be so great as it was in 1919.

ARTIFICIAL GRAPHITE

Graphite is manufactured by the Acheson Graphite Co. at Niagara Falls, N.Y. This company utilizes the electric power generated at the Falls to manufacture graphite from anthracite coal or from petroleum coke. This product is used mainly in lubricants, but it is also used in paints, foundry facing, preventives of boiler scale, and fillers for batteries.

Artificial graphite may be used for any purpose for which natural graphite is employed according to the United States Geological Survey except in the manufacture of large crucibles. Patents have been issued recently, however, for methods of manufacturing crucibles in which artificial graphite may be used. Artificial graphite is peculiarly adapted to the manufacture of certain graphite products, among them graphite electrodes, which are not made from natural graphite and for which the demand has greatly increased in recent years. The table below, published by permission of the Acheson Graphite Co., represents only the manufactured graphite that comes into competition with natural graphite.

Graphite manufactured by the Acheson Graphite Co., 1915-1919.

	Pounds
1915	5,084,000
1916	8,397,281
1917	10,474,649
1918	9,182,,272
1919	8,163,177

ELMER A. HOLBROOK APPOINTED ASSISTANT DIRECTOR OF UNITED STATES BUREAU OF MINES.

Nova Scotia readers and members of the Canadian Mining Institute will be interested in the appointment of Elmer A. Holbrook as Assistant Director of the Bureau of Mines, succeeding Dr. F. G. Cottrell. Mr. Holbrook has spent much time in Canada, and has been a frequent visitor to the meetings of the Canadian Mining Institute.

The following account of Mr. Holbrook's professional career is taken from "Coal Age".

Mr. Holbrook was born at Pittsfield, Mass., forty years ago. His early education was obtained at the public schools of that place. His higher education was secured at the Massachusetts Institute of Technology, from which institution he was graduated in 1904, after having completed his course in mining engineering. Prior to his graduation from the Institute he worked in mines in Montana and was a member of one of the locals of the Western Federation of Miners.

Mr. Holbrook's first position after leaving college was with the Standard Ore Co. in Montana, where he served as a sampler and underground surveyor. His next position was as superintendent of Ruby Gulch Mining Co. at Zortman, Mont. Later he served in the same capacity for the Gould Mines Co. at Gould, Mont. In 1907 he was made general superintendent of the Daly Reduction Co. at Hedley, British Columbia. At that time the Daly Co. was the largest producer of gold in the Dominion of Canada. After three years with this company Mr. Holbrook began a general practice as an examining engineer. He reported on properties in Nevada, South Dakota, Georgia, Ontario and Quebec, and was engaged for a time at Guanajuato, Mexico.

Entrance of the New Building of the U. S. Bureau of Mines

In 1911 he established headquarters at Halifax, Nova Scotia, where he designed and erected the mining laboratory for the Department of Technical Education of the Province of Nova Scotia. During the three years he was at Halifax he did a general engineering practice, most of which was in coal mines. For a time he was in charge of the mining department of the Nova Scotia Technical College.

In 1913 Mr. Holbrook joined the staff of the University of Illinois as associate professor in the mining department. Two years later he was raised to the rank of professor in the same department. During the several years he was associated with the University of Illinois he carried out important engineering and investigational work in the coal mines of the Middle West. In 1917 he was made supervising mining engineer of the Bureau of Mines and was placed in charge of the Middle West coal field station at Urbana, Ill.

The United States Bureau of Mines has at all times co-operated heartily with mining organizations in Canada and with our own Mines Branch. The co-operative mining investigations which have been undertaken at the Urbana Station of the Bureau and the University of Illinois at Urbana have made valuable contributions to coal-mining technical literature, to which Canadian readers have always been made welcome. Mr. Holbrook's acquaintance with diversified mining operations in several provinces of Canada, and his close connection with the co-operative technical investigations referred to will ensure a continuance of the helpful and friendly relationship between the Bureau and mining men in Canada, particularly as the new Director, Dr. Cottrell is no stranger in the Dominion, either in person, or through his technical attainments.

We wish both the Director and his Assistant all success in their positions.

GOVERNMENT NAMES COMMISSION TO INVESTIGATE LABOR AND WAGES CONDITIONS AT NOVA SCOTIA COAL MINES.

The Minister of Labor has appointed M. E. Quirk of Montreal, Sir William Stavert of Montreal and W. P. Hutchinson of Moncton, N. B. as a Commission to enquire into the questions attending the demand of the United Mine Workers of Nova Scotia for an increase of 25 per cent. in wages from May 1st 1920. Mr. Quirk is chairman. He was formerly Fair Wage Officer for Ontario, and has been entrusted on previous occasions by the Department of Labor with investigations in connection with coal mining disputes in Nova Scotia. Sir William Stavert is a well-known banker, with Maritime Provinces affiliations. W. P. Hutchinson is a train despatcher at Moncton, and has for many years been General Chairman of the Order of Railway and Telegraphers in connection with the Canadian National Railways.

The sittings of the Commission will commence at the earliest date that can be arranged.

A preliminary map of the International Boundary Region between Portland Canal and Stikine River, Alaska-British Columbia, has been issued by the International Boundary Commission of the United States and Canada. During the present summer there is to be a slight change in the line near Gracey Creek, south of the Unuk River and on the other portions additional monuments will be erected.

Centrifugal Pumps and their Use

By F. A. McLEAN, Sherbrooke, Que.

(Concluded from page 563 of last issue).

Some applications and Uses of Centrifugal Pumps.

Centrifugal pumps may be driven by means of belts or gears from steam engines, steam turbines, or electric motors, water wheels or any other sources of power available, most convenient or best suited to the location in which the pump is to be used. When operated by electric motors they readily lend themselves to the installation of automatic starting and stopping systems of the float-switch type. Driven by steam turbines they are more economical than steam pumps, operating on less steam and requiring less lubrication. The compactness of such units and their freedom from valves, more or less complicated motions, and sliding surfaces reduce the attendance costs to no small degree

On Water Works Service.

During the last few years motor driven centrifugal pumps have been widely adopted for waterworks service in small cities, towns and villages. Where they are used to pump water to a standpipe or elevated tank they are often arranged to be started and stopped automatically by either a pressure regulator or float switch. When used with a system of the direct pressure type, they may be run continuously, maintaining the pressure and delivering only such water as may be drawn from the mains. In some locations where a part of the system is at a higher level or at some distance from the station, it is necessary to maintain sufficient domestic pressure at the pumping station to supply the greatest demand and to install a centrifugal pump to act as a booster in the line which requires the higher pressure. A booster pump may be operated continuously and allowed to "float" on the line thus adding a fairly constant net pressure irrespective of the amount of water which may be taken from that line. A common practice is to use moderate pressure lines for domestic service and increase this largely in case of emergencies such as fire service, etc. Motor driven centrifugal pumps usually being fitted with constant speed motors are not adaptable for more than one pressure, and it is often necessary to install two or more duplicate sets designed for ordinary service which may be operated in series to obtain a larger pressure for fire service.

It is often desirable when installing centrifugal pumps for fire or other service where great reliability and freedom from interruption is essential, to either duplicate the equipment or to provide the pumps with more than one form of driving power.

An interesting instance of this kind is the installation at the Public Markets, St. Boniface, Manitoba, which comprises a No. 5 Cameron Class DV horizontal, double suction volute pump with a capacity of 500 U. S. gallons per minute, operating against a total head of 130 feet, at a speed of 1755 R.P.M. This pump is direct connected at one end to a 30 H.P. Westinghouse, 550 volt, 60 cycle, 3 phase induction motor, and at the other end to a 35 H.P. General Electric Steam Turbine, in such a way that either the motor of turbine may be used as desired thus making the equipment entirely independent of power failure. This arrangement is very compact and has proved very efficient and economical in operation.

Crank and flywheel pumps have been displaced in many localities by turbine driven turbine pumps connected to condensers which have proved much more reliable and economical that the best triple expansion crank and flywheel pumps. Their low installation and yearly operating costs together with their compactness—permitting their use in small buildings and doing away with the necessity of special foundations—

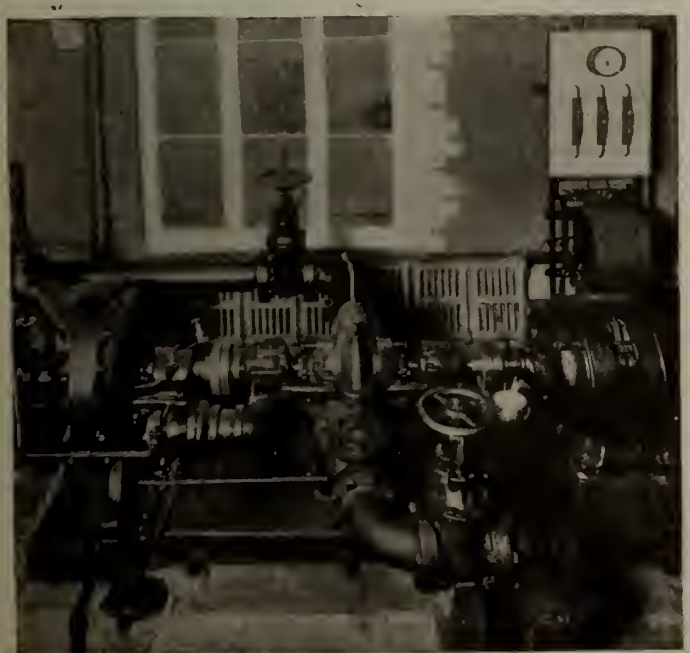


Fig. 6—Cameron Double Suction Volute Pump, Arranged for Steam, Turbine or Electric Motor Drive. Installed at the Public Markets, St. Boniface, Manitoba

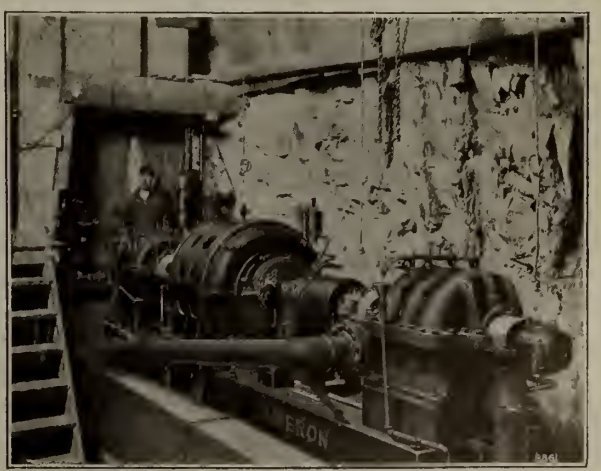


Fig. 7—Three-stage, Motor-driven Centrifugal Pumps in Series in a Mine Pumping Station

are some of the reasons whey they are displacing other types for fire protection and water-supply services

Mine and Industrial Service.

In the last few years steam pumps have largely been displaced in station pumping service for the unwatering of deep mines where the installation is to be of a permanent nature. For temporary use the steam pump is well suited to this class of service, but where the equipment is to be operated continuously the same features of low maintenance and economy of operation which have led to the use of centrifugal pumps in other fields has caused them to be very widely adopted by many mining companies. Reliability is an essential feature of mine pumping equipment, and the ability of centrifugal pumps to operate continuously 24 hours a day with a minimum amount of care and attention, has resulted in their installation in many places in the mine where steam pumps were formerly used

Where electric power is available, the motor-driven centrifugal pump can be obtained in portable units, of large capacity, which are very suitable for emergency requirements, such as inrush of water from drowned workings, or inundations from surface waters.

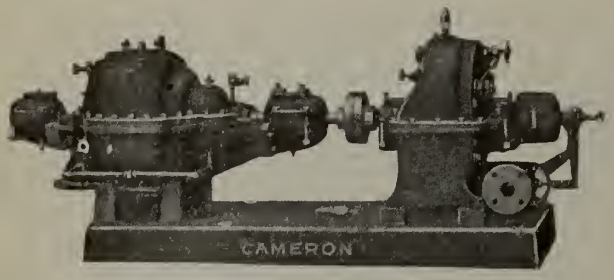


Fig. 8—Three-stage Turbine Pump, Driven by Steam Turbine

Emergency pumps of this type are very desirable at any mine exposed to danger of inundations, and, in many instances, the initial expenditure has been well repaid by the availability of portable pumping equipment when it was badly needed.

For handling slimes, tailings, acids and corrosive solutions in mine concentrating and reduction plants, the centrifugal pump has many advantages over other classes of pumping equipment. For this class of service it is possible to secure units designed to pump dirty and gritty water, or liquids containing semi-solids, and for handling chemical solutions.

The centrifugal pump is specially adapted to the use of corrosion-resisting materials in the construction of those parts that come into contact with the liquid being pumped.

Marine Service.

The steam pump has long been standard for use on dredges, barges, naval vessels and merchantmen, and still retains some supremacy in this field which, however, has recently been invaded by steam turbine, engine, or electric driven centrifugal pumps with so much success that it seems to be only a question of time until they will entirely replace reciprocating pumps of all classes of service on the larger vessels.

It is not hard to understand the preference for the centrifugal pump which occupies considerably less space than the best type of reciprocating pump; and space is always at a premium in ships. The centrifugal pump is higher in economy, simpler in construction, and delivers the water in a steady stream, resulting in quiet operation, and permitting the use of smaller piping.

For Boiler Feeding and General Mill Service.

Centrifugal pumps are ideal for boiler-feeding purposes and are usually either motor or steam-turbine driven. Motor-driven feeding pumps are generally allowed to operate continuously at full speed, maintaining a practically constant pressure in the feed line for a large range of capacity. The amount of water which is fed to the boiler can be controlled by a valve in the feed line without danger of creating a dangerous pressure in the boiler as centrifugal pumps will not build up a pressure greater than 5 or 20 per cent above normal even when the discharge valve is closed.

Steam turbine driven boiler feed pumps may be operated in the same manner, but are often equipped with pressure regulators similar to those used on ordinary steam pumps to maintain a fairly constant differential between the steam and feed line pressures, practically where the variation in steam pressure is considerable. The amount of water fed to the boiler by either steam or electric-driven centrifugal pumps can be regulated without touching the pump, and there are no valves, rods or large packings to be looked after. In case of loss of suction there is no danger of breakage by water hammer as is the case with the ordinary reciprocating pump.

Fig. 9—Motor-driven, Three-stage Turbine Pumps in Series

For circulating and other low-pressure service, steam-turbine, steam-engine or electric-motor driven single-stage pumps are generally used while for higher pressures such as required in boiler feeding, etc., steam-turbine or electric-driven multi-stage pumps are more suitable.

Efficiency of Centrifugal Pumps.

The efficiency of a centrifugal pump is highest at only one combination of head and capacity for each change of the speed at which it is driven, and therefore if it is operated at a speed other than that for which it was designed, the capacity in gallons per minute and amount of driving power required can only be approximately determined. When run at other speeds the efficiency is likely to be low, making the equipment unsatisfactory for the purpose for which it was installed as well as expensive to operate.

Even though the increased power necessary to drive an inefficient pump is but small, it must be remembered that the excess power is continuously consumed while the pump is in use and will total up to a considerable sum in a year's time,, often representing in money more than the difference in first cost between

the highest for any one year in the company's history, and that during 1920 with production at the rate of about half a million higher than in 1919 the net profit may reasonably exceed even that set last year.

Following is the June statement:—

"During the month of June the company mined ore of an estimated value of $200,449 and shipped residues from Nipissing and custom ores of an estimated value of $109,746. No bullion was shipped.

"There was no unusual development underground. All stopes continued to produce in a satisfactory manner. Development on several veins were generally encouraging. The usual amount of exploration was carried on.

The low grade mill treated 7,160 tons. The high grade plant treated 183 tons. Following is an estimate of production for the month of June:—

Low grade mill	$120,967
Washing plant	79,482
Total	$200,449.....

Ore and Bullion Shipments

During the week ended July 9th, three Cobalt companies shipped a total of eight cars containing approximately 583,206 pounds of ore. The Nipissing, with five cars headed the list, as shown in the following summary:—

Shippers	Cars	Pounds
Nipissing	5	390,147
Mining Corporation	2	128,679
O'Brien	1	64,380
Totals	8	583,206

During the corresponding period, the Mining Corporation and Nipissing both shipped bullion, sending out a total of 155 bars containing 175,943 fine ounces, made up as follows:—

Shippers	Bars	Ounces
Mining Corporation	99	100,564
Nipissing	56	75,379
Totals	155	175,943

THE GOLD MINES.

Interest swings again to the question of a bonus on gold, an explantion of the proposal having been made by Louis T. McFadden of Pennsylvania who introduced the Bill in the United States Congress. "It seems to meet conditions from all corners, is simple and not costly," says Mr. McFadden, "and provides for the immediate imposing of an excise of 50c. per penny-weight ($10 an ounce) to be collected on the sale of all articles containing gold or gold used for other than monetary purposes, thereby creating a fund from which the gold producer is to receive $10 for each ounce of gold produced." Opinion differs as to the possibility of the Bill becoming law.

At the Hollinger mine, an average of about 1,700 tons of ore is being treated daily and the indications appear to be that the final result for 1920 will approximate that of the preceding year. It is learned that among the necessities recently undergoing a change in price is high grade cyanide which advanced 2 cents a pound this month.

On July 13th the directors of the Porcupine V.N.T. Mines are holding a meeting. On the following day, a special general meeting will be held. The question of obtaining finances for the treasury is to be dealt with. Three proposals are to be considered, one of which is an offer from the Associated Gold Mines of Western Australia to loan the V.N.T. some $50,000, taking a first mortgage as security. This proposal is being opposed in the North. Another suggestion has been made that the company consider merging with the North Crown Mines, the company which recently took over the Porcupine Crown and the Thompson-Krist. This suggestion does not appear to be favored by the officials of the V.N.T. The third plan seems to find more general favor, and is the suggestion that in view of the company having 657,000 shares remaining unissued in its treasury, that these should be sold for the purpose of financing the treasury. It is pointed out that on the strength of the assurance that work is to resume, very little difficulty would be experienced in selling a block of perhaps 200,000 shares at around 25 cents a share. Later on, on the strength of the work going on it is felt that quotations would advance and enable the company to sell an additional block of 200,000 shares at a considerable higher price. This, it is thought would put the company in shape to produce in a pretty big way. Officials who have just concluded a visit to the mine, after making an examination of the plant, have announced to the "Journal" correspondent that by spending $50,000 on the mill it could be so re-modelled and enlarged as to treat between 150 and 160 tons daily. Also, with about $100,000 the main workings could be extended from the present depth of 600 feet to a depth of 900 feet, with main levels at 600, 750 and 900 feet, thus mining the ore in stages of 150 feet.

According to official advice, the Teck-Hughes in recent months has been able to increase its ore reserves about 30 per cent. This was accomplished at a time when operations were at about two-thirds capacity, by confining effort to that part of the mine lying between the 400-ft. level and surface. Just now the mill is treating an average of 2,400 tons per month. It is found that greater efficiency can be established by operating at a uniform rate of two-thirds capacity than endeavoring to work at full capacity when in doing so the unsatisfactory supply of men would cause moreor less erratic results. About 70 men are now on the payroll. In regard to the financial standing of the Teck-Hughes Company, while the mine itself is now producing a profit, yet the $500,000 bonded indebtedness is a source of worry, some $70,000 in interest falling due in October. Just what will be done to tide this over has not yet been determined, but the proposal has been made to increase the capitalization of the company.

Final arrangements are being made for the Kirkland Lake Proprietory, 1919, to take over all responsibility for the operation of the Tough-Oakes Mine, paying the Canadian Tough-Oakes Company a nominal rental for the plant so as to relieve this company from responsibility. The shares of the Tough-Oakes Mine are to be exchangeable for Kirkland Lake Propriety on the basis of two of the former for one of the latter. It is intimated that the Proprietory has $90,000 immediately available with which to re-open the mine, and to be exchangeable for Kirkland Lake Proprietory on with more in sight provided such is necessary.

From the rate of progress being made in the big construction programme at the Wright-Hargreaves Mine, the mill will be in readiness for operations some time during the closing quarter of the current year. The foundations are all completed, and the structure

Our Northern Ontario Letter

THE SILVER MINES

In the report this week that India is to go on a straight silver basis almost immediately, producers of the metal believe they see reason for anticipating a substantial increase in quotations. The price, having sagged to under 90 cents an ounce, rose to 94½ on the strength of the report.

The scope of mining activity in the silver-bearing areas of Northern Ontario is gradually broadening, as shown in the amount of work being done outside of Cobalt, including Gowganda and South Lorrain. It is obvious that high prices for silver will lead to still further activity, and excellent prospects of new producing mines being developed.

Very considerable importance may be attached to an official statement from Major J. McIntosh Bell to the Northern Ontario Correspondent of the "Journal" in regard to the result of work on the Keeley Silver Mines in South Lorrain, in which it is shown that a considerable tonnage of ore assaying from 40 to 90 ounces to the ton has been opened up. An important feature of the statement is that the vein measures about three feet in width, that it has been opened up quite extensively at a depth of 230 feet, with mineralization found to continue to a depth of 300 feet as shown in a winze driven to the last named depth. Major Bell also states that the mill being constructed is nearing completion and will be ready to treat about 80 tons of ore daily by early fall. In the meantime, during the course of developing a large tonnage of milling ore, occasional patches of high-grade ore are being taken out, all of which is being assembled ready for shipment just as soon as a car is filled.

In regard to the ownership of the Keeley Mine, some confusion exists. It is generally believed that it is now owned by the Associated Gold Mines of Western Ontario. As to this the following is an explanation:—The Keeley Silver Mines, Limited, (with an authorized capital of $150,000) in Feb. of this year took over the Keeley Mine, as well as the adjoining Beaver Lake property, and is now in complete control of both properties. The only shareholders of the Keeley Silver Mines are the Associated Gold Mines of Western Australia, holders of 80,000 shares, and the Erdlich proprietory and the Siberian Proprietory holders of the balance of 40,000 shares.

A rich ore shoot is reported to have been encountered on the recently opened Colonial Mine, which property lies adjacent to the O'Brien. The Colonial has been idle for a number of years, although generally regarded as a profitable producer when worked. The geological conditions are somewhat similar to that occurring on the rich O'Brien Mine, and it is believed the Colonial will in a short time take its place among the regular shippers.

The Kerr Lake Mining Company has made final arrangements to have the Dominion Reduction Company treat between 75,000 and 100,000 tons of low grade ore, contained largely in surface dumps. The contract has been let and work is to commence just as soon as the Reduction Company can provide facilities. Meanwhile, production from the Kerr Lake continues at the rate of approximately $1,500 daily, the revenue to be derived from the treatment of the low grade material to be in addition to this amount.

Additional high grade ore is being developed at the Beaver Consolidated, the latest shoot opened up about three inches in width and containing patches of exceptionally rich ore.

At the Oxford-Cobalt property, the shaft has reached a depth of 150 feet. Cross cutting to the vein was commenced this week, the distance being estimated about 22 feet. After reaching the vein, considerable drifting will be done, after which the shaft will be continued to deeper levels.

Opinion in Cobalt is that from now on the Nipissing will not only disburse regular dividends of 5 per cent quarterly, but may also make an annual capital reduction of $1 per share. The 5 per cent dividend would require $1,200,000, while the capital reduction would require an equal amount, making a total return of $2,400,000 an amount equal to $2 on each of the 1,200,000 issued shares. Current net profits exceed that amount annually, in addition to which there are quick liquid assets of over five million dollars.

A shipment of between 10 and 11 tons of high grade ore has just been made from the Castle property at Gowganda. The ore contains an average of over 1,500 ounces of silver to the ton. A considerable part of it was taken from an open cut on the recently discovered vein on R. C. 101. Further rich shipments are expected to be made at seasonably short intervals.

The reported silver find which last week caused a rush of prospectors from Haileybury has turned out to have been another rainbow. A vein containing considerable bismuth was quietly being worked by lumbermen who believed the substance was silver. It was located in the township of Rattray, east from Boston Creek, and adjacent to the Ontario-Quebec boundary.

According to offical information the Reeves-Dobie is operating its mill about 20 hours daily. The plant has a capacity for treating between 25 and 30 tons of ore daily. It is announced that arrangements are being made to have the mill enlarged so as to treat about 50 tons daily. The ore is said to contain close to 30 ounces of silver to the ton. Work on the property has been confined largely to between surface and the 100 foot level.

Owing to a shortage of ore, the Peterson Lake mill has been closed down. The usual amount of development work is proceeding, however, and it is planned to reopen the mill just as soon as sufficient ore is broken.

According to advice just to hand from managing-director H. A. Frank, the directors of the Walsh Mines, Ltd., at Miller Lake, in the Gowganda district, have decided to close down operations temporarily in order to remove their plant from the present location to an island near the north of the property where it is proposed to sink a new shaft and explore the area underlying beneath the lake.

During the month of June, according to the regular monthly statement just issued by Hugh Park, Manager, to the President and directors, the Nipissing mines Mine produced $200,449. This is a falling off as compared with the$335,597 produced during the previous month, but in averaging up the first six months of the year shows a total of $2,037,567. This being at the rate of over four million annually far exceeds the total for 1919 when a total net value of $3,553,958 was produced. From these figures it is significant to note that on the operations for the whole of 1919 the net profit amounted to $2,717,312 which profit was

will be obtained by making the suction piping as direct as possible, and allowing the water to flow to the pump under a head of from 6 to 10 feet, to eliminate the formation of vapour.

As previously mentioned, the efficiency of a centrifugal pump is lowered by the presence of vapour, air or gas in the suction line. These collect in the suction opening of the impeller, being the point of least pressure, and interfere with the passage of the liquid, thus seriously reducing the capacity of the pump or even causing it to lose its suction altogether.

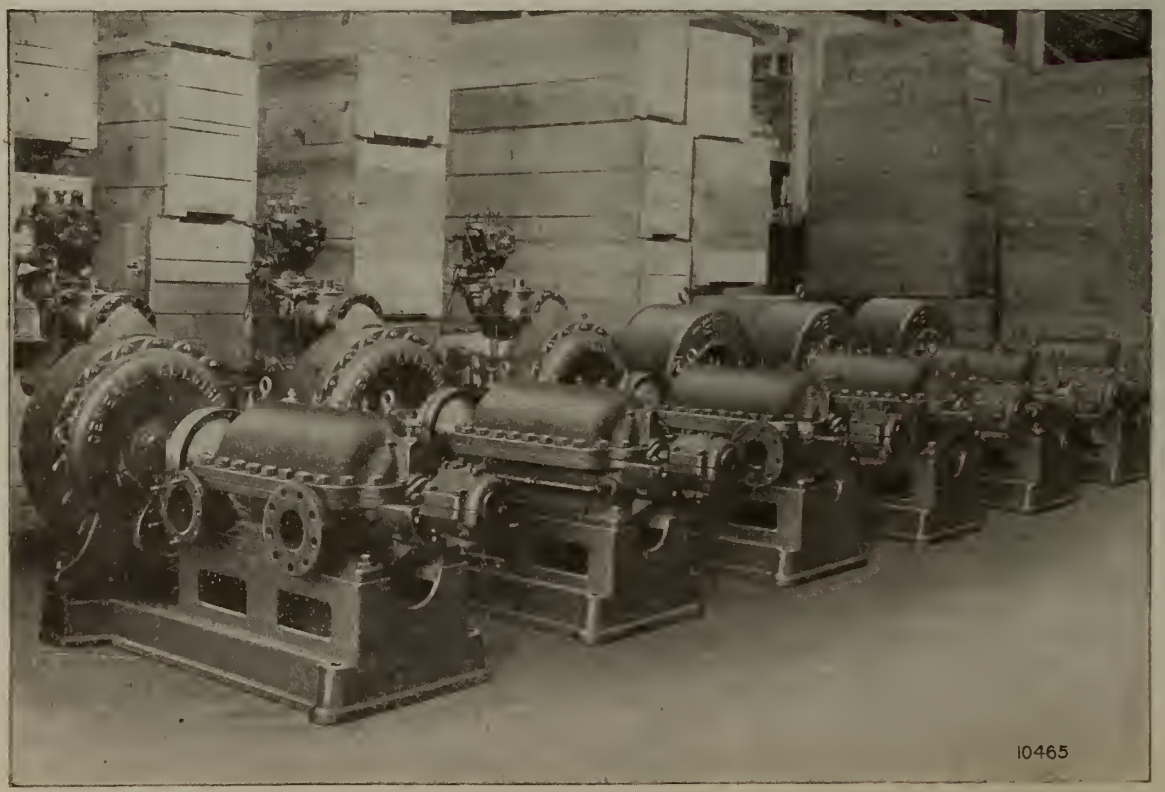
Size and Arrangement of Piping.

All connecting discharge piping should be arranged to place no strain on the pump and it is usually advisable to make this from one to two sizes larger than the nozzle on the pump, using reducers at these points to make the connections. This will cut down the friction losses and makes the installation more economical to operate. In consideration of the marked advantage of small suction lift the intake pipe should be of as large a diameter and as short and direct as possible. The piping should be so arranged that there are no pockets for the accumulation of air and where these are unavoidable, some means of exhausting them must be arranged. The principles on which the action of the centrifugal pump is based require the liquid to be handled at high velocity. The intake and discharge opening are much smaller than those of a reciprocating pump of the same capacity, and in determining the sizes of pipe to be used, it is well to refer to a standard friction table such as is generally published by the various pump manufacturers in their catalogues. In placing discharge piping it should be kept free of high spots and loops as any air bubbles which may be formed will interfere with the passage of the liquid being pumped.

A gate valve is usually fitted in the discharge line of centrifugal pumps so that the pump may be shut off the line when not in use or when open for repairs or inspection. A centrifugal pump will revolve in either direction and there is nothing to prevent the liquid in the discharge line flowing back through it when not in operation. Consequently should the power be suddenly cut off, the impeller acting as a water turbine might be driven backward at a speed dangerous to both itself and its prime mover. A foot valve placed on the intake pipe or a check valve on the discharge line may be employed to eliminate this danger. Pumps operating at high pressure on which a foot valve is used, should be provided with a check valve on the discharge line to reduce the shock on the pump when the foot valve seats. It is a good plan to put a by-pass around the check valve so that the pump may be primed should the foot-valve start leaking.

Centrifugal pumps are usually fitted wtih heavy bedplates so as to allow the use of a small foundation, which must, however, be of ample strength to bear the weight and support the pump firmly. The pump must set level on its foundation and be carefully aligned before being put into service. The pump, motive power, and bed-plate of direct-connected units which are purchased complete are generally accurately aligned by the manufacturer before shipment, but this alignment is very likely to be disturbed in shipment or by carelessly tightening up the foundation bolts before assurance is had that the alignment is correct.

Some manufacturers ship their pumps with the coupling bolts packed separately, so that alignment may be accurately made by placing a straightedge across the rims of the coupling and measuring the distance between the faces of the coupling. The couplings should not be connected until one is sure that the prime mover is moving in the direction that the pump is intended to rotate which is usually indicated by an arrow cast or painted on the pump casing.



A Battery of Turbine-driven, Multi-stage Marine Pumps awaiting Shipment to U. S. Navy Yards.

an inferior and a properly designed pump. Sometimes this amount will equal the interest and depreciation on the entire installation for a similar period of time.

The saving made by the good pump when compared with an inferior type will pay back its cost in a very short time.

Correct Design of Wearing Parts.

There are a few parts of the enclosed-impeller type of pump that are subject to wear, such as the sections of the shaft which are carried in the stuffing boxes and bearings, as well as the portion of the casing which makes a running joint with the impeller These wearing surfaces should be provided with renewable parts, easily replaced at small cost, and the main or more costly parts being thus well protected will last a great deal longer, ensuring a low depreciation. The casing should be protected from wear in the casing, and a similar pair of rings mounted around the impeller inlet by working rings secured on the impeller used to protect it from wear also Bronze sleeves fastened to the shaft and passing out through the stuffing boxes will ensure the shaft against scoring and rusting. Centrifugal pumps of the highest grade are usually provided with self-oiling, babbitted shell-type bearings made in two pieces, spherically seated and so arranged that they may be removed when worn and either re-babbitted or replaced with a new set, so that the alignment of the impeller will not be disturbed and the close fit between it and the casing, which is so necessary to prevent leakage internally, will be preserved.

Operating Conditions.

In designing a pump for a particular installation, it is necessary that the conditions of head, capacity and speed be correctly determined and furnished to the builder together with information regarding any special requirements which may be involved if the highest efficiency is desired. It should be understood that the centrifugal pump is not an extremely sensitive affair that will be efficient at only one particular combination of head and capacity, and uneconomical when it is not possible to obtain these ideal conditions. The efficiency remains constant for a small variation on either side of the normal capacity, varying inversely as the head, and consequently it is usually better to figure the head a trifle higher than normal and design the pump accordingly, and then if the head should be a little bit less, a slight increase in capacity will be the result, which in most cases will not be objectionable. Sometimes it is possible to obtain two or more conditions of head and capacity from a pump of special design running at a constant speed with satisfactory results, and when some provision is made for speed variation the possibility of designing an efficient pump for variable service is greatly increased.

Explanation of Total Head.

The make up of the total head on which a pump has to operate is as follows: the vertical static suction lift from the level of the liquid to be pumped to the center of the pump; the static discharge head which is measured from the centre of the pump to the point at which the liquid is discharged, and the friction in the piping, elbows, valves, etc., in both the suction and discharge lines, as well as the velocity head and entrance head. Another point to be considered, which concerns only the manufacturer of the pump is the loss of head within the pump itself. The efficiency of the pump is the ratio of the power theoretically required to raise a given quantity of water against the total head to the sum of this power, plus the friction in the bearing and stuffing boxes and the hydraulic losses in the pump due to leakage, etc. These latter figures when worked out for any given pump represent its pump horse-power, or in other words, the total driving power required.

The Effects of Variations in Speed.

Both the capacity and the total head of a centrifugal pump are affected by speed variation, and consequently considerable care must be taken to determine the speed at which a pump is to be operated so that its design may be governed accordingly. This is very essential in the case of pumps which are directly connected to constant-speed alternating-current motors which operate at slower speeds under no load than when fully loaded and cannot be conveniently regulated.

Starting the Pump.

The impeller of a centrifugal pump possesses no positive displacement of itself and when running in air cannot create sufficient suction to be self priming, and, therefore, both the pump and suction pipe must be filled before starting. This may be accomplished by placing a foot valve on the lower end of the suction line and filling the pump and suction piping from the discharge line allowing the air to escape through an air cock on the top of the pump casing. Another method is to close the discharge gate-valve and exhaust the air in the pump case by means of an injector allowing the foot valve to be dispensed with, provided the pump is started while it is primed. When the pump has been primed it is ready to be started and should be brought up to its proper speed and the discharge valve opened. After the pump has been started, it will require but little attention; an occasional inspection of the bearings, from which the oil should be removed and new oil substituted from time to time is all that will be required. The so-called dynamo oil is well adapted for use in the bearings of centrifugal pumping machinery. Pumps intended for use with corrosive liquids are made of special metal, but the case should be opened occasionally and all internal portions thoroughly inspected. The presence of air or gases in the suction pipe will considerably reduce the capacity and pressure of the pump and care should be taken to avoid this trouble by properly baffling the suction pipe.

The Suction Lift.

When a centrifugal pump is once under way it will handle water or other liquids of the same specific gravity at ordinary temperature on as high a suction lift as the best reciprocating pumps, or about 26 feet at sea level, provided the pump and suction piping are free from air and air leaks. It is usually difficult to maintain air-tight suction-glands and piping, and the maximum commercial suction lift is therefore considered to be about 18 feet, although some manufacturers advocate not more than 12 feet whenever possible. The limit of suction lift is decreased by a rise in temperature of the liquid being pumped, and when the temperature of the liquid to be pumped is over 150 Fahr. it is better to have the pump so arranged that the water will enter it by gravity. In boiler feeding and similar service where water near the boiling point is to be handled, the best results

itself is now going up. The crushers, ball mill and one of the tube mills are already in place, and work is soon to commence on the construction of the tanks All buildings including, power house, heating plant, dry, etc., are being brick-veneered inside and the estimated cost of heating the plant is perhaps the lowest in the North. The saving realized in heating is believed as likely to more than repay the cost of the heavier initial expenditure. Underground work is proceeding, the object being to connect shafts Nos. 1, 2 and 3 at the 400-ft. level. More than a dozen faces are in ore, and it is planned to operate the mill on ore coming from development work during the course of cutting the necessary stopes.

At the Bidgood property at Mud Lake in Lebel township, the vein has been cut and measures approximately 15 feet in width. This compares with a width of 12 feet at the 100-ft. level. As yet, average assays have not been announced from the 200-ft. level. The shaft is to be continued at once to a depth of 300 feet at which point the main development program is to be carried out.

Cross-cutting on the 500-ft. level of the Miller Independence mine at Boston Creek is nearing the point where it is expected to encounter the downward continuation of the "Adams" vein in which gold tellurides were found in spectacular quantities near surface. A number of highly mineralized stringers have been cut, and work during the balance of July is regarded as likely to be attended with important results. Work is also being carried on at the "D" or incline shaft.

PERSONALS.

O. G. Donaldson, shareholder of the Wright-Hargreaves and the Lake Shore Mines, has concluded a visit to the Kirkland Lake district and returned to his home in Buffalo, N.Y.

Major J. McIntosh Bell paid a visit to the Porcupine V.N.T. mine during the past week-end and returned to the Keeley Mine in South Lorrain early this week.

Wm. Gowans, assistant superintendent of the Castle property in the Gowganda district paid a brief visit to his home in Haileybury returning to Gowganda on Monday.

AMBER REPORTED FOUND BY MR. J. C. MURRAY IN NORTHERN MANITOBA.

A newspaper despatch from The Pas, Manitoba, states that Mr. J. C. Murray, formerly Editor of the "Journal" has arrived at The Pas, returning from Cedar Lake, with a gunny sack of amber of good quality. Mr. Murray reports a plentiful supply of amber scattered about the sand and the muck on the borders of the lake. He states that a canoe could be filled with it in less than an hour. The presence of amber at that place has been known for several years, but until Mr. Murray examined it for New York and Toronto interests, its value was unknown. Col. J. B. Miller, of the Parry Sound Lumber Company, and Major Craig, of Toronto, left here for the amber fields today.

The Poulin Asbestos property recently acquired by Mr. Samuel W. Cohen and associates has been organized under the name of the General Asbestos Company, Limited, with head office, Montreal.

British Columbia Letter

THE METAL MINES

Victoria, B.C.

The amendments to the Placer Mining Act of British Columbia, passed at the last session of the Provincial Legislature, came into effect on the 1st of July. Holders of placer leases, however, have until the 1st of January, 1921, to make such arrangements as are necessary to hold their property. They may do one of two things, viz., pay up arrears on their leases and continue annual payments as laid down by the old Act or consolidate the arrears and pay a proportion of the whole amount together with the current annual fees. Those failing to do either one or the other will be dispossessed of their holdings, the Act as amended providing for automatic forfeiture under such circumstances.

Stewart, B.C.

Arrivals from Stewart, B.C. declare that there is no mining boom in the Portland Canal District, but that there is much solid development. Nine diamond drills now are in operation, two on the Premier, two on the Northern Light Group, one each on the 49 Group, the Big Missouri, the Mother Lode, one on Goose Creek and one on the B. C. Exploration Company's property, Marmot River. It is stated that the snow is rapidly disappearing from the higher reaches and that there still is employment for good miners.

Activity is apparent through the country contiguous to the Bear River Valley. Men are engaged in putting the line of the Canadian Northeastern Ry., owned by Sir Donald Mann, in shape for operation, and a gas locomotive has been bought, together with some rolling stock, in order that the transport of supplies to the various camps may be undertaken as soon as the repairs to the road render it feasible.

Some of the mining operations in this section that may be instanced are the development of the Q & L Group held under bond by J. Tretheway, of Cobalt, consisting of surface stripping which has resulted in the exposure of a vein carrying good values and the driving of a tunnel on the vein the ore of which on assay gives return in galena, zinc-blende, and silver; the opening of the Red Top Group by G. Seivert; further work on the Tower Mountain Group by K. P. Matheson, who found promising leads of silver-lead galena last year; the exploration of the Goose Group by the Algunican Development Co., who have it bonded; the development of the L. L. & H. on Bitter Creek; and the vigorous development of the Lakeview Group, Glacier Creek, by P. Welch, of Spokane, and H. J. Fletcher, of Seattle, Wn.

Alice Arm, B.C.

The population of the town of Alice Arm is growing to such an extent that increased accommodation has to be provided with the result that there is much building in progress. A three storey hotel is under construction; also many homes in the nature of log cabins. The community radiates prosperity. Everyone is busy and the Dolly Varden Mine Railway is operating regularly, if not in the transport of ore from the mine in carrying supplies from tidewater to the camp. Reports continue to be received regarding the richness of the new ore being found on the development of the Dolly Varden Mine property. It is stated also that the Royal Group nearby is showing up well and that other

properties under development give encouraging indications of merit. Prospectors are going into the hills both up the Kitsault and the Illiance Rivers and much is looked for favorable to the district from the season's work.

Usk, B.C.

High grade copper ore is reported to have been discovered on the Nicholson Creek, near Usk, northern B.C., by Albert Baxendale a prospector. As a result the Crescent Group of Mineral Claims has been staked Stripping is said to disclose a fissure vein, one foot to six feet wide, for a distance of 700 feet carrying bornite and chalcopyrite, much of which is of sufficiently high grade to ship.

Slocan, B.C.

That the Utiza Mine will be re-opened at once and by C. F. Caldwell, vice-president and managing director of the Utica Mines Ltd. The old Sunset property, situated near the Utica, also is to be developed. The latter has not been worked for fifteen years. During its operation over $500,000 worth of ore was shipped, some 2,000 tons averaging over $250 a ton at the former price of silver. It is proposed to continue the existing crosscut to strike the vein at new depth. The mine, it is hoped, will be shipping by fall.

Work on the Evening Star Mine, Dayton Creek, is proceeding with satisfactory results. The crosscut being driven for depth has reached an advanced stage, its face now being somewhere near the line of the shaft and below it. The workings will be unwatered before an attempt is made to connect the two. As the workings radiating from the shaft are quite extensive the latter work will take some time. Hugh Sutherland, of Winnipeg, Man., formerly executive agent for the Canadian Northern Ry., is the owner of the Evening Star and also of the Silver Nugget, in the same vicinity, which is to be developed.

Nelson, B.C.

The Florence Silver Mine, near Nelson, B.C., is in operation and the installation of another unit for the power plant is underway. The mine is working on a two shifts and the concentrator on a one shift basis. There is said to be an abundance of ore in sight, both the Fisher and Replacement veins looking splendid. About 150 tons of millfeed is coming down daily and it is expected that the mill will be able to ship 300 tons of concentrates a month.

Another deal is reported in connection with the Granite-Poorman Mine, Eagle Creek, it being stated that a syndicate has been formed to take over the property from the Vincent Development Co., As a result the Granite-Poorman property will resume operation immediately, a crew of men already having been put to work.

The Coal Mines

G. W. Bowen, vice-president and managing director of the Canadian Western Fuel Company, predicts that there will be a scarcity of coal all over the American continent during the winter of 1920-21 and attributes present conditions in the United States in this respect to the transportation problem. The increased demand for coal locally he explains by the shortage of oil and the greater population. The cost of production would govern prices, oil shortage and other contingencies having nothing to do with the matter. Discussing the latter question he pointed to the fact that the Company was engaged in prospecting for coal, that what appear to be good body at the outset possibly would peter out in development, that in the Nanaimo Mines not more than 25 per cent of those employed actually were engaged in the production of coal, so that the average output of coal per day per person would not run more than a ton and a half. The profits of the mines were not as great now as they were some years ago when coal was cheaper on the market. Little coal was being shipped from Nanaimo to the United States whereas a few years ago the bulk of the output went to San Francisco, Cal. Now practically the only coal going south of the line was that required to fill small contracts with Seattle, Wn., dealers.

In an endeavor to produce satisfactory coking material the Granby Consolidated Mining & Smelting Co., is bringing coal from Brule Lake, Alberta, for mixture with the product of the Cassidy Collieries, Vancouver Island. As a result a considerable proportion of the output of the Cassidy Mine likely will find its way to the domestic markets of Vancouver, Victoria and other British Columbia centres.

T. A. Spruston, superintendent of the Extension Division of the Canadian Collieries (D) Ltd., pointed out to the miners recently the importance of their working more steadily than in the past. In the month of May out of 296 contracts miners employed only 85 worked full time. He figured that 906 shifts were lost which was the equivalent of working the mines one day a week with no miners. Reference was made to the high cost of producing coal at Extension under ordinary conditions. As matters stood there not only was the handicap of time voluntarily lost by employes but of actual lack of labor, there being places in the mines for 100 additional hands if they could be secured. Owing to the habit the contract miners had fallen into the earners of day wages were finding it diffienlt to get along as the Company had been compelled to close down each Saturday. There was a danger too, that, if production remained low, contracts entered into for the supply of Extension coal would have to be allowed to lapse, in which event, of course, the Company's customers would go elsewhere. Mr. Spruston emphasised the position by pointing out that loss of four days a month meant the loss to the community in wages of $15,000 a month and resultant depression of trade and general business. He urged the men to work the full six days a week, thus increasing the productivity of the mines 3,171 tons a month. After discussion the miners passed a unanimous resolution urging the men to fill a full six days a week on the morning shift and five days a week on the afternoon shift.

The Chua Chua coal-bearing lands on the North Thompson River, near Kamloops, B.C., have been bonded to the Queen Bess Mining Corporation of Seattle, Wn., approximately $500,000 being involved in the transaction. Glenville A. Collins, who was chairman of the recent International Mining Convention at Seattle, Wi., was instrumental in putting the deal through. Drilling is to commence forthwith and it is expected that the first shipments will be made next September.

THE USE OF GYPSUM IN A NON-CONDUCTING ROOFING SLAB.

A paper read before the Technical Section of the Canadian Pulp and Paper Association at Sault Ste. Marie on June 23rd by Mr. H. S. Taylor, described the use of a non-conducting roofing with gypsum as its chief constituent, to overcome the decay and other troubles associated with roofing in paper mills caused by condensation of moisture on the underside of the roof. A moist atmosphere is inseparable from paper-making processes, which consist largely of the evaporation of moisture from a mixture of ground wood and water by passage over heated rollers.

After explaining the required characteristics of a roofing material as durability, non-conductivity and resistance to corrosion, and giving some instances of rapid decay in mill roofs attributable to interior condensation, with particular reference to the mill of the Spanish River Pulp and Paper Co., on Lake Superior, Mr. Taylor (who represents the Management Engineering and Development Co.) was asked to report on a suitable roofing to overcome the difficulties indicated. An abstract from the paper follows:

The result of a thorough investigation was the selection of gypsum for roof slab material combined with wood shavings. .

This monolithic gypsum composition slab has long been used for fireproof floors and roof construction in the eastern United States and Canada under the trade-name "Metropolitan." Some of the oldest of the large buildings of downtown New York city are of this construction 60 Wall Street, 42 Broadway, Beaver Bldg., Singer Bldg., etc., as well as hundreds of heavy manufacturing and loft buildings, apartments, hotels, residences and the like throughout the metropolitan district and in other communities. The first installation was made in 1892, and came into extended use in 1894. During this year a gypsum roof was placed on the St. Nicholas Skating Rink. I have for your examination a piece of gypsum knocked from the underside of the floor slab of this building just about the refrigerating machinery. The steel stable enforcement was found to be in excellent condition when exposed after 22 years. I also have for your inspection a piece of cable 32 years old, taken from the Horticultural Hall, Philadelphia.

This Metropolitan type of construction was placed on the Woronoco Mill of the Strathmore Paper Company in 1912; the Wayagamack Pulp and Paper Company at Three Rivers made an installation in 1915; Price Brothers have this type of construction over one of their machine rooms, the roof having been laid in 1915, and the Great Northern Paper Company, of Millinocket, Me., have a gypsum slab roof which was placed in 1913. For mills of the Escanaba Paper Company at Escanaba, Michigan, designed by the Management Engineering and Development Company, gypsum roofs are on machine room, boiler house and grinder rooms and the owners are well satisfied.

The slab is designed on the cantenary principle; cold drawn, twisted steel wire cables being figured to carry all the loads in suspension between beam supports. These cables are anchored to the end beams and brought into uniform deflection and tension by steel rods midway of each span.

Gypsum, more commonly called plaster of Paris, is mined as a moderately soft mineral, composed, in varying degree of purity, of hydrated calcium sulphate, $CaSO_4 2H_2O$. When gypsum is calcined at a temperature of 100° to 120° c., ¾ of the water of crystallization is driven off and the product obtained is the ordinary plaster of Paris. If calcined at temperatures between 250° and 500° C. but not sufficiently long to remove all of the water, a nearly anhydrous product is obtained which also forms a cement.

The product formed, as the result of the setting in either of the above cases, is practically identical with the original gypsum. This material is appreciably soluble in water. One part of the hydrated calcium sulphate a 0° C. dissolves in 488 parts of water; at 35° in 393 parts of water; at 100° in 460 parts of water. Its maximum solubility occurs at 35° C.

The gypsum composition, consisting of about 85 per cent. pure calcined gypsum, mixed with wood fibre to act as a binder and to toughen the finished slab, is mixed with water to a medium working consisteney and poured into the forms. The set takes place within ten or fifteen minutes, and the forms are removed the same day if desired leaving a full live load capacity slab. The duty of the gypsum is to fireproof the steel, form a flat slab, and transfer the load from the surface to the cables in direct compression. Its work is analogous to that of the stiffening truss of a suspension bridge floor, for which duty it has proved itself amply strong in various authoritative tests as well as in actual service.

The chief advantages of the construction are:—

1. **Light Weight**: Composition weights 48 lb. cu. ft., or 16 lb. sq. ft. for a 4-inch slab, this weight being one-third that of concrete—less than the dead load of any other permanent, fire-proof construction, and no more than the ordinary wood sheathing. This light weight means a ten to twenty per cent. saving in steel framing supports, as well as reducing loads on foundations.

2. **Quick Setting of Slab**: As gypsum will set ten minutes after pouring, whereas four to ten days are necessary, depending on weather conditions, for concrete, this means a saving in interest and overhead charges by earlier completion. A full live load can be placed on the roof slab two hours after pouring, and forms are generally removed in from four to six hours. Of great interest and value in Canada, this quality permits progress in cold weather, as the slab may be placed without injury in zero temperature and below, the quick set taking place before the water can freeze.

3. **Heat Insulation**: Among the literature furnished you, are copies of the report of Prof. C. L. Norton of Massachusetts Institute of Technology. This report gives the B.T.U. transmission through various constructions used for roofs, together with a chart showing the possibilities of condensation under varying con ditions. You will note that with the highly insulating gypsum roof, slab condensation will not occur under a very wide difference and indoor and outdoor temperatures, where the humidity is kept below 80 per cent. by means of ventilation. The dollar value of an insulating roof slab like gypsum as compared with wood of two or three times the conductivity, and concrete of five times the conductivity, may be readily determined from Prof. Norton's report. One heating engineer has established a 7½ to 10 per cent. reduction in heating equipment, and a 25 per cent. annual fuel saving as compared with concrete. (These tables showed mostly relative conductivities.)

4. **Resistance to Corrosion:** Gypsum is calcum sulphate and, being a salt of sulphuric acid, is not affected by any acids of this group. Beaker tests show corrosion by nitric and hydrochloric acids, but concentrations of these acids in a building are very rarely sufficient to affect a roof slab of gypsum. The same may be said of the strong alkalies, soda ash and caustic soda. In floors twenty years old, the steel has been found perfectly preserved by the embedding gypsum.

5. The fire resistive qualities of gypsum have been proved by many authoritative tests and fire experiences. In 1911 a fire occurred in the Knickerbocker Storage Warehouse, Newark, N. J.—an eight-story building with monolithic gypsum floors and roofs erectedabout 1900. The five floors were packed to the ceilings with furniture, and the fire raged over a period of eleven hours. The records of insurance and other inspections show the building was repaired and the floors restored, with the exception of two panels, by being plastered underneath with gypsum, the building then being used as a storage warehouse. The low cost of salvage is very apparent.

Gypsum slab was placed over the Lake Superior Paper Company's Sault Ste. Marie mill in the summer of 1919. Since then a new machine room at Espanola and a machine roof at Sturgeon Falls have been covered. A second machine room at Sturgeon Falls is now being constructed and will be covered with gypsum roofing. The roof has a pleasing appearance and is guaranteed for a period of ten years. This guarantee appears to be perfectly safe when considering the time this type of roof has remained in perfect condition on buildings constructed many years ago.

Other types of gypsum roofs will be found on many paper mill structures, the gypsum channel type and also pre-cast type. The channel type is made up in 8 ft. lengths, laid on steel supporting members and joints cemented. It has a pleasing appearance, but as reinforcement is not continuous there is a tendency to deflect under extreme heat. No doubt this deflection is aided by moisture. The pre-cast type we have not had experience with. The Thorold Mill of the Ontario Pulp & Paper Company is covered with this type of construction, but for mills that we have been interested in, the cost of pre-cast was greater than the monolothic slab, due to handling charges. I believe this Metropolitan type of roof construction ideal for machine rooms, grinder rooms, recovery plants, sulphite mills or for almost any paper mill building, as at the present time it is very little more expensive than wood, and from all indications will outlast wood many times over.

For a new mill the labor of placing a gypsum roof is very little more than that of placing a standard wooden roof, but for mills in operation a replacement entails great precaution. If properly planned and carried out, however, operation may be carried on without interruption. As an example of this statement we can take the Lake Superior Paper Company's machine room, a building 180 ft. x 270 ft. where the removal of their wooden roof and the placing of the new gypsum slab was carried on without an hour's shutdown of four paper machines running beneath.

For roofs over machine rooms, grinder rooms or other buildings, wherein moisture is excessive, all steel members directly embedded in the roof slab should be insulated by gypsum covering throughout their entire surface, as, due to their high conductivity, low temperatures will be conducted to sections on the under side of the roof and on these sections condensation will form, with the resultant drip.

METAL QUOTATIONS.

Fair prices for ingot metals at Montreal, 15th July 1920:—

Copper, electro	23¾c
Copper castings	23½c
Lead	10½c
Zinc	10¾c
Tin	57c
Aluminum	37c
Antimony	10c

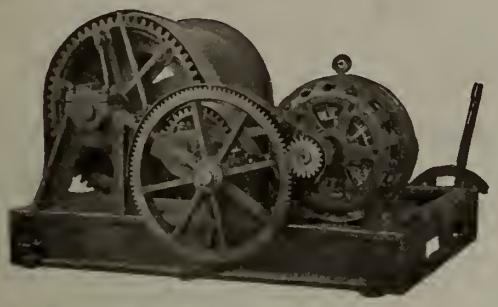
Mr. Charles Camsell, the new Deputy Minister of Mines will make a flying visit to Vancouver the first part of August, when his friends will have a chance to see him for a short time before he takes up his home in Ottawa.

SQUARE CORNERED MOLECULES.

One of the strangest true stories that we have heard in some time was told at the summer meeting of the Technical Section. It seems that an oil salesman visited a pulp mill and in praising the quality of his oil to the superintendent remarked that the oils which were being used were decidedly inferior because in one of them the molecules were of cubical shape (and he drew a picture to show the form), while the other was not quite so bad as the molecules were pyramids, (and he drew another sketch), but that the oils which he was selling was far superior to any other on the market because the molecules were round. In fact the salesman, by misrepresenting something with which the superintendent was not at all familiar, convinced him that he was selling a ball bearing oil and consequently the best possible kind of lubricant. The curious part of this story is that we repeated it last week at the smoker of the American Society of Chemical Engineers and one of the gentlemen present was the chief chemist at the mill where the incident occurred and had overheard the conversation between the oil salesman and the superintendent. Another chemist from the same mill was also present and vouched for the truth of the story, else we would be strongly inclined to doubt it.

The superintendent in this case was not acquainted with even the rudiments of every day science and the salesman knew it. If the chemist had not been present, the wonderful new conception of the molecular state of lubricants would have been lost to the world, and this particular mill might have been induced to purchase a really inferior grade of oil, because a concern that permits its salesmen so grossly to misrepresent either his own product or that of others is not likely to be depended upon for a first class article. It is not necessary for a man to have a college education or to be an expert chemist or engineer to have a clear conception of such elementary science as would enable him to detect such misrepresentation and to perceive the principal qualifications of the materials required in his department. The man on the job must be depended upon for considerable advice in the purchase of materials unless the concern has a large technical staff which can carry out performance tests for the benefit of the purchasing and cost departments.From "Pulp and Paper Magazine."

SAFETY FIRST HOISTS and CAGES



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PORT ARTHUR NOTES.

(By J. J. CONNOR).

The Swedish-Canadian Mines, Ltd., operating the "Foley" mine, at Mine Centre, has been reorganized, under the following gentlemen: Senator George W. Fowler, Ottawa, President, H. R. Drummond Hay, Barrister, Winnipeg, Vice-President, J. P. Hanson, Chicago, Ill. Secretary-Treasurer, N. T. McMillan, Winnipeg, W. D. McKay, Toronto, and C. R. Fitch, Fort Frances. Directors, F. A. S. Carnegie, M.I.M.E. Engineer at the Mine, J. A. Johnson, Superintendent and Manager.

The work of sampling, and making mill runs is now in progress, with a view of determining the most efficient processes of recovering the maximum of values in the ore, before installing their permanent plant for treatment.

30 men are employed at present. This number will be increased to a full complement to operate the whole mine at an early date. The Company are not giving out the results of their operations, but are apparently well satisfied with the outturn, and are looking forward to active and continued mining and milling of ore.

The Silver Inlet Syndicate are meeting with continued success in uncovering fresh bodies of high grade macfarlanite ore in the roof of the East Stope. In this stope, the roof is of enormous extent. Vast cavities were mined out in the former operations that are without floors, and the operatives move about on rafts, in prosecuting the sampling. The walls and roof are so discolored with graphite, that it is impossible to determine what is under it, without putting in shots. This is being systematically done, and expectations are being fully realized as the work proceeds.

VANCOUVER NOTES.

A new cabinet of the minerals of Canada has just arrived at the Vancouver office of the Geological Survey in the Pacific Buildings, Hastings Street W. The minerals were assembled by the Dominion Department of Mines and are neatly arranged, numbered, and listed so that the name and origin of each mineral is easily located.

Prospectors and the public in general should make good use of this exhibit, which has taken much time and trouble to arrange.

The Publicity Committee of the B.C. Chamber of Mines is planning a Chamber of Mines exhibit, to be held in connection with the Vancouver Exhibition in September. All prospectors, associations and individual companies are invited to send exhibits of ores, photographs and interesting data to Chamber of Mines, freight and express prepaid, and such exhibits will be taken care of and placed in prominent positions. The exhibition directors have agreed to give every assistance toward making this the best mineral exhibit ever held in connection with the exhibition.

This is for all British Columbia and everyone is invited to help and make it a success.

THE THREATENED BITUMINOUS COAL SHORTAGE IN CENTRAL CANADA DURING NEXT WINTER.

The Board of Railway Commissioners, which is now charged with the supervision of coal imports and exports that were formerly vested in the person of the Dominion Fuel Controller, is completing the organization necessary to carry out this addition to the regular duties of the Commission.

On the 12th July, a Committee from the Canadian Manufacturers' Association was received by Dr. S. J. McLean, the Assistant Chief Commissioner and the possibility of averting the threatened increase in the existing stringency of bituminous coal supply in the provinces of Ontario and Quebec was discussed.

The Committee comprised the Fuel Controllers of Ontario and Quebec, representatives of the eastern and western coalfields, and members of the Special Fuel Committee of the Canadian Manufacturers' Association which has been collecting information on coal supply for the past two years.

In regard to the possibility of bringing coal from the Alberta collieries it was pointed out that the question was largely one of transportation and freight rates, as at the present time the capacity of the Alberta collieries was equal to the supply of any quantity of coal within the possibility of rail transportation, but the amount of coal that the railways could handle and the freight rate that could be arranged would have to be definitely ascertained by Alberta operators before extensive arrangements to meet future orders from Ontario could be made. The time between this date and the commencement of grain shipments eastward—the only period during which it will be possible to handle coal shipments of any volume—is limited, and the attention of the Commission was drawn to this point.

The probability of a coal shortage was admitted, and there was no discussion or questioning regarding a condition that now amounts to a certainty.

With regard to Nova Scotia coal, an actual shortage in production exists, practically identical in extent with the customary annual seasonal shipments to St. Lawrence ports before the decline in outputs which was a result of enlistments among the miners. No possibility of any appreciable assistance from Nova Scotia coal is likely unless additional miners can be obtained, and the advisability of assisting in every possible way the emigration of miners from European fields to Nova Scotia was suggested. The tonnage of coal exports from Nova Scotia to European points was stated to be almost negligible in comparison with the actual drop in production. The necessity to provide ships at reasonable freights was a first consideration in sending Nova Scotia coal to Montreal and St. Lawrence points.

It was further suggested that assistance would be obtained in connection with the coal supply of 1921, if the Nova Scotia collieries were enabled to work steadily and bank out coal during the Winter of 1920-1921. This is possible if an outlet for the coal is guaranteed by making railway contracts this year for next year's delivery, and if the coal companies are assisted by full release of their shipping from government control.

The Fuel Controller of Ontario is vested with the necessary powers to carry out his office, but in Quebec there are no existing regulations empowering the office of fuel controller to take any effective action. It is expected that the necessary powers will also be revived in Quebec to meet the present emergency.

The Fuel Committee of the Canadian Manufacturers' Association is studying the fuel problem from the standpoint of a permanent solution by the enlargement of coal-mining in Canada, but this is of course a duty in regard to which there is no visible present likelihood of a discharge. The action of the Association at this time was taken because of the recognition of an existing emergency which requires immediate remedial measures. Such action does not, howver, imply that present and emergent measures will be also those that promise greater permanent security in our domestic coal supply.

THE BENDIGO GOLDFIELD, AUSTRALIA.

Rehabilitation of an old Goldfield by Consolidation of Properties and Profit-Sharing with Miners.

(Abstracted from an article in the "Industrial Australian Mining Standard" by "F.M.L.")

The following extract, taken from the above-mentioned source, is not without interest to Canadian readers, and has certain analogies in conditions existing in Canada—but not in gold-mining districts.—Ed.

Since 1851 the Bendigo field has produced over twenty million ounces of gold, valued at nearly eighty millions sterling. Of late years the annual yield has steadily declined, but it must not be imagined that the mining industry is by any means played out; it is still the largest industry by far in the district. It is true mine after mine has closed down on account of increased working costs, and the probability is that many mines now being worked would have been added to the list had it not been for the business-like methods and foresight of a few public-spirited business men, who brought about an amalgamation of a large number of companies, with the idea of running the mines on business lines.

Mining on Commercial Lines.

These men had seen the disadvantages that accrued from the gambling methods generally associated with mining throughout the State. Dividends were paid with money that should have gone to build up reserves, development work was neglected, and the heart taken out of a mine, with the result that it became a common thing for a mine to be making calls on its shareholders within a few months of paying its regular dividends.

The first step of the promoters of the new amalgamation was to remove, as far as possible, the gambling element, and place the stock on an investment basis; the next, to build up substantial reserves. Thus speculation was discouraged and steady investment encouraged. When it is remembered that a great deal of capital invested in Bendigo mines comes from outside the district, it can be seen that this policy must lead to increased security and confidence.

The Bendigo Amalgamated Goldfields Co.

The company was formed by the issue of 200,000 shares of 7s. 6d.; nominal capital £750,000, of which £479,848 is paid up. The amalgamation acquired a number of mines, and of these twenty are in full working, the number of men employed being about 800.

By the adoption of business methods, scrapping and disposing of old and worn-out machinery, installing new boilers in place of old and weak ones, thus saving

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wages and firewood, taking advantage of the huge prices ruling for timber, secondhand machinery, and old metal, the cost of new plant was considerably reduced.

A number of the mines are at present being worked at a loss, but in these cases the prospects are such that development work is considered worth proceeding with; as a set-off to the mines on the non-paying list, there are those that pay working expenses, and others, notably the Constellation, in which rich stone is being obtained. This claim was amongst the non-payers for a long time, but the rich yields from it have enabled the directors to build up a fairly large reserve, and the question of a dividend to shareholders is now under discussion. The larger holders favor waiting until the annual meeting in July, when stock will be taken, and the exact position of the company known.

It is to the credit of the management of this company that it has never approached the Government for a grant.

Profit-Sharing with Miners.

Another unusual and important experiment that has been made, and which may yet cause an alteration in the working, not only of our gold but of our coal and other mines, and that is the granting of a share of the profits to the miners themselves. A co-operation, of association, of the miners employed by the B.A.G. Co. has been formed, and is known as the "Co-operative Alliance"; 250,000 shares, representing one-seventh of the company's present issue, has been allotted to the to the miners as profit-sharing shares. This gives the men employed an interest in the fortunes of the company, and their work; shares are paid up, and there is no liability. The shares, though profit-sharing, do not, of course, carry any interest in the assets of the company. At the present market value, these shares are worth about £25,000. Having a share in the profits of the mines, the men come to regard the company as one in which they have a vital and personal interest; for instance, a dividend of sixpence a share, declared by the company, absorbing £44,266, means that the Co-operative Alliance benefits to the extent of £6250. The miner receives a wage of £3 12s. a week of 44 hours, and, in addition, one-seventh of the profits earned.

This is a sound business-like arrangement. There is an inducement to work, as the men participate in the fortunes of the company. The stealing of gold will be less rife, as the men guilty are taking a percentage of what belongs to their fellow-workers. They are aware they are receiving a fair deal, and a go-slow policy would be almost an act of suicide. There is considerable allotment coming to the men, and a wise proposal has been made, and that is, that they should form a Co-operative Society along the lines of the one at Port Pirie, which has proved so successful. The miners alone would be shareholders, and with competent management, it should be a means of considerably reducing the cost of living for the miner and his family. The miners are also encouraged and assisted to buy their own homes. It is certain that the methods such as those described been introduced years ago, throughout the State, many a goldfield that lies deserted would be alive to-day.

The gold yield for the year is about 60,000 oz., which is much below the average, but there is no reason why, under the new conditions, it should not be maintained, and even increased.

The Bendigo A1 Co. acquired the northern area from the B.A.G. Co., and are actively carrying on development work, from which they expect good results at any moment. The New Argus and New Moon are in the same category.

The Lansell interest is small compared with what it once was, but they have a number of mines still working.

It will thus be seen that mining is still alive in Bendigo, and that the district offers in some respects a safe field for investment, now that the gambling element has been largely eliminated.

CHEMICAL INDUSTRIES EXHIBITION NEW YORK: WIDE RANGE OF TECHNICAL PAPERS.

For the sixth National Exposition of Chemical Industries which will be held in Grand Central Palace, September 20 to September 25, inclusive, there is being arranged the biggest Symposia on Chemical Engineering ever carried out in the United States. Up to the present four symposiums have been scheduled. One will be on Fuel Economy, one on Materials Handling, one under the general head of Chemical Engineering, and another on Industrial Management.

Many important topics will be treated upon when the Fuel Economy division holds its session. Among the papers to be read will be one on "Fluid Heat Transmission," by A. B. McKechnie, Parks-Cramer Co.; one on "Refractory Cement; Life Insurance for a Furnace," F. W. Reisman, Quigley Furnace Specialties Co.; another on Producer Gas and the Modern Mechanical Producer," by W. B. Chapman, Chapman Engineering Co.; and one on "Preventing Conduction and Radiation Heat Waste," by S. L. Barnes, Armstrong Cork Co. W. O. Rankin, of Quigley Furnace Specialties Co., will talk on "Powdered Coal" and there will also be an address by Conrad Dressler, of the American Dressler Tunnel Kilns.

The Speakers at the Industrial Management Symposium will include Harrington Emerson, on "Ultra Analysis of Costs; H. E. Howe, of National Research Council of Washington, on Research in Industrial Conservation,"; H. A. Ernst of Barret Co., Grinnell Jones, of Harvard University and others who have yet to select their topics.

The Chemical Engineering program consists of A. Hough and Wallace Savage on "Construction of Horizontal Stills; Thomas W. Pritchard, on "New Method of Destructive Distillation; W. D. Richardson, on "Corrosion and Galvanic Action in the Industries," and others to be selected.

The speakers for the Materials Handling program have not yet been announced, but F. G. Anderson, Chain Belt Transmission, will be among those who will occupy the rostrum for a time. Moving pictures have played a big part in previous chemical expositions but this year there will be a series of films which will far surpass anything before attempted. The majority of these are absolutely new, in fact some are still in the process of making.

In the U. S. Chemical Industries Series are included "The Story of Sulphuric Acid," General Chemical Co.; "A New Chemical Industry-Leather from the Sea-Fish Leather," Ocean Leather Co.; (Ford Educational Film Co.); "Perfumes for the World," Antoine Chiris Co.; "Modern Coke and Gas Manufacture," The Koppers Co.; "The Story of Petroleum Oil," Standard Oil, Co., N.J.; "The Asphalt Paving Industry," Bar-

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ber Asphalt Paving Co., and Colloidal Movement in Asphalt," Barber Asphalt Paving Co.

The Mining Industries Series of pictures will include "The Production of Salt for the Chemical Industry," International Salt Co.; "The Story of Coal," Sullivan Machinery Co. & U. S. Bureau of Mines; "Building, Mining and Quarrying Machinery," Sullivan Machinery Co.; "Silver Mining in Ontario," Ontario Department of Mines, and "Gold Mining in Ontario," Ontario Department of Mines.

In the Plant Operations Series there are two films already scheduled and others will also be shown. The ones listed are: "Continuous Motion, Conveying, Stacking, Elevating, Etc," Brown Portable Conveying Machinery Co., and "Foamite Firefoam Extinguishing Apparatus at work," Foamite Firefoam Co.

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5

EDITORIAL

SIR JOHN WILLISON ON THE OUTLOOK FOR CANADA.

Sir John Willison recently delivered before the Canadian Club at Halifax an address on the outlook for Canada in which he strikingly expounded the necessity to turn our raw materials into finished products in Canada. "Those who have ears to hear, let them hear," says Sir John, "for surely there is no other "national policy for the Canadian people, whatever "may be the fiscal faith which they have inherited, "or the economic creed which they profess. It would "be a blessing of the gods for Canada if we could for- "get that we ever had a tariff controversy and if we "could approach the questions that are vital to national "unity, national expansion and national prosperity "without the fettering and narrowing incubus of old "racial quarrels and party animosities. Through war, "the debt upon the estate has been increased from "$336,000,000 to $2,000,000,000, and if we are to re- "duce the obligation we must maintain and expand "the industrial fabric and conserve and develop the "natural resources."

"During the four years of war the half of our "population which was not engaged in agriculture "carried $83,379,099 of the war taxation, while the "half engaged in agriculture carried $389,011—or on- "ly half of one percent. In this comparison I am not "making any covert attack upon the farmers."—and here Sir John makes what we conceive to be his main point—"but only emphasising the heavy con- "tribution of finance and industry and suggesting the "heavier burden which must fall upon agriculture "and industrial workers if these special sources of "taxation should be restricted or destroyed..... We "get only one-tenth of the value of natural resources "if they are exported for manufacture in other "countries."

We believe that the single vision which arises from the unrelieved and therefore necessarily selfish dominance of agriculture is gradually being enlarged as the peaceful penetration of agricultural communities by manufacturers proceeds in the West. One has only to glance over the provincial incorporations to see how persistent is this expansion, nor does it require great perspicacity to realize that the capital accumulation of many wealthy agriculturists is arousing a desire to have this money put to work.

The complete agricultural occupation of Canadian lands has not yet arrived, but it is closer to the event than ever before. Agriculturally we shall soon have reached the frontiers of settlement in Canada, but there will still remain vast territories for the exploitation of the prospector and the miner, with future centres of population that will grow up around mining developments that may extend the agricultural limits in a circumscribed way. We are approaching the time when the repercussion of more or less complete agricultural settlement will enlarge the urban districts of the West, and there will then proceed to evolve that increase in industrialism and the intensive development of natural resources which will follow the appearance of the wealthy son of the farmer—himself not a farmer as will naturally happen—and the presence of an urban population from which to obtain the workers in manufacturing industries and mining and quarrying.

In other words, Canada is past the point where she is to be regarded merely as the northern storehouse of raw materials to be used in the industries of the United States. We have lived long enough on our capital in Canada. As Sir John Willison points out there is no ethnical or geographical obstacle between ourselves and our neighbors such as determine nationalities and divert the routes of industry into national channels in Europe.

In their decision to be and to remain a separate nation in North America the citizens of Canada, so Sir John intimates, have undertaken a great political experiment, which can not succeed unless we enlarge the development of those basic industries which will enable us to export a greater value of finished manufactures than we import. Volume of exports, if consisting solely of raw materials, is like to the action of a spendthrift heir which precedes the bankruptcy of the estate.

EMPIRE STEEL'S DONATION TO DALHOUSIE UNIVERSITY.

The friends of education in Nova Scotia will be much heartened by the statement made by Mr. Roy Wolvin, President of the Dominion Steel Corporation, that $250,000 will be given by the companies entering the British Empire Steel Corporation to Dalhousie University, with the idea of "definitely providing for "professorships in research work in connection with "the natural resources of the Province of Nova Scotia." The justification for this munificent gift is best stated

in Mr. Wolvin's own words, namely that any subscription to Dalhousie University at this time "will "be well repaid year after year". Mr. Wolvin said that men who first undertook the founding of a coal and steel industry in Nova Scotia were men of vision, a tribute both accurate and deserved, but to none of the predecessors of those who are now directing the allied industries has there been vouchsafed a clearer vision of the right action at the proper time. The large coal and steel companies in Nova Scotia have themselves been the victims of the meagre facilities for technical research existing in Nova Scotia, and they will be the chief beneficiaries of enlarged facilities.

Mr. Wolvin's statement was made after consultation with Mr. D. H. Mc. Dougall and Mr. J. W. Norcross. At the Toronto Meeting of the Canadian Mining Institute, Mr. D. H. Mc. Dougall, as the retiring President said: "Efficient and full use of our resources is de- "pendent upon the progress of science, which, applied "to their limitations, and supplementing their defici- "encies, will have the effect of increasing their quan- "tity and duration." Mr. Mc. Dougall pleaded for a recognition of the importance of applied science to our young nation, and expressed his belief that it was necessary that the Canadian people should "entirely revise their valuation of the scientific worker."

It is therefore heartening to observe that the most pregnant re-arrangement of industrial forces which has recently taken place in Canada is headed by men who have the desire, as well as the power, to practice what they preach. The gift to Dalhousie University is timely, wise and good business.

A GERMAN COAL "KING."

Cabling from Berlin, as correspondent of the New York "Times", George Renwick sends a character sketch of Hugo Stinnes, whom he describes as a "soul-destroying success, sinister as his looks," a man to whom power is as the breath of life, and whose remarkable influence in European politics is attributed to his realization of the basic necessity for coal in this age.

" 'I build on coal', Stinnes once said to me in the days long before the war. 'From coal you go on to iron and steel and then to the various industries, to ships to commerce; and coal will lead you to woods and forests, to wood pulp and paper. Coal is King.' "

One may dissent from the ambitions of Herr Stinnes, but, so long as private ownership is acknowledged in Germany, there is no disputing the power of any man, who, being the possessor of many groups of coal mines, has also the vision of the material power that accompanies such possession when followed to its ultimate application in the arts of civilization.

There was no doubt in the minds of those who followed the course of the war, and realized the part that coal played in the ambitions of European nations, that the movement of Germany's armies was dictated as much by the hand of the mining engineer as by the military chiefs. Had Germany won the war, and imposed the terms which we now know had been drafted, and of which the peace of Brest-Litovsk was a mere forerunner, it is apparent how, with the aid of Hugo Stinnes and others like him in Germany, the conquered nations would have been scientifically relieved of their basic materials and industries by men who have devoted their whole being to the worship of material power. Once more, neither for the first nor the last time, the imponderables and the intangible things of life defeated the scientific calculations of an armed nation arrogant in its mightiness, but victory would not have been possible to the Allies, no matter how righteous their cause, had they not been able to marshall the coal production of their countries against their enemies.

Herr Stinnes's recital of the structure built upon coal has its exact parallel in the course of events in Canada today. From coal to steel, from steel to ships and commerce, with the by-path to wood-pulp and paper is curiously reminiscent of the chief items of discussion in financial and political circles in Canada during the past few months.

ALBERTA GOVERNMENT ADVERTISES ALBERTA COAL IN WINNIPEG.

The "Winnipeg Free Press" of July 17th contains a three-quarter page display advertisement published by the Alberta Government in the interests of Alberta coal, urging the use of western coal during the coming winter, and its immediate purchase.

"Whether for hot water, hot air, steam, direct or indirect heating or the good old-fashioned stoves and heaters, there is a coal from Alberta that will give you full satisfaction, and any responsible dealer can get it for you." So runs a portion of the announcement. Publicity of this kind is the very best kind of business and in every way to be commended. What the eastern coal man finds it difficult to understand, however, is why it should ever have been necessary to urge western people to burn western coal.

METAL QUOTATIONS.

Fair prices for Ingot Metals in Montreal, July 22nd, 1920.

	Per lb.
Copper, Electro	24¼
Copper Castings	23½
Zinc	10⅝
Lead	10¼
Tin	56
Antimony	10
Aluminum	36

*Vide issue 19th March, page 209.

Northern Ontario, Between the National Transcontinental Railway and James Bay, along the Abitibi and Mattagami Rivers

ECONOMIC GEOLOGY OF THE PALEOZOIC AREA

(Illustrations loaned by the Ontario Bureau of Mines).

Part II of the 29th Annual Report of the Ontario Bureau of Mines, 1920, consists of a tri-partite description of that portion of Northern Ontario lying between the line of the Transcontinental Railway and the mouth of the Moose River in James Bay, as seen along the courses of the Abitibi and Mattagami Rivers, prepared by J. G. Cross of the Ontario Bureau of Mines. M. Y. Williams of the Geological Survey and Joseph Keele of the Mines Branch at Ottawa.

Mr. Cross has reported upon the pre-Cambrian rocks and iron-ore deposits in the Abitibi-Mattagami area, and Mr. Williams has described the geology of the Paleozoic area as seen in the cuttings of the two rivers. Mr. Keele deals with the clay and shale deposits.

The topographical character of the region is clearly recorded by Mr. Keele, as follows:—

The Blanket of Glacial Drift.

A great sheet of glacial drift covers the whole region drained by the Abitibi and Mattagami rivers from James bay to some distance south of the National railway. It is composed principally of boulder clay or till gathered in the Hudson bay basin, moved southward by land ice and spread like a huge poultice over the land surface, completely obliterating the topographic inequalities of the underlying rocks.

This thick drift sheet was derived principally from the Paleozoic and Mesozoic rocks bordering the southern part of the Hudson Bay basin and possibly in part from the sea bottom, extends southward and covers the pre-Cambrian rocks from the Paleozoic border to a distance from 20 to 40 miles south of the National Transcontinental line. The only field data we have at present concerning the southern limit of this thick clay drift is the presence or absence of lakes. Where the drift is thick and persistent, lakes and rock ledges are practically absent, but where this drift thins out and disappears to the southward, lakes and rock ridges become numerous.

Photo by J. G. Cross.

SMOKY FALLS, MATTAGAMI RIVER.

These beautiful falls, with a drop of 86 feet, receive their name from the mist which continually hangs over the crest.

The pre-Cambrian rock surface yielded less material than the more easily eroded Paleozoic rocks and very little clay during glaciation, hence when the southward moving ice sheet exhausted its load of fat northern clay it could not gather much more as long as it moved only over the old crystalline rocks.

The generally barren character of the pre-Cambrian upland when not enriched by the northern till, is exhibited along the Temiskaming and Northern Ontario railway line between North Bay and Cobalt, where the glacial drift consists of sand, gravel, and boulders only. The drift here is generally thin, so that it does not obscure the inequalities of the old pre-Cambrian surface, therefore rock ridges, small valleys or lakes are constantly in view of the traveller.

A very different aspect would open to an observer travelling on the proposed extension of the railway through the region north of Cochrane, where there is a marked absence of lakes and rocky ridges. So effectively has the till sheet levelled up the surface that if the whole area along and north of the National Transcontinental line were denuded of trees, it would be a rolling prairie country. The Abitibi and Mattagami rivers and their branches flow in roughly parallel trenches incised in the till sheet. These rivers occasionally lay bare a rock ridge which stands at a higher level than the general rock surface beneath the glacial till, and at these points rapids or falls occur.

The great mass of the unconsolidated surface materials originating from glacial conditions consists of till or boulder clay. In northern Ontario this till sheet is so thick and so persistent that it deserves a formation name, but none has hitherto been applied to it. It forms the greater part of the extensive clay belt over which the National Transcontinental railway is built, and includes a vast reserve of agricultural land. This till sheet is not entirely continuous, but is interrupted by minor areas of sand or gravel which are the result of the washing and sorting of the boulder clay by streams of water issuing at the water issuing at the edges of ice sheets.

There are no large areas of the till sheet entirely level in these regions, but the surface exhibits a series of gentle undulations. The hollows are swampy, owing to the fact that water collects in them, and cannot escape on account of the impervious character of the underlying boulder clay and the small amount of evaporation. The hollows accumulate a deposit of peat, and in time may support a thin growth of stunted black spruce. The higher portion of the surface is dry, and supports a forest growth of poplar and birch in addition to spruce. Travelling in any direction, then, one passes alternately from wet to dry land.

No definite evidence of multiple glaciation during Pleistocene time was found in the region examined. In places stratified sands and clays are overlain and underlain by till, but such occurrences are probably to be explained as the result of minor retreats and advances of the ice-sheet. No fossils were found in the stratified deposits interbedded with till, nor was any other evidence obtained which would suggest that inter-glacial warm climate conditions prevailed at any time during the Pleistocene in this region. It was found that the clay beds which occur on the Mattagami river, and which have been referred to by previous workers as inter-glacial in age, are pre-Glacial in age.

Observation Limited to River Channels.

All that is accurately known regarding this part of Northern Ontario—which comprises approximately 26,000 square miles—is confined to the observation possible in the river channels cut through the all pervading mantle of glacial till, and in this regard it resembles the knowledge of Ungava and the North-West Territories in being tantalisingly incomplete. The portion of Northern Ontario traversed by the Abitibi and the Mattagami, as may be seen from the map, constitutes only a small part of the little known territory surrounding Hudson Bay, and when one reads the statement of Mr. Cross regarding explorations in the muskeg along the Abitibi, where "an average of one mile an hour was considered good going," it is clear that little is known, and that little can be known for many years to come, either as to the feasible limit of economic settlement northwards in Canada, or of the mineral occurrences in unprospected continental areas.

Photo by M. Y. Williams

Section of Onondaga limestone in cliff 50 feet high, Long rapids, Mattagami river.

Pre-Cambrian Rocks and Iron-Ore Deposits, Abitibi-Mattagami Area.

The mineral occurrences noticed by Mr. Cross's party are briefly noted as follows:

Metallic.

Nnmerous quartz and calcite veins were carefully examined for traces of gold and silver; none were observed.

Siderite.—At the head of Grand Rapids, Mattagami River, possibly in commercial quantities. Inferior metal at the foot of the Rapids.

Limonite.—Occurs sparingly with the above.

Chalcopyrite.—Occurs sparingly disseminated in a number of quartz veins examined, and similarly in the gabbro of the Abitibi Canyon.

Non-Metallic.

Peat.—Enormous areas of swamp and muskeg are underlain with peat. The depth is uncertain. The quality appears to be good.

Lignite.—Lignite beds occur along the lower stretches of the Abitibi and Mattagami rivers. These do not appear to have sufficient depth or lateral extent to be of economic importance.

Gypsum.—Gypsum similarly occurs along the Moose and Abitibi rivers.

Pyrite.—Pyrite, mixed with considerable quantities of pyrrhotite, occurs as irregular masses and lenses

Photo by M. Y. Williams.

Deposit of iron ore on west side of Mattagami river at Grand rapids. The dark mass in foreground is the ore. Cliffs of weathered limestone rise in the background.

impregnating and replacing biotite gneiss, at the foot of Island portage, Mattagami river. The pyrite is not sufficiently rich to be considered an ore of sulphur. The sulphur content would probably not exceed 25 per cent.

Clay.—Clays of a refractory nature were observed, often associated with lignite along the Mattagami river, below Long portage.

Kaolin.—An interesting occurrence of highly kaolinized syenite gneiss, containing as impurities biotite and garnets, was observed in the Canyon of Long portage, Mattagami river.

Siderite Deposits, Mattagami River.

From an economic point the iron ore occurrence at Grand Rapids on the Mattagami, about 80 miles directly north of Mattagami Station on the Transcontinental, is the most interesting part of the report of the Cross party, which gives the following particulars:—

Description of the Ore.

The ore is essentially siderite, although limonite is occasionally present. The limonite is found in vuggy or nodular masses in the siderite, and also occasionally forms a casing around the margin of the larger siderite bodies. On the whole the limonite forms only a very small percentage of the ore.

Wherever exposed the surface of the siderite has been oxidised to limonite; hematite is also probably present, judging from the streak. This oxidation is very superficial being seldom more than three inches in thickness. In the inferior grades of ore, where there is much silica and clayey material, the oxidation is more pronounced; nowhere, however, was extensive oxidation observed.

In colour the siderite varies from dark brown to nearly white. The different shades of colour are probably due to finely disseminated limonite, or organic matter. Often the organic matter is visible in fairly large pieces, and appears to be of a lignite nature, having the appearance of charcoal. The structure is compact and finely granular. The fracture is uneven. A light coloured, coarse grained variety was observed as float, farther up-stream. No ore of this nature was found in place, and it is assumed that this material came from other localities, not yet discovered. Speculation as to the origin of this float will be presented later.

Siderite occurs at both the head and the foot of Grand rapids, but it is only in the former locality where ore of commercial quality exists. This showed on analysis the following composition:—

Sample (6) chipped, 600 ft.

	Per cent
Iron	43.52
Silica	5.40
Alumina	2.63
Sulphur	0.74
Phosphorus	0.08
Manganese	0.00
Water	2.18
Carbon dioxide	30.40

The chief impurities in the ore are silica, clay, limestone, sulphur and organic matter. The phosphorus is not abnormally high for this class of ore. Silica in the form of sand and gravel was often observed in the inferior grades. The clay content is also very high in places, the silica and clay frequently forming the greater part of the outcropping. Limestone is also present, often forming a breccia, the cementing material being siderite of inferior quality. Sulphur is present in all the ore. Often this can be observed as small pockets of pyrites in cavities in the siderite, and occasional specks of pyrite can be seen, with the aid of the glass, in nearly every specimen observed. Organic matter is also contained in all the ore, but in varying quantity; some of the siderite contains so much organic matter that it is almost black in colour. The best quality ore contained 1.27 per cent. carbon. This organic matter is probably lignite, as occasional pockets and seams of lignite were observed in the ore.

From the foregoing analyses it is apparent that samples Nos. 1 to 5 represent ore of very inferior quality, while sample No. 6 represents siderite of good

commercial grade. The latter will be referred to as the main body, and the former as ore of inferior quality.

The main ore-body has a maximum width of approximately 600 feet but the exact extent of workable ore was not determinable.

The ore occurs in cavities in limestone of Corniferous age, and the larger the cavity the better appears to be the concentration of iron content in the ore. It is suggested the iron was deposited in the cavities from solutions, iron being present in the neighboring rocks, and streams in the vicinity being noted as heavily charged with iron in solution.

Some work has been done on the Grand Rapids deposit by the original owners, but, interesting as this occurrence is from many points of view, its present economic value is small.

The conclusions of the Report are, in part, as follows:—

Conclusions Regarding Ore Body

The analysis of sample No. 6 shows that the ore is a siderite of very good quality. This material when calcined gave a product that analysed 61.22 per cent of iron. The sulphur and phosphorus content are too high for a Bessemer ore, but the material should be well adapted for the manufacture of steel by the basic open hearth process, and for the manufacture of pig iron.

Regarding the possible occurrence of similar ore bodies, it would appear, judging from a superficial examination only, that these siderites may be quite widely distributed. The following reasons are ascribed for this assumption:—

(1) The occurrence of siderite elsewhere in the same general vicinity.

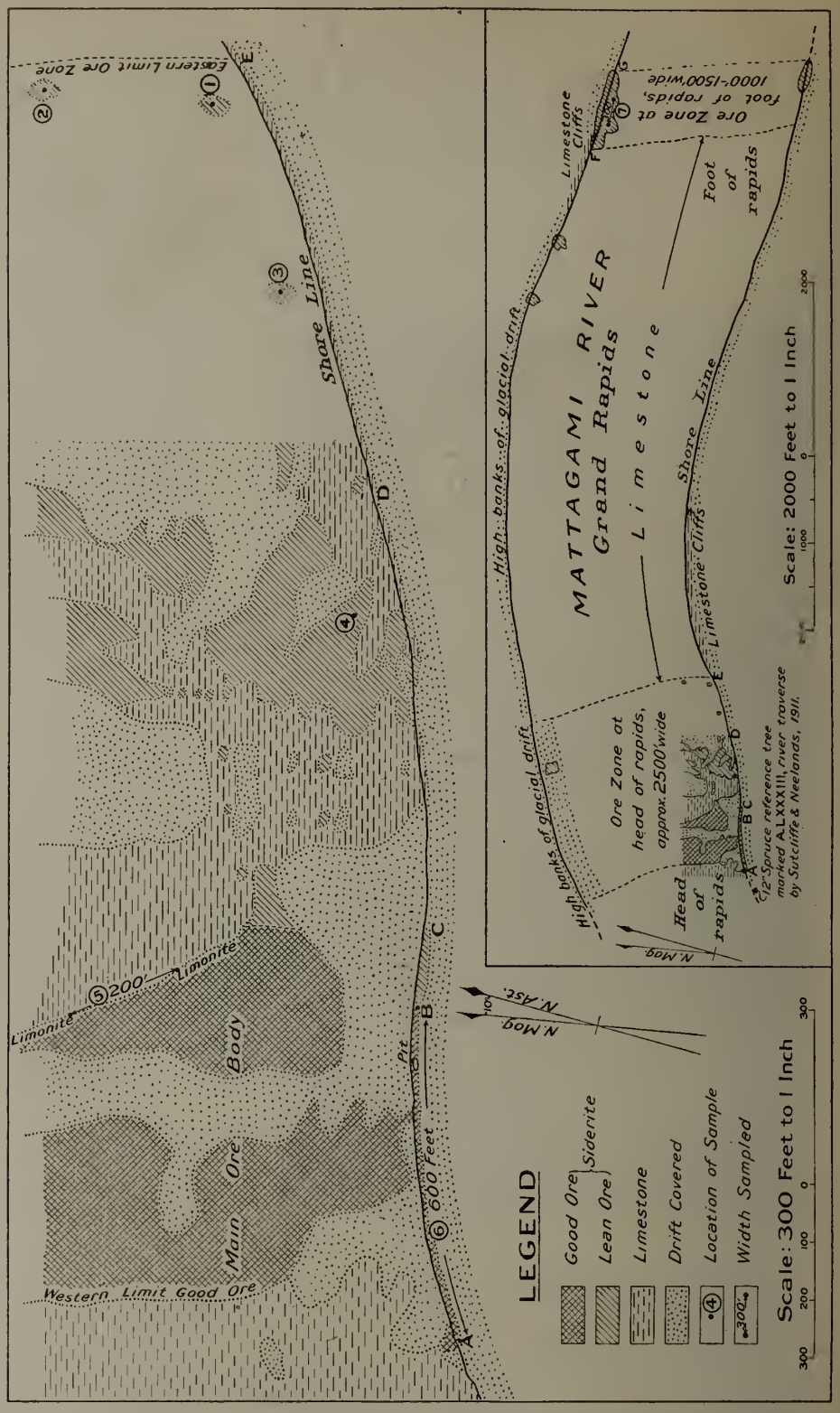
(2) The similarity to this area, geologically and physical, of other large areas in the locality.

(3) The great abundance of siderite boulder drift for many miles along the Mattagami river. The deposits described would not seem of sufficient size to supply this profusion of boulders.

(4) The occurrence of siderite drift greatly in physical properties from any observed **in situ.**

(5) The existence of a talus slope of sideritic material four miles further up-stream than the deposits at Grand Rapids.

Attention is called to the presence of siderite on the Opazatika River in limestones, as indicating probable wide distribution of these siderites.



Possible Occurrence of Oil in the James Bay Sedimentaries.

Dr. Williams reports on the geology of the Paleozoic rocks as they approach James Bay with particular reference to the possibility of the presence of petroleum. The Onondaga limestone is present, but mostly it outcrops, and only in a few localities of restricted area is it covered by impervious shales such are presumed to be necessary for the retention of the oil in this section, which has been unformly productive of oil in southwestern Ontario.

Dr. Williams suggests that nowhere in the district is it likely that there exists a greater depth of Paleozoic strata than 600 to 700 feet. The possibility of oil is suggested by the presence of formations which have yielded oil in southwestern Ontario, but, from reading the Report, it is not possible to gather that any definite indication of the presence of petroleum has as yet been observed.

The presence of oil-shales is noted, of low oil-content, samples from the Long Rapids, on the Abitibi river showing respectively 1.6, 3.9 and 5.5 per cent of crude oil. The outcropping beds along the Mattagami are of limited extent "but there is evidence they are of Portage age, and, if they are, the whole Ohio shale section may be present."

Clay and Shale Deposits of the Abitibi and Mattagami Rivers.

Mr. Keele, whose knowledge of the geology of shales and clays in Canada is well known as accurate and extensive, has dealt at length with the sorting and deposition of the glacial debris into sands, gravels and varying classes of clays. While there are in the district under review a number of clays, sands and gravels that would be valuable in settled districts, it is necessary that before any economic value can attach to such materials when situated so far from centres of population that they should possess unusual merit, and the refractory pre-glacial clays found in this part of Northern Ontario show such excellent qualities that they may become of industrial value. The clays of particular value, the presence of which is verified by Mr. Keele, occur on the banks of the Mattagami, about 55 miles north of Kapuskasing Station on the Transcontinental. One clay is stated to have the composition and physical properties of the fireclays of New Jersey, and another clay is stated to approach English ball clay in character.

With regard to the distribution of these clays, Mr. Keele writes:—

Prospecting for Fire Clays.

"Enough has been said about the qualities of these clays to show that they are of high grade and of extremely rare occurrence in the Province of Ontario, or indeed anywhere in Central Canada.

As already stated, small bodies of these high grade clays are visible at low water stages on the Mattagami river, and at about forty miles to the west of this locality on the Missinaibi river the most extensive known deposits of fire clays in the region are to be found.

There are no occurrences of fire clays reported from the Opazatika, a tributary of the Missinabi which intervenes between that river and the Mattagami, but then they have never been sought for on that stream.

In all probability the fire clays were originally spread over the large area extending between the two streams or beyond them, but glaciation must have removed some of the beds or scooped out the whole formation in places.

The clays as far as we know never overlapped the pre-Cambrian rocks, but are confined to the area underlain by Paleozoic rocks.

The persistent cover of glacial drift and forest growth retards considerably the prospecting of the interstream areas, and the only thing to be done there is to put down borings at a venture in the hope of tapping the underlying fire clays, so this practically confines prospecting to the river banks for the present, until some nearer approach to the deposits is made by railway transportation.

Their distinctive colour is the principal clue to be used in prospecting for these clays, as they present a strong contract to the monotonous drab of the ever present glacial clay. Dilute acid is a convenient field test, but it is not final, as some clays which do not show effervescence may not be fire clays. This test, however, prevents the burden of carrying useless samples.

The excessive overburden of glacial drift is one of the chief drawbacks to the exploitation of these clays. In regions where similar clays are mined it has been found that it is possible to remove one foot of overburden for every foot of good clay obtained, but it is not profitable to remove more than this."

Kaolin.

The presence of kaolin, or china clay, is not reported, but Mr. Cross discovered a kaolinized zone of rock below the Long portage on the Mattagami river, regarding which the Report comments:—"The discovery "of a considerable body of rock well on its way to "being a kaolin is of importance, as it may lead to "the discovery of true kaolin in this region. The ever "present burden of glacial drift, however, which "makes prospecting so difficult has always to be "reckoned with."

The presence of thin beds of lignite is several times mentioned in the report, but unfortunately there appears to be no possibility that in the region traversed any workable bodies of lignite exist. Peat-bogs exist in profusion, but their usefulness as a source of fuel supply is much smaller than peat-bogs nearer the frontiers of settlement, and, so far, experiments in the preparation of peat for use as a fuel have shown that it will not bear long-distance transportation.

GIFTS OF CANADIAN MINES TO PRINCE OF WALES ON EXHIBITION IN LONDON.

The Bulletin of the Imperial Institute states that the presents received by H.R.H. the Prince of Wales during his visit to Canada are now on exhibition in the Canadian Section of the Public Exhibition Galleries of the Institute. Included among the exhibits are specimens of cobalt, nickel and silver ores from Coniagas Mine, Cobalt; copper and gold ores from Drum Lummon Mine, Douglas Channel, British Columbia, native silver from the O'Brien Mine, Cobalt; gold quartz from the Hollinger Mines, Porcupine District, and coal from the Wellington Extension Mine, B. C.

The time has come for the people of this country to look the fuel situation squarely in the face and for public opinion to demand a course of action leading towards remedy. If any nation in the world cannot afford to trust to luck for the winter's coal that nation is Canada. Handling of the coal situation by frantic adjustments of succeeding crises ought to be a repugnant to the good sense as it is beneath the dignity of Canadians.—Montreal "Star."

Our Northern Ontario Letter

THE SILVER MINES

The mine operators in the silver producing arears of North Ontario, while free to admit that the decline in quotation for silver has been a disappointment, nevertheless are also mindful of the fact that even present quotations back in 1917 would have been sufficient to cause great enthusiasm. There is no sign of lessening activity, while the indications point to the likelihood of increased work in certain parts of the district.

During June the Cobalt mines shipped an aggregate of 1,497 tons of ore, as compared with 1,568 tons in May. The average price of silver during June was 90.95 cents an ounce, as compared with 102.58 cents in May. The lowest point reached in June was on the 16th when the metal was quoted at 80 cents an ounce. So far during July, the price has ranged well above 90 cents, and the July averages promises to exceed that of June . In addition to this price, the producing companies continue to receive payment in New York funds and are thus in receipt of an extra 12 or 13 per cent, making a total of more than $1 an ounce for their product.

Negotiations between the Mining Corporation of Canada and the Penn-Canadian Mines, involving some 125,000 tons of tailings owned by the latter company, do not appear to be making much headway. The Penn-Canadian offered to dispose of the tailings at a time when quotations for silver were much higher than at present, having based its price on such figures. It is now believed that unless modified terms are presented, the negotiations will not terminate successfully.

For the first half of 1920 the properties of the La-Rose Consolidated are reported to have produced close to a quarter of a million ounces of silver, as compared with 269,000 ounces for the whole of 1919. At the present rate of output, the 1920 figures are expected to exceed 1919 by more than 50 per cent. It is also intimated that while production costs in 1919 amounted to $1.05 for each ounce of silver produced, the reduction of exploration work this year is enabling the management to produce the metal at a much lower cost, and which leaves a satisfactory margin of net profit.

According to advice just obtained the mill of the Bailey Silver Mines, formerly the Northern Customs Concentrator, during the second quarter of the current year, earned $50,477.65, made up of $16,000 for April, $17.000 for May and $17,477.65 for June. It is also learned that the company is meeting with success in development work on the Bailey Mine itself, having opened up another rich ore-shoot in addition to developing additional milling ore. Prior to this development work, ore in sight was estimated at 23,000 tons of upwards of 20 ounces of silver to the ton.. The higher grade ore is being assembled ready for subsequent shipment, while arrangements to install a railway siding and transport the milling ore to the Bailey Mill are proceeding satisfactorily.

Official advice to the "Journal" from the Canadian Light Railway Construction Company, of Toronto, conveys the information that twenty miles of the survey work from Elk Lake to Gowganda has been completed and that it is now possible to estimate the probable cost of construction work. It is also stated that survey parties are still engaged in making a survey of also tapping Boston Creek and the township of Kirkland Lake, and with the ultimate object in view of also tapping Boston Creek and the township of Skead. Financial arrangements consist of raising approximately $1,500,000 for these projects, and the promoters of the enterprise appear to be confident of the outcome being successful. In the meantime, mining activity in the districts which the proposed lines are to serve is steadily increasing with indications of added impetus just as soon as rail transportation can be provided.

About 200 feet of underground work has been done on the property of the Cobalt 53 Mining Company, and consist chiefly of lateral work at a depth of 70 feet. The work is stated to have been financed personally by the promoters. The work done is for the purpose of endeavoring to open up the downward continuation of a vien which at surface contains encouraging quantities of silver.

The Thompson Powder Company is meeting with success in Cobalt and Porcupine in the sale of shares with which it is proposed to finance the manufacture of "Thompsonite," a comparatively new explosive. Former demonstrations were very satisfactory, so much so that quite a number of mining men in a position to pass on the merits of the explosives are stated to have subscribed quite liberally for shares in the company. It is planned to manufacture explosives in Toronto.

Although it was generally understood, at the time the deal was closed in which the Conigas Company took a working option on the Gamble-Thompson property at Gowganda that work would be carried on in an aggressive way, nothing much has so far been done. The property is rated as an excellent mining prospect.

In connection with the recent unofficial reports that the Nipissing Mining Co. contemplates making a capital reduction, in addition to regular dividend disbursements of 5 p.c. quarterly, it is learned by the writer in official circles that such a plan is not under consideration and that a circulation of such rumors merely serves to raise false hopes among the shareholders.

In recent years, the Nipissing has paid dividends at the rate of 5 p.c. quarterly, plus an additional bonus of 5 p.c. with the January dividend and a 5 p.c. bonus with the October dividend, making a total of 30 p.c. annually on the issued stock. In spite of this liberal rate of disbursement of profits, the company has accumulated a large surplus, the most recent financial statement showing over $5,000,000 in quick liquid assets

At a meeting this year, some of the shareholders made the suggestion that the rate of dividends should be increased. No action was taken on the suggestion, however, and, meanwhile, the treasury continued to grow. These facts appear to have been the basis of the recent reports that a capital reduction would be made. This report now receives official denial.

Following is an official statement from Arthur A. Cole, mining engineer for the T. and N. O. Railway, showing the total ore shipments from Cobalt over the railway for the month of June, in tons of 2,000 pounds:

SILVER ORE

Cobalt Proper	Tons
1. Conigas	86.90
2. Dominion Reduction	62.00
3. LaRose	73.60
4. Mining Corporation	301.52
5. McKinley-Darragh	82.28
6. Nipissing	793.22
7. O'Brien	32.00
8. Temiskaming	66.25
	1,497.77

The above shipments were made to the following Companies:—

CANADA

Deloro Smelting & Refining Co., Deloro Marmora	1,232.34
Conigas Reduction Company, Thorold	153.15

UNITED STATES

American Smelting & Refining Co., Chrome	30.00
American Smelting & Refining Co. Perth Amboy	82.28

PRICE OF SILVER

June 16th.	Lowest	80.000
June 2nd.	Highest	99.625
	Average	90.957

ORE AND BULLION SHIPMENTS.

During the week ended July 16th, six Cobalt companies shipped a total of six cars containing approximately 445,020 pounds of ore, a summary of which follows:—

Shipper	Cars	Pounds
La Rose	1	90,666
Nipissing	1	86,390
Temiskaming	1	82,366
Dominion Reduction	1	64,000
Coniagas	1	61,305
Hudson Bay	1	60,293
Totals	6	445,020

During the corresponding period, no bullion shipments were made.

THE GOLD MINES.

A most optimistic turn has taken place in Northern Ontario in connection with the gold mining industry, and some of the most conservative mining men in the business are found numbered among those who are openly predicting interest and activity during the remaining months of the current year that may actually attain boom proportions. They base this belief on the strength of the facts that conditions are becoming less abnormal, that ore reserves are the highest in the history of the mines and that labor is becoming more plentiful, all of which promises to permit the mines to utilize their milling facilities to full capacity and thus add enormously to output and to the rate of dividend disbursements.

Not since the recent war laid its adverse influence in the way of the industry have gold mine operators seemed so optimistic. Speculation in mining shares is becoming more pronounced, and almost on every hand appears to be a spirit of pent-up enthusiasm which may reasonably find vent almost any day. Such mines as the Dome, Hollinger, McIntyre and Lake Shore are the favorites among the big producers, while among the lower priced shares the Dome Extension, Porcupine V.N.T., Schumacher, etc., appear to be favorites. These mines are expected to lead the way, and to signalize general interest in all mining properties of promise throughout the district, to the end that great incentive will be offered for more intensified exploration and development work on properties as yet in the prospective or development stage.

A dividend of 5 per cent. will be paid September 1st to shareholders of the McIntyre-Porcupine of record August 1st. The disbursement will amount to $180,514 and will be the third made so far this year. Up to date the McIntyre has disbursed a total of 55 per cent. or $1,985,655. The company is capitalized at $4,000,000 made up of 4,000,000 shares of the par value of $1 each. Some 3,640,283 shares have been issued.

As a result of the special general meeting of the Porcupine V.N.T. Mines held this week, it is estimated that a plan to underwrite a block of treasury shares finds favor and may be adopted as a means of raising finances with which to remodel and enlarge the mill, as well as increase the scope of underground operations. The company has 675,000 unissued shares still in its treasury. It is suggested that about 200,000 shares may be underwritten at about 15 cents each 200,000 at 30 cents and 200,000 at 50 cents and with the funds thus made available it will be possible to completely finance the work in connection with putting the mill in shape to handle from 150 to 160 tons of ore daily as well as greatly enlarging the scope of underground operations. The outlook for the mine is considered very favorable.

It is apparently the quite general belief in the Porcupine district that the Dome Mines Company will, on or before September 15th, be justified in exercising the option which it holds on the Dome Extension mine. The indications that one of the main zones of mineralization will extend from the Dome onto the Dome Extension at a depth of about 1,150 feet seems to be the chief basis for such a belief. Great importance is attached to the latest official statement from the Dome in which it is shown that one of the main ore bodies, (the first so far opened up at the 850-ft. level) is believed to prove this body to be one opened up at various upper levels and having a sharp dip to the East, from surface to the 8th level, on the slope, having a depth of about 1,800 feet. The indications are that this orebody continues to dip to the East and probably enters the Dome Extension at a depth of 1,150 feet. Following is an extract from the latest official statement, relative to the big orebody found at the 850-ft. level:—

> "A cross-cut was driven north from 803 drift (8th level) on the course of diamond drill hole 261. This drill hole showed an intersection of 65 feet averaging $8.20 and is the first disclosure of payable ore on the 8th level. The cross-cut confirmed the results had from the drill hole and showed a principal ore body averaging $7.61 over which a width of 43.5 feet. A stope is being cut in this ore body and is maintaining the grade disclosed by the development on the level, as well as showing some excellent specimens of free gold, this being the ore referred to in a previous paragraph, as the probable downward extension of the 723 ore body.
>
> "We attach considerable importance to the finding of this ore on the 8th level as it should

prove the continuity of the east-dipping ore-shoot without a break from the surface to the 850-ft. level, a distance on the slope of 1,800 feet."

At the Kirkland Lake Gold Mines, additional rich ore is being opened up, recent developments having added a considerable tonnage containing average values somewhat higher than the former general average in the mine.

As a result of surface exploration, a vein has been opened up on the Kirkland Lake Townsite property. The vein or "break" contains considerable well- mineralized quartz, and occurs in a well-defined contact between the conglomerate and porphyry formations.

Delays have occurred in connection with delivery of equipments for the Hunton-Kirkland plant. It is learned, however, that the Elliot-Kirkland may loan its transformers to the Hunton so as to enable the latter to utilize its plant before the end of July, as originally planned.

Samples taken from a test pit six feet deep on the Wood-Kirkland property in the township of Lebel, are stated to have shown a high average gold content across a width of nine feet. Three feet is said to average $65 to the ton, while six feet averages $6 to the ton. The samples contain no visible gold,but gold tellurides are present, the ore also containing an average of about two ounces of silver to the ton.

Mr. Frank Huth, president of the Ontario-Kirkland Gold Mines, has issued the following statement to the shareholders, as of July 8th:—

"In my letter of May 15th, I advised you that the shaft on the Company's property had reached a depth of 450 feet, and that cross-cuts had been commenced to intersect the veins on this level. Since sending this communication, two veins have been cut on the 450 foot level showing ore of excellent grade. Drifting operations have proceeded along the veins with most satisfactory results, and the values so far encountered are considerably in excess of the values found on the 300 foot level directly above thus indicating an increase in the value of the ore with depth. These developments are rapidly adding to the ore reserves and greatly increasing the value of the property.

"As you were formerly informed, the Company has made a contract with R. C. Coffey to design and erect a mill suitable for the treatment of the ore. The preliminary work of clearing the mill site and excavating for the foundations is now under way, and it is our intention to proceed with the erection of the mill as fast as conditions will permit. We will be unable to make as rapid progress as we had hoped owing to the fact that the mines of Kirkland Lake have been unable to secure an adequate supply of efficient labor. The Ontario-Kirkland together with the other mines of Kirkland Lake, has granted an increase in wages amounting to an average of fifty cents per day, the effect of which has been felt, and we confidently expect a gradual improvement.

"The Shareholders and Directors who visited the property on the 7th of June, after carefully going over the entire situation and consulting with the Engineers in charge, decided that the best policy would be to continue the underground development work as rapidly as possible, and also proceed with the erection of the mill with all reasonable dispatch. This policy will mean the more extensive opening up of the ore bodies thus placing the property in a more advanced stage of development, which will greatly facilitate the extraction of ore in an economical manner when the mine is placed on a producing basis. Our progress mut to a great extent depend upon the amount and efficiency of labor obtainable and, as noted above, the situation is showing signs of improvement.

"The amount of development work accomplished to date and the very favorable results are most gratifying, and places the Ontario-Kirkland in a high position among the mines of Kirkland Lake. Every effort will be made to continue the development work and advance the construction of the mill as above outlined. The success of the Company seems assured, and it is our intention to keep the shareholders duly informed of progress being made."

British Columbia Letter

Victoria, B. C.

That the development of coal lands and the obtaining of accurate information regarding all reported oil fields are serious responsibilities under present conditions is recognized by the authorities of the United States would appear to be indicated by an announcement from San Francisco, Cal., to the effect that Josephus Daniels, Secretary of the Navy, together with Secretary Payne, of the Interior Department, and Governor Riggs of Alaska, have left to investigate coal and oil possibilities of certain Alaska lands. In this connection Secretary Daniels is quoted as follows:—"We have an appropriation of $1,000,000 for development of the Matanuska coal fields for naval purposes and we also believe it possible that productive oil fields may be discovered. The oil, however, is only a possibility, but we will look into it."

Lists of Crown-granted mineral claims which have reverted to the Crown because of non-payment of taxes, and now are subject to leave under the terms of the "Taxation Act" have been forwarded to the Gold Commissioners and Mining Recorders throughout the Province. This publication is of suprising size, containing thirty odd pages. Every mineral district of British Columbia figures in the tables it contains. As would be expected, the sections best known to miners, because they have been longest prospected and have yielded and, it may be said, still are yielding the bulk of the mineral wealth for which the province is responsible every year, have contributed to the Crown the greater number of deliquent mineral claims. The Rossland Assessment District, for instance, has provided something over 800 such properties, all of which, as stated, may be leased after compliance with the statutory formalities, the particulars of which will be furnished on application to the Assessor. The Slocan Assessment District, also, is well represented wit habout 300 such claims advertised for lease. Nelson has about 328; Fort Steele about 90; Kettle River 170 odd, and, coming to Vancouver Island, it is found that Nanaimo has some 28 of these, presumably abandoned, claims; Cowichan, 18; Comox 33; and Alberni 45. It is safe to assume that many, if not the majority, of these properties, have not been sufficiently developed to conclusively prove their merit. and that sooner or later they will be further explored and opened up with, at least in some cases, satisfactory results. On this point it is illuminating to contemplate the success of Clarence Cunningham, one of British Columbia's largest individual operators, in the exploitation of several groups of claims which their previous owners thought had given up paying ore to the full extent of their resources.

W. Pellew-Harvey, of the firm of Pellew-Harvey & Co., London, England, is in Victoria, B.C., and intends it is stated spending some months in a general survey of the mining development and possibilities of the province. Mr. Pellew-Harvey is an engineer with practical experience in the Canadian West dating back some twenty years who subsequently made his headquarters in London. He is said to be here on a special mission on behalf of a syndicate of British capitalists and proposes, in pursuance of his commission, visiting all the mining camps and many reported promising prospects of the province.

Word received recently by mail from Dawson, Y.T., appears to confirm the recent report of a new silver strike in the Mayo District. The latest discoveries are on the slope of Mount Hinton, opposite Keno Hill. They are about five miles from Keno Hill, where was the first excitment, the water of Lightning Creek separating the two. When the news reached Mayo there was a stampede and the ground has been thoroughly staked. As to the Keno Hill properties, it is stated that the Yukon Gold Company have found a rich new silver deposit near where they have been working. A pioneer prospector, writing to a prominent resident, says: "I've been up Keno prospecting. I located three claims and hope to prospect for the remainder of the summer. I got in on the new stampede. It is located near the head of Lightning Creek and shows gold and galena. Everyone is away stampeding. Middlecoff Hydraulics are about closed, and the men are staking. They are opening up the biggest thing yet on Keno Hill, taking the ore out of the mud, five feet wide and got it stripped over 200 feet in length two days' ago. It runs 1,000 to 2,000 ounces to the ton, and they take it down to the frost about one foot deep, and there must be a big lead under. Words cannot express the big thing we got at Mayo. I believe it is going to astonish the world. Everyone who sees it says the same. The worst drawback at present is too many stakers and too few prospectors."

Stewart, B. C.

The Premier Mine, Salmon River, Portland Canal District, is the most talked of mining property of this province at present, and if the reports concerning the value of the ore shipped during the past winter and the results of diamond drill prospecting that has been under way are substantially correct, it is destined to continue to hold the attention of American mining men. As to shipments it is said that 1,500 tons have been extracted yielding an average of $300 to the ton and that there is much milling ore on the dump awaiting treatment. Regarding development, the report is that the drills have cut the high grade ore at depth and that exploration in other respects is very satisfactory. The concentrator being installed is expected to be ready for operation next month.

The Provincial Department of Mines has sent two reconnaissance parties into the Unuk River country, north of the better known section of Portland Canal District, this summer. They were organized by Geo. Clothier, resident engineer at Prince Rupert, B.C., and will work along lines laid down by him. Commenting on the geology of this section, Mr. Clothier, in his report for the year 1918, says:

"Bordering the main granite mass on either side is a broad belt of altered sedimentaries, with unaltered sedimentaries farther away from the contact, through which have intruded dykes of all kinds, spurs, isolated peaks and short ranges from the main granite batholith, throughout which are ore deposits of every description. This district includes the west contact-zone, from Bella Coola north to the mouth of Portland Inlet, on the southern boundary of the Alaskan strip. The east contact belt extends from the Zymoetz (Copper) river near Terrace on the Grand Trunk Pacific Railway, north to the Alaska-British Columbia boundary line. The coast range is penetrated to the eastern contact by the Skeena river, the Naas River, Portland Canal and Observatory Inlet and through the Alaska strip by the Unuk river, the Stikine river (with its principal tributary, the Iskut) and the Taku river, admitting of a lot of prospecting north of the Portland Canal. The value of the eastern contact has already been demonstrated by the discovery of such properties as the Hidden Creek Mines of the Granby Consolidated at Anyox the Dolly Varden Mines and others in the Alice Arm country, the Bush, Big Missouri and others of the Salmon River section of Portland Canal; and the Engineer Mine in the Atlin District. It should be noted that, almost without exception, the ore bodies occur in greenstones or andesites, more or less altered where mineralized, and carry all the mineral bearing metallics, such as gold, gold-silver, silver-lead, gold-copper, copper and silver."

One of Mr. Clothier's parties, on reaching the Unuk River, will work in a southeasterly direction, eventually meeting the other explorers, who will go in by the Salmon River, over the divide to the Naas Slope, and northwesterly along the line of contact.

Alice Arm.

Major J. A. McLennan, of Vancouver, B.C., president of a company organized to develop certain Alice Arm mining property, on his return from the North stated that work on the Royal Group of Mineral Claims, adjacent to the Dolly Varden, was giving satisfactory results. He asserts that the lead of the latter mine has been found on the Royal Group, that it has been traced for 400 feet, that a tunnel has been started on the 600 foot level where the vein is well defined. Major McLennan also states that while there still is snow in the gulches the season may be said to have opened. Every train leaving Alice Arm is well filled with prospectors bound for different parts of the interior.

Trail, B.C.

For the half year there has been received at the Trail Smelter of the Canadian Consolidated Mining & Smelting Co. a total of 147,389 tons of ore and concentrates. Receipts for the closing nine days of the month of June were 8,755 tons and five properties were added to the list of shippers in that period, namely, the Mandy, Le Pas, Manitoba, the Lookout, of Skagway; the Loon Lake of Loon Lake, Wn.; the Maestro of Ainsworth; and the Stemwinder, of Fairview, B.C.

Fifty-two claims have been made by farmers against the Canadian Consolidated Mining & Smelting Co. for damages to crops as a result of the injurious effects of the fumes from the Trail Smelter. The allegations of those who seek compensation of the company are being investigated by Judge J. A. Forin and a party of advisers, with some legal and others with agricultural experience as their qualifications. Before setting out on a tour of the farms said to have been affected Judge Forin and party made an inspection of conditions in an adjacent valley outside the smoke area.

Lonis H. Biggar, a flotation engineer of Montreal, P.Q., claims to have developed a process for the treatment by preferential flotation of the silver-lead-zinc feed of the Standard Mine, Silverton, B.C. He now is engaged in the construction of a six-cell plant, which will be ready for operation in conjunction with the Standard Mill in two or three weeks. The process will be used first in the treatment of a 5,000 ton slime dump averaging 11 ounces silver, 3 per cent lead, and 7 per cent zinc, which was accumulated before the adoption of flotation at the Standard. As this material averages 50 per cent of 200 mesh the only way the silver and lead can be separated from the zinc is by a process of preferential or selective flotation.

With reference to his plans at the Standard Mine, Mr. Biggar is quoted as follows:

"The process has been successfully developed and the testing completed and the Standard Silver-Lead Company is now constructing a commercial sized machine, duplicating the laboratory machine, and it is hoped to operate the Mill, treating the slimes, within a few weeks.

"As the sump as been exposed for several years some of the lead has become severely weathered and oxidized and cannot be recovered by flotation. However, it is hoped to recover 50 per cent of the lead, carrying 60 to 70 per cent of the silver in a concentrate carrying only 10 to 15 per cent of the zinc. The remaining zinc also will be recovered in the usual manner, carrying the remaining silver and practically free of lead, as the oxidized lead that does not concentrate at first is carried through with the tailings.

"This process has been tried in the laboratory on several crude silver-lead ores with very successful results and it is also hoped to apply to these in due course."

There promises to be a representative attendance at the International Mining Convention to be held at Nelson, B.C., from the 20th to the 24th of July, inclusive. Governor Emnet D. Boyle, of Nevada, is reported to have accepted an invitation, as have also L. K. Armstrong American Institute of Engineers, Spokane, Wn.; M. J. Carrigan and Glenville A. Collins, Seattle, Wn.; and Hon. Wm. Sloan, provincial minister of mines, R. F. Green, member of Dominion Parliament for the Kootenay District.

Vancouver, B. C.

The Vancouver Chamber of Mines is engaged in assembling an exhibit of British Columbia ores that will be as far as possible, representative of the mineral wealth of the various mineral districts of the province. The display will be ready for the Vancouver Exhibition next September. It will be made a permanent exhibit, however, being transferred to the quarters of the Chamber of Mines later. The Boards of Trade of different sections, the different branch Prospectors' Associations, and the individual prospectors and mine operators are being communicated with to the end that their co-operation may be obtained.

R. W. Brock, Dean of the University of British Columbia, has taken a party into the Francois Lake country, southwest of the Bulkley Valley, on geological survey work. He expects to be in the field some two months.

KIND WORDS.

Those who were fortunate enough to attend the Canadian meeting of the American Institute of Chemical Engineers had the pleasure of seeing modern Canada teeming with ambition. The future city of Belleville may be taken as an example. There cannot be the slightest doubt that it will forge ahead, endowed as it is with creative citizens. Shawinigan Falls has accomplished most, and credit for it should not be of less pride to Canadians because they must share it with their neighbors the citizens of the States. For the very greatest heritages that are theirs also belong to these kinsmen of theirs to the south. The ownership of North America perhaps forms the greatest of all partnerships and the dividend of a greater language, a richer literature and a finer race of men shall be reared from North America, Inc. and Ltd. by the co-operating peoples who loyally love the Maple Leaf or American Eagle.—"Chemical and Metallurgical Engineering."

THE NOVA SCOTIA COLLIERIES.

Reported Transfers of Coal Properties.

Rumor is very busy with the coal properties in Inverness Co. The Inverness Coal and Railway Co. is said to have been purchased by Halifax interests, but no definite confirmation of this is available. Statements as to the sale of the Mabou property are also made, but nothing definite has transpired. There is of course no blinking the fact that the only hope for a profitable and permanent coal mining industry in Inverness County lies in the possibility that eventually the separate properties, developed and undeveloped, may be consolidated and come under the control of parties with large capital at their disposal.

A further unconfirmed newspaper statement reports the acquisition of the Loch Lomond coal areas by the Dominion Steel Corporation. The small synclinal outlier basin of the Sydney coalfield, while its tonnage content is not large, is understood to be underlain by seams of low sulphur coal, very suitable for metallurgical purposes, and, while the immediate operation of the coalfield is unlikely, it has some importance for future metallurgical requirements.

Coal Outputs.

Coal production is showing a disposition to increase in the Province, and an appreciable tonnage is likely to be added by the operations of small mines during the year. The coal mined by Malcolm Beaton and partners at Port Hood, Inverness Co., the contribution of the New Campellton Colliery at the Little Bras d'Or Entrance, and neighboring operations by a newly formed company on the Stubbert Seam, near Point Aconi, together with the enlarged production of the Indian Cove Coal Co., near North Sydney——all these being in Cape Breton Island—will in their aggregate amount to a substantial addition to last year's figures.

The Lanark Engineering Co. in the New Glasgow district and the Greenwood Coal Co. at Thorburn will both show a satisfactory output increase this year.

Later figures indicate that the estimated production of all the collieries in Nova Scotia, which in our issue of June 25th was placed at 5,400,000 tons, may, if present production rates are maintained and no labor troubles intervene, reach between 5,500,000 and 5,600,000 long tons, closely approximating the production of 1917, but still 1¾ million tons below pre-war production. The significant fact, however, is that production has now an upward trend for the first time in five years.

First Benefits of the Dominion Scotia "Merger".

Now that the Dominion Steel Corporation's shareholders have ratified the recommendation of the directors to enter the British Empire Steel Corporation, it is of interest to note that quick enlargement of production is possible from certain collieries in the Sydney Field where the working faces have for some years been prevented from advancing into the abutting solid coal because of the intervention of lease lines. This enlargement of the output capacity of the existing collieries without the necessity for additional or important capital expenditure will be the first benefit arising from single management of the coal properties. Anything that enlarges the "pit-room" of the collieries is important, because the restriction on development is one of the most serious effects of the reduction in the number of miners that was a direct result of heavy enlistments during the war. There are a

number of instances where quick access to favorably situated coal areas are possible under single management and harmonious policies which were not possible when, as the President of Scotia recently stated, the coal companies were "working at cross purposes along individual lines." The most striking advantages of the consolidation which now seems quite assured will proceed from the co-ordination and undivided purpose which it will be possible to attach to the technical operations of coal mining in the Sydney field.

Coal Outputs of the "Besco" Companies.

A review of the coal production of the proposed constituent companies of "Besco", which follows, indicates a probable increase in tonnage outputs of 400,000 tons in 1920 over the figure of 1919.

	First Half 1919	First Half 1920	Year 1919 (Actual)	Year 1920 (Estimated)
Dominion Coal Company.				
Glace Bay Collieries:	1,539,328	1,615,713	3,087,638	3,300,000
Springhill Collieries:	187,690	220,000	393,441	430,000
Nova Scotia Steel Co.				
Sydney Mines:	244,655	315,329	552,044	625,000
Acadia Coal Co.	190,558	251,000	407,326	490,000
	2,162,231	2,402,042	4,440,449	4,845,000

During the week ending the 17th July, following a meeting of the shareholders of the Dominion Steel Corporation in Halifax on the 15th., when approval of the recommendation of the Board of Directors to enter the British Steel Corporation on the terms proposed by the promoters was given, a number of directors of the constituent companies and others interested have visited the coal and steel plants in Cape Breton. President Wolvin intimated that a statement regarding the new policies would be given out after inspection of the properties was complete.

At a Directors Meeting held in Sydney on July 17th., Mr. D. H. Mc. Dougall, President of the Nova Scotia Steel Co. and formerly General Manager of the Dominion Steel Corporation, and Dr. W. L. Mc. Dougald, President of the Ogdensburg Coal and Towing Co., and of the Century Coal Co. of Montreal, were elected directors of the Dominion Steel Corporation. Mr. Mc. Dougall's appointment as a director of the Company with which he has had such long and intimate connection coincided fortuitously and significantly with his resignation of the position of General Manager on the 17th July 1918. Mr. Mc. Dougall made the following statement to the newspapers following the meeting:

"My return to the Dominion Steel affairs, coinciding as it does with the date of my departure two years ago, is peculiarly gratifying and interesting to me. The association of the Scotia and Dominion companies together in addition is a development fraught with the greatest possibilities, not only to the Maritime Provinces, but also to the Dominion and the Empire at large. Working together instead of at cross purposes along individual lines, the possibilities ahead of us are invaluable. The British Empire Steel Corporation and its success with hereafter be our joint endeavor."

DOMINION COAL COMPANY ESTABLISHES DEPARTMENT OF INDUSTRIAL RELATIONS.

Mr. Angus W. Macdonald, employment agent of the Dominion Steel Corporation, has been appointed superintendent of Industrial Relations of the Dominion Coal Company. The new department will supervise and compile statistics in connection with accidents, health of workmen, housing, first-aid and accident prevention.

Mr. Macdonald is a life-long servant of the Dominion Steel and Coal Companies, and has a unique knowledge of employment conditions in the coal and steel plants and the ore and limestone mines and quarries. At the last meeting of the Mining Society of Nova Scotia, Mr. Macdonald read a brief, but extremely suggestive paper on labor turnover in industrial plants, which dealt with the high cost of hiring and "firing" men, and represented the crystallization of a lifetime of observation of this process, so fraught with happiness or disaster to those who are the involuntary pawns in the game.

As a fisher, both for men and trout and information, Mr. Macdonald has a well-deserved reputation for carefulness and patience and ultimate success, and there is most certainly ample scope for such activities as may be properly conceived to come under the newly created department in the widely extended operations of the Dominion Steel Corporation.

NOVA SCOTIA COAL AT COCHRANE, ONT.

"An all-rail shipment of 2,000 tons of Nova Scotia coal to a pulp mill 32 miles west of Cochrane on the National Transcontinental cost, including freight, about the same as Pennsylvania coal, plus duty, laid down at the same point. This apparently demonstrates that if the duty on bituminous coal remains, Nova Scotia coal can be shipped to southern Ontario at a profit even by rail, and much more advantageously by water."—*Toronto Globe.*

Presuming this shipment came to Quebec by water, it would give a total distance transported of roughly 1,125 miles, and if by rail, possibly 1,300 miles. The bituminous coalfields of Alberta are distant from Cochrane approximately 1,500 miles. The bituminous coalfields of the United States from which Ontario draws its fuel are from 700 to 800 miles distant from Cochrane, depending on the source of the coal. The distances are not so vastly divergent that Canada could not take her own coal pretty much where it was thought necessary in Canada, should it be regarded as proper national policy. The reason why United States coal can be cheaply transported to Southern Ontario, and the Head of the Lakes, is because coal is "stealing a ride," being largely an outward freight from the Pennsylvania fields for cars —which would otherwise travel empty—going north for Lake Superior iron ore.

Sir Robert Borden, in almost his last appearance as Premier, told the House that a committee of the Cabinet had the question under consideration. An adequate and permanent supply of fuel is of such vital consequence to Canada that the Government ought to adopt a broad and statesmanlike policy to assure it.—*Toronto Globe.*

Toronto Notes

Mr. Frank C. Loreing, of Toronto, is homeward bound on the S.S. Megantic, after having enlisted English capital for development purposes in the Canadian north country.

A. J. Bone, superintendent of the smelter at Anyox, B.C., who recently has been at Sudbury assisting in the starting up of the British-American Nickel plant, was in Toronto last week, and is now in New York.

Shareholders of Porcupine, V.N.T., held a special meeting in Toronto on July 14, when an offer was received from Hamilton B. Wills and a syndicate for 600,000 shares of treasury stock. The offer is 15c per share for the first 200,000, to be taken at once, an option of 30c for another block of 200,000 shares, and 50c for the third block of the same quantity. This would bring $30,000 for immediate working capital and another $160,000 later on. As the control of the company is held in England, news of the offer was cabled. The Porcupine V.N.T. has a 100-ton mill, and is regarded as a good property. It is a consolidation of the Vipond and North Thompson properties, and is situated adjacent to the Hollinger and Porcupine Crown Mines.

Announcement was made at the annual meeting of the Davidson Consolidated Gold Mines, Ltd., in Toronto, on July 15th, that operations would be discontinued at the mine for the time being, pending plans for carrying them out on a much larger scale later on, when present plans for financing have been completed. It was stated by President G. C. Crean that in the absence in England of the managing director H. H. Sutherland, the affairs of the mine had been under the supervision of F. C. Sutherland. The managing director, he said, had been in England negotiating to provide money to make large scale operations at the mine possible. "At the present time," he said, "I am not in a position to make a definite statement regarding the matter. However, I may say that the success of these negotiations seems assured. I feel confident that if you will continue to be patient for a little while longer, everything will work to the best interests of all concerned."

It was stated by the President that during the ten months since the Davidson Consolidated took over the property and plant of the Davidson Gold Mines, Ltd., results from development work had been highly gratifying. It is now proposed to sink a large compartment shaft to cut the ore body at a depth of 1,000 feet, and to provide facilities for handing a large daily tonnage of ore for milling, as well as permitting the carrying out of mining operations at the minimum cost. The old board of directors were re-elected and Col. Robert Starke of Montreal, who joined the board recently, spoke briefly, stating that he was in entire accord with the policy of discontinuing operations for the present.

La Rose Mines, Limited, have entered an action at Osgoode Hall, Toronto, against the Mining Corporation of Canada, Limited, and the Cobalt Reduction Company, to recover damages for the alleged conversion by the defendants of tailings from the plaintiffs' ore deposited by the Northern Customs Concentrator on the bed of Cobalt Lake or on lands leased by the Cobalt Townsite Mining Company, Ltd., and the Northern Concentrator, Limited. The lease of the property was subsequently acquired by one of the defendants, and is now owned by the other defendant. In the alternative the plaintiffs ask that they receive a proper proportion of the tailings deposited on these lands.

According to an Order-in-Council just passed by the Ontario Government, the Gillies timber limit, on the French River, will shortly be thrown open to the mining prospector. These limits were withdrawn from prospecting, but practically the whole area, with a reservation in the south, may now be entered by prospectors after July 20th. The lands are added to the Timiskaming mining division. Those lands still withheld by the Crown against prospecting include the right-of-way of the Cobalt Power Co., and the right-of-way of the Cobalt Hydraulic Company's transmission line, both 100 feet wide. The Crown also reserves land one chain deep along both banks of the French River. There has been a constant demand for the opening of the area and some members of Parliament from the north have brought the matter up in the House.

PROHIBITION—SOCIAL REVOLUTIONIST.

While ours may not be a voice crying in a very arid wilderness, it shall once more be lifted to record what we believe to be an indisputable fact—that prohibition is responsible in greatest degree for the acute labor unrest and growing world hatred that permeates certain productive strata of society. We believe that mining men, above all others, will appreciate the truth of that statement. Explain it as the prohibitionists may, there is no manner of doubt that labor conditions have grown worse since the eighteenth amendment became the law of the land. And, what is worse, hatred, deep and indefinable, seems to actuate a great majority of those forced to earn their living by manual work.

We think that the experience of one mining operator, in this particular vicinity will illustrate our point. He has been the victim of extensive sabotage throughout all departments of his operations. New hose has been left to be shattered by the blast; tools have been thrown down abandoned stopes; a machine drill was dumped into an ore shoot to emerge two weeks later when the ore was drawn, and many other vicious, persistent and contemptible outrages have been committed. One man was caught in the act, after three weeks' on the payroll, and given his "time." He truculently admitted that he was to blame and asked if his employer wished to know why. He did. And the explanation was that all the avenues of enjoyment, or what he considers enjoyment, had been closed to the worker and that he now had no choice but to sit around killing time until he hates the world and himself. No fault was found with the scale of wages paid; in fact, miners are earning six and a half dollars a day in that particular mine, but the monotony of the daily grind, coupled with the elimination of what has hitherto been held as the prerogative of every man who pays his way, has led to bitter and unreasoning hatred of so-called upper classes, that to all appearances still find fair enjoyment in life.

To us it seems that the time has come to meet the situation fairly and squarely and quit indulgence in idle theories that cal for enforcement of sumptuary laws interfering with man's right to live as he pleases. The present condition of unrest is the greatest question before the American people. The employment of

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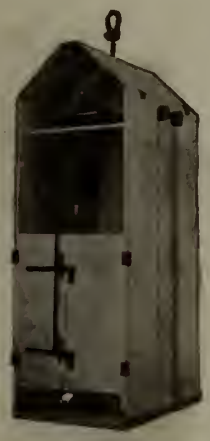

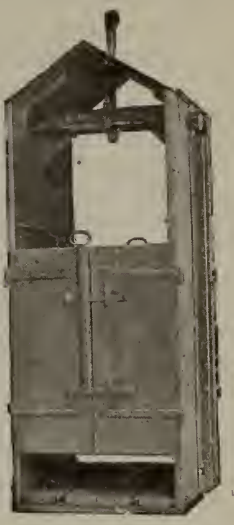

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force or the imprisonment of a few misguided leaders will not eradicate the trouble, in fact will but make it worse. Better by far to meet it with the same recognition of the fact that human nature cannot be made to conform to the ideals of the fanatic of any breed, even if recognition leads to restoration of privileges now banned upon the statute books. Regulate the liquor traffic if you will, and as severely as good reason indicates, but restore to the working man that which he desires. Give him a chance to enjoy himself as he sees fit, so long as he does not encroach upon the rights of others, and brush from the statute books laws that make criminals of thousands of good citizens. Then, and only then in our opinion, shall we be on the way to real solution of the problem of industrial unrest.—Northwest Mining Truth.

STATE IRON AND STEEL WORKS IN QUEENSLAND, AUSTRALIA.

In connection with the State Iron and Steel Works which it is the intention of the Queensland Government to install at Bowen, a seaport town on the Eastern Coast of Australia, about 600 miles north of Brisbane, the General Manager Mr. J. W. Brophy, accompanied by the Engineer for Harbours and Rivers, and the Chief Inspector of Mines for Queensland, have left Brisbane on a tour of inspection of iron lodes in Western Australia, the option on which was secured by the Government a short time ago.

These deposits are situated on islands contiguous to Yampi Sound on the north west coast of Australia, are very extensive, and are described by the State Mining Engineer for Western Australia, as "the richest and most accessible of their kind in the World."

The grade of the ore is 69 per cent metallic and it is estimated that there are nearly 100 million tons available above Sea level; while the mining problem present no difficulties as the ore can be quarried by the inexpensive open cut method, and delivered from the bins direct on the ship, the lode running right into the sea, and thereby offering every facility for cheap and efficient handling and shipping.

The Queensland Government is considering the recommendation of Mr. Brophy, that they should purchase for this trade, two steamers of the Lake Superior type, this class of vessels being specially built and equipped for the carrying of iron ores, and possessing great tonnage capacities.

It is the intention to blend those with the Queensland ores of 57 per cent metallic, which it is considered will make excellent iron, and enable the Queensland State Works to successfully compete with any other Iron Works either in Australia or elsewhere.

THE BASEMENT COMPLEX.

Modern children are precocious, and it is only natural that they should pick up words and phrases used by their elders. The seven-year-old daughter of an erst-while geologist, playing with a bedraggled but cherished kitten, was asked what her pet was called. "Well," she replied, with a pedantic air, "there is considerable divergence of opinion. Daddy calls her a segregation from an intrusive magma of doubtful genesis; mother refers to her as the basement complex; sister Bessie insists that she is a typical example of secondary impoverishment; but I just call her my dear little Kitty."—"Engineering and Mining Journal."

IRON ORE.

By J. J. O'Connor.

A notable forward step in the direction of utilizing Canada's vast deposits of low grade iron ores, has been made in the results obtained by Prof. Alfred Stansfield of McGill University.

The announcement, just made, by The Honorary Advisory Council for Scientific and Industrial Research, Ottawa, that the task allotted to Prof. Stansfield of determining the best method to pursue in bringing these ores to merchantable grades, has resulted so satisfactorily, and at such small cost, that if they had available funds at their disposal, they would undertake a demonstration on a commercial scale.

James W. Moffat, M.E.I.C., Toronto, has been experimenting along the same lines for some years, and is said to have perfected an extremely simple and successful process, that offers great possibilities in the future of low-grade iron ores. Mr. Moffat has taken out patents in Canada, and various other countries, on both the processes and apparatus.

The announcement of the Advisory Council, coming as it does, from the highest scientific body in Canada, should be sufficient warrant for the Government to furnish the money necessary to carry out this most important investigation. In lieu of this, they should make the whole question of the utilization of our low-grade iron ores the subject of departmental investigation. They have the necessary machinery in the Mines Branch, if the matter be not left to the Advisory Council to carry out.

This question has been urged upon the government by representatives of the mineral and industrial interests, by deputations of Members of Parliament, representing all classes. All has been said, that very well can be said, in urging some form of government assistance in developing an iron industry in Canada. It is now time for action. The results obtained by Prof. Stansfield clears the decks for that action, and it should no longer be deferred.

The Government that had the courage to stop borrowing, impose luxury taxes, and pay its debts out of its own resources, so as to make Canada and Canadians self reliant, should have the courage to take one more step, and make Canada independent in the matter of iron ore.

Operations are now being carried out on the eastern Mesabi range, in Minnesota, by the Mesabi Iron Company, on ores similar to much of our own, where millions are being expended in erecting a plant, and constructing the town of Babbitt. The first unit of this plant will cost three million dollars, and have a capacity of 3000 to 4000 tons of magnetic ore daily. All of this is being done after the most careful investigation, and the expenditure of over half a million dollars in a testing plant at Duluth, under the supervision of experienced engineers. This operation, of itself, should be sufficient stimulus to the Government to, at least, make the question a subject of investigation.

In Minnesota, where the greatest known deposits of high-grade ores in the world, are being exploited, the iron operators are taking steps to meet the conditions that are bound to arise as their high-grade ores near exhaustion. Every season sees an increased amount of beneficial ores shipped from the Minnesota ranges, until now it runs into millions of tons annually.

Skillings "Mining Review," an authority on Minnesota iron ores, has this to say regarding the low-

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grade ores: "Non-merchantable iron ore of the Mesabi range is the greatest potential tonnage asset of the State. The fact is that the known deposits of merchantable ore compose but a fraction of the tonnage that will be shipped from the range, unless some short-sighted policy, such as a tonnage tax, makes its appearance to discourage capital and inventive genius from converting non-merchantable ores into merchantable ores."

There is no question in the minds of Minnesota operators, but that their lean ores can be profitably converted into commercial grades, if they are not taxed out of the market by faulty legislation. What is true of the Minnesota ores of low iron-content, is equally true of Ontario ores of similar character.

Therefore, in the light of Prof. Stansfield's determinations, the Government should take this matter in hand without unnecessary delay, should pursue it to a definite conclusion, and settle the question of its commercial feasibility.

GUIDE TO NORTHERN BRITISH COLUMBIA.

We have received a copy of the Northern British Columbia Index and Guide and City Directory of Prince Rupert, published by F. S. Wright of Prince Rupert. This compendium of information regarding Northern British Columbia is printed on paper of extraordinary strength made from British Columbia timber in northern mills, and is of interest and value to any person concerned with the mining industry of the Prince Rupert District, as it contains a list of mining properties and companies, together with information on Post Offices, Banking points, telegraph offices and settlements. Names and addresses of owners of properties are given, and those mines that are shipping ore are indicated.

The Guide states that Northern British Columbia contributed 96 per cent. of the placer gold, 40 per cent. of the lode gold, 28 per cent. of the silver and 47 per cent. of the copper mined in British Columbia in 1919.

For a town which twelve years ago was a wilderness of bush and scrub Prince Rupert is making wonderful progress.

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GILLIES LIMIT TO BE OPENED FOR STAKING July 20TH.

Postponment of Date of Opening Urged by our Correspondent.

Despatches this week which carry the information that the Ontario Government has passed an Order in Council which will throw the Gillies Limit open for prospecting on July 20th comes both with welcome and disappointment to prospectors throughout Northern Ontario. It has been known for some time that this matter has been under consideration, but it had generally been expected that at least thirty days notice would be given. The first intimation of definite action came on Saturday, July 17, only three days ahead of the date of opening.

Many prospectors throughout Northern Ontario have spent more or less time in The Gilies Limit so as to be well posted as to its merit and prepared to stake claims at such time as it might be thrown open. A large number of these men who are giving the best part of their lives towards exploring the mineral lands of Northern Ontario are at this season scattered far and wide over the vast stretches of virgin territory in Northern Ontario as well as in Northern Quebec and Northern Manitoba. These men may not learn for several days and possibly weeks of the Limit having been thrown open, and are thus denied an opportunity to share in any advantage arising from such a step. These men, in preference to all others, appear to be entitled to at least an even chance. Therefore, in view of the circumstances, it may still be found possible for the Ontario Government to rescind the date set and to extend it for another thirty days.

General satisfaction is expressed that the new Minister of Mines, Hon. H. Mills, has been able to announce success in arranging to have the Gillies Limit opened, and it is plainly obvious on every hand that great appreciation would be added provided the minister is able to correct the unfortunate circumstances of a hasty opening and perhaps defer the date until August 20th instead.

The Gillies Limit is a large strip of territory lying immediately adjacent to the silver-bearing area of Cobalt. Its opening is expected to result in much added exploration work, and offers promise of commercial deposits of silver being opened up.

Personal.

Mr. Gerald M. Ponton has opened an office as consulting engineer and metallurgist at 14 Place Royale, Montreal.

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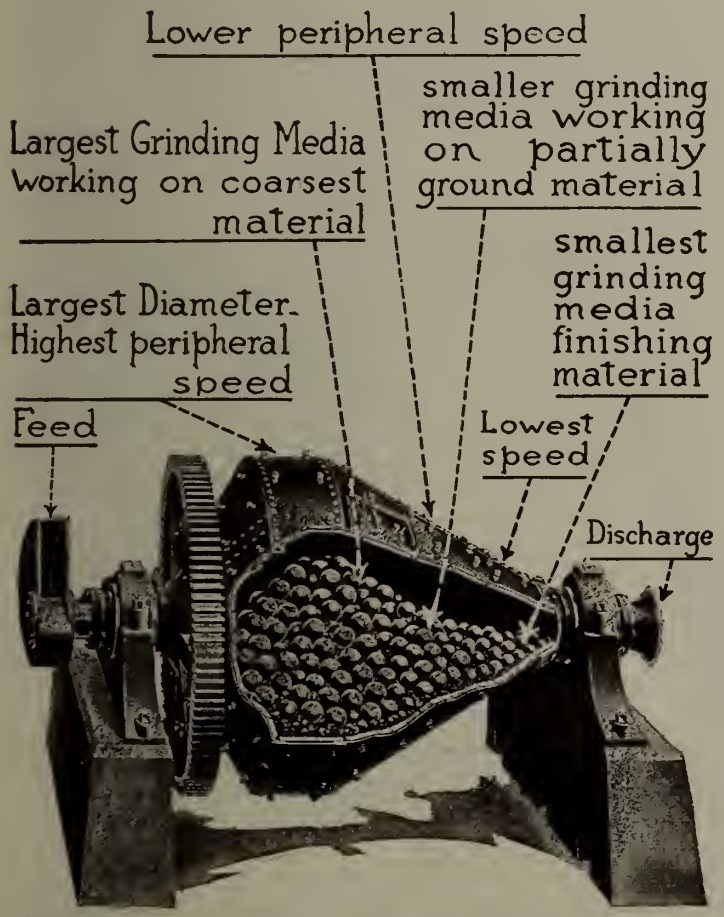
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:-: EDITORIAL :-:

PEAT FUEL IN CANADA.

The opinion of Professor Purcell of Dublin University upon the promising nature of the work done at the Alfred peat bog near Ottawa is one that is heartening because it is delivered by an authority on peat utilization. Professor Purcell's researches on the peat bogs of Ireland considered as a source of fuel have been published by the Department of Scientific and Industrial Research of Great Britain.*

Complaint has been made that the results obtained by the Peat Committee have not justified the time and money spent on experiments, and it is possible that one cause of this feeling is that too much, in too short a time, has been expected from the trials. The manner in which the problem of the commercial utilization of peat as a competitive fuel against the best coal in the world has been handled by the Peat Committee has excited the admiration of those who appreciate the technical difficulties, and it is has in particular called forth much commendation from workers on a similar problem in Great Britain.

Every peat bog is not a suitable source of peat-fuel. Writing in the "Journal of the American Peat Society," Mr. Herbert Garnett of Minneapolis assumes that fifty per cent of the failures of peat fuel projects can be traced to selections of unsuitable raw material, and he states that the knowledge required for successful peat technology includes such studies as botany, chemistry, geology and an intelligent understanding of the functions of mechanical maceration. Peat fuel is not an experiment today, provided the raw material is suitable. In 1919, in the United States, 76,301 tons of peat were sold valued at $860,841, which is less by 31,000 tons than the quantity marketed in 1918, in which year the value exceeded one million dollars.

If, as it is reported, the Alfred Bog has produced 20,000 tons of fuel, that is 20,000 tons to the good for Canada. The chief importance of the production of this by no means negligible tonnage of fuel lies, however, in the experience that has been gained. Facts have been learned concerning the suitability of raw material, its chemical and botanical characteristics, its physical behavior under the maceration process, and other things, trivial in themselves, but all important in their aggregate, that will many times repay any expenditure so far made.

It is not quite fair to quote Dr. Haanel's estimate of sixteen billion tons of coal-fuel equivalent in the peat bogs of Canada, unless it is qualified by particulars of the locality of the bogs, and the nature of their contents, but Dr. Haanel has most properly called attention to the tremendous potentialities of this fuel source, and no doubt his point of view—like that of all who urge greater development of our internal fuel resources—is that we can call nothing our own that we have not got in Canada.

We would suggest that if the Peat Committee had given more publicity to their trials and successes through the technical press it might have assisted in disseminating knowledge of a very justifiable expenditure of public monies, and of experiments that have much technical interest which the "Journal" would have been glad to have described in its columns.

While we believe that nothing that can be done in Canada in regard to the utilization of water-powers, peat-fuel, or lignite utilization can ever be more than palliations of a chronic fuel inadequacy in default of more intensive development of the bituminous coals of Nova Scotia, Alberta and British Columbia; yet every little helps, nor is any good likely to come of disparagement of any branch of fuel engineering. We need full development in Canada of every available and local source of heat and power, not forgetting the necessity for fuel economy, a vast and only partially explored field of endeavor. We recommend the attention of the university faculties of Canada to the opportunities that Canada offers to graduates in fuel engineering.

When the American Institute of Chemical Engineers was entertained in Ottawa a few weeks ago, each visitor was presented with a lignite briquette. We wonder how many of those present realized the historical significance of that gift?

*See "Journal," July 9th, page 572.

TRIPLE FATALITY USING OXYGEN BREATHING APPARATUS IN ABANDONED MINE.

Our British Columbia correspondent states that the Minister of Mines has instructed the Chief Inspector of Mines for British Columbia to follow any investigation that may be instituted into the death of three men using oxygen breathing apparatus who undertook to explore an abandoned mine filled with black damp situated in Washington State. The despatch from

Seattle reporting this occurrence stated that an inquest had not been considered necessary. In default of exact information regarding this disaster—for it is not less than that—it is not possible to comment, any more than to express the opinion that the occurrence should be investigated in every detail. The statement made that the cause of death was the lack of an adequate supply of oxygen in the apparatus is not in any sense an explanation. The mine is more likely to have contained carbon monoxide than the mixture of inert gases usually called "blackdamp." For the sake of the good repute of the oxygen breathing apparatus it is to be hoped that the United States Bureau of Mines will enquire into this most unfortunate accident, and give the widest publicity to its report thereon. Mr. Sloan has rightly apprehended the importance to coal miners of correct information on this unprecedented triple fatality connected with the use of oxygen breathing apparatus, and no man using these devices will be satisfied until he knows just how and why the fatal results were caused.

RELATIVE SAFETY OF GAUZES FOR MINERS' LAMPS.

Investigations by engineers of the United States Bureau of Mines, quoted in this issue, have shown that the greater the protection from air-currents given to the flame of the oil safety-lamp the greater the relative safety against ignition of inflammable mixtures of mine air. The double-gauze is to be preferred to the single gauze, and the bonneted lamp to the unbonneted. To Canadian readers an interesting suggestion is that the properties of monel-metal or nickel in lamp gauzes should be investigated. Steel wire was proved by the investigators to be preferable to brass or copper, but it has the objection of susceptibility to oxidation. Monel-metal or nickel having a higher melting point than steel, and not being subject to rusting even under severe conditions, would seem suitable materials, and would have unusual wearing qaulities.

RADIUM.

In view of the possibility that radium-bearing ores may be found in the pre-Cambrian rocks of Canada in sufficient percentage to allow of commercial concentration, the article published in this issue and extracted from "Chemical Age," on "The Business of Radium" shows how very specialized is the new industry of obtaining radium in a concentrated form. If radium ores containing the necessary quantity of radium element are found in Canada presumably the concentrate would be sold to parties in the United States possessing the necessary equipment to produce radium of high purity.

HARNESSING AUSTRALIA'S GREATEST RIVER

The "Industrial Australian and Mining Standard" of June 17th, contains an illustrated supplement which gives an account of a little known undertaking, namely the control and efficient distribution of the waters of the Murray River, the result of which will be a vast addition to the area of land capable of irrigation; security and regularity of water supply, establishment of new settlements; increased production, and the securing of a permanent navigable channel along the River Murray Valley of over one thousand miles in length.

The work, which when completed will cost £7,000,000, and will, it is believed make available for agricultural purposes a territory capable of supporting 5,000,000 people, is under the direction of a Commission composed representatives of the Commonwealth Government, and the three States interested, namely New South Wales, Victoria and South Australia.

The steel, concrete aggregate materials, and stone used in the construction of the impounding reservoirs, irrigation conduits, weirs and dams, together with the modern machinery for excavating and handling materials which are in use have provided an outlet for the growing steel industry of Australia, and for the utilization of local sources of concrete materials and granite, which are plentifully distributed.

To those who think of Australia as a land of heat and periodical droughts, there is pleasant surprise in reading of the snow-covered mountains that supply the waters of the great Murray River, and to read, in the advertisement of the Victoria Government Tourist Bureau, of the attractions of skating, tobogganning, and ski-ing in the Australian Alps, and of the mountain scenery and trout streams of the Grampians.

The endeavor of a sister Dominion to obtain the most efficient use of its natural resources arouses sympathetic interest in Canada, where our water-powers, so different in their physical and climatic characteristics to those of Australia, have always been a source of great solicitude and have seen much development; and are destined to be still more efficiently utilized.

COAL SHORTAGE AN OUTCOME OF DEFICIENT TRANSPORTATION.

Now that the real reason for the inadequate supply of United States bituminous coal coming into Central Canada is admitted by everybody to be deficient transportation, it may not be amiss if we recall that this fact was brought out and emphasised in the symposium of papers on the fuel problem read before the Canadian Mining Institute at the Annual Meeting in Toronto almost five months ago.

Mr. M. A. McInnis of Montreal in his paper on "Coal Transportation" pointed out that, under ordinary conditions of traffic movement, the province of Quebec was not badly situated in regard to coal sup-

ply, having, because of its superior transportation facilities, which apply both to the U.S. rail connections and the water-route for Nova Scotia coal, only seasonal difficulties to contend with in coal transportation.

"Our greatest difficulty in importing coal," stated Mr. McInnes, "occurs at what is known as the "Niagara Gateway. Canadian roads at this point are "unable to accept freight at the speed and in the "quantity offered by American roads. Ontario points "must take more coal by water, and adequate unload-"ing and storage facilities must be developed to allow "this to be done." "Transportation," emphasized Mr. McInnis, "is the weak link in the chain." Other papers in this symposium, which dealt with coal production in Alberta, Saskatchewan and Nova Scotia, made the same point. Unfortunately, no discussion took place on the group of papers, and the publicity which it was hoped to give to the fuel supply question was not obtained. Th desirability of full discussion and adequate publicity of the Institute's proceedings is now apparent, particularly when these touch upon matters of public policy.

While civil peace exists in North America there is not, nor can there be, any actual physical shortage of coal. The capacity of the bituminous coal mines of the United States and Canada has never been tested. Few who know the facts will dissent from the statement that if the collieries in the United States and in Canada worked to their full output capacity they could produce bituminous coal at the rate of one thousand million tons annually.

The Canadian Manufacturers' Association, some two years ago, appointed a standing Fuel Committee, primarily with the idea of fostering the production of coal in Canada, and educating the public to the necessity of lessening, as far as that may be found possible, Canada's dependence on the United States for bituminous coal supply. In this respect the C.M.A. has shown the way to the Canadian Institute of Mining & Metallurgy, a body not less interested in securing a less hazardous supply of a commodity without which neither mining nor metallurgy could be carried on. Is not the Institute a fit and proper body to advise the Government as to the best means to bring about stability in our coal supply? The suggestion is made that the Government of Canada would probably welcome counsel and aid from the Council of the Institute—as did the Government of the United States welcome assistance from a sister society under like circumstances—in regard to a problem that will bother our children as much, if not more, than it bothers this generation.

We believe the fuel problem presents to the Institute not only an obvious opportunity for usefulness, but a pressing patriotic duty. Following up a previous suggestion, if it should be that the Government at Ottawa sees the necessity to establish a permanent body to work out a solution to the problem that is actually our chief national handicap, the co-operation of the committee of the Manufacturers' Association with a committee of the strength and ability that the Institute could produce should provide that multiplication of counsel in which wisdom is reputed to reside.

GRAPHITE IN CANADA.

Report No. 18, Graphite, its Properties, etc., by Fritz Cirkel, has long been out of print and there has been much enquiry for an authoritative publication on graphite occurrences in Canada which is now met by the publication by the Mines Branch of a monograph by Hugh S. Spence that deals with the history, occurrence, mining, concentration and uses of graphite, all with particular reference to Canadian resources.*

The production of graphite in Canada in 1919 was, with the exception of 1911, the smallest recorded since 1909. Inasmuch as graphite was one of the "war minerals" this was to be expected, but considering the demand for the mineral, which to quote the export, "is employed in so many branches of industry that the supply can hardly meet the demand," if concentration methods can be devised to take full advantage of the comparatively high graphite content of Canadian ores, the industry should prove permanent. The Report states the opinion of prominent New York graphite importers, that Canadian crucible flake graphite in order to compete with the American graphite market when normal conditions are restored, will have to be produced at a price of about five cents per pound.

*Graphite, by Hugh S. Spence, Mines Branch Report No. 511, 1920.

LIMITATIONS OF GOVERNMENT ASSISTANCE TO A MINING ENTERPRISE.

Tin-mining in Cornwall reaches back to the beginnings of British history, but recently the industry has fallen on evil days. By a process that is becoming natural and well-recognised in mining circles the suggestion has taken form that rehabilitation of the industry could be effected by consolidation of operation of the mines, which would enable modern machinery to be installed and economy in crushing and concentrating of the ores. The Board of Trade was asked whether, in the event of such a consolidation being undertaken, which would involve the raising of new capital, the British Government were prepared to assist by a loan.

The reply of the board of Trade is interesting as stating in clear terms the extent to which a government is justified in granting monetary assistance to

a mining industry, and is, in essential part, as follows:

> "Though more economy in working costs might be secured by a scheme of amalgamation, it appears to be clearly established that the only possibility of the maintenance of some of the Cornish mines on a remunerative basis lies in the discovery of new lodes as the result of development work; but it has been definitely stated by those concerned that it is not possible for them to raise any of the capital necessary for such development. His Majesty's Government fully appreciate the difficulties in which the industry is placed and the unfortunate consequences which may follow the closing down of the mines, but, after carefully reviewing all the circumstances, in view of the present position of the national finance, the unwillingness of private enterprise to invest further capital in the undertakings in question and the uncertainty as to whether any development work is likely to place the industry on a permanently sound basis, His Majesty's Government regret that they do not see their way to ask this House to vote financial assistance in this case."

It does not necessarily follow, however, that the refusal of government aid will mean the closing of those tin mines that possess intrinsic value.

BOOK REVIEW.

MINES AND THE SPECULATIVE INVESTOR. J. A. Gallard. Publisher, Walter R. Skinner, 11-12 Clements Lane, London (Eng.). Price 7s 6d, 63 pp. Linen Boards.

This little book is the collection of a series of articles which originally appeared in the "Financial Times" of London from the pen of Mr. Gallard, the Mining Editor of that paper for seventeen years, and is intended as a guide to the mining share markets for the non-technical investors.

Mr. Gallard notes that recent years have seen a considerable addition to the ranks of those who participate in Stock Exchange operations with the object of increasing their capital. The reason for this development on a scale in excess of ordinary appears to lie in the increase in the taxation of incomes Whereas in years gone by many people were content to invest their capital to yield them an income from dividends, the tendency of late has been to purchase shares in the hope of capital appreciation rather than for dividends since the former is not taxable.

The book has been prepared with the laudable object of elucidating the salient features of mining operations and methods of mining finance for the benefit of those "who being neither mining engineers nor mining financiers, have, so to write, only a casual acquaintance with mines and mining companies."

"Almost invariably" states the author, "mining share operators—at any rate among the public—are optimists, and many of them seem to have accentuated imaginative faculties; otherwise it would be difficult to account for the values placed on some shares from time to time. 'While there's life there's hope' is evidently a favorite motto of the speculative investor in mines." Mr. Gallard is to be congratulated on his restraint.

The scope of the book is indicated by the chapter heads, which include such subjects as "Prospects and Mines," "Factors in Valuing Mines," "Ore Reserves," "The Life of a Mine," etc.

The chapter on "Engineers' Reports" includes a quotation from Mr. Walter McDermott regarding "old friends we meet in numberless reports, which seem to need a little protection against excessive wear and tear," to wit.

a. A true fissure vein
b. Increasing width in depth
c. Increasing richness as depth is attained
d. Junction of veins
e. Ore in sight
f. Proximity to a rich mine
g. Failure from mismanagement

Mr. McDermott's penetrating comment on the correct and incorrect use of these familiar phrases is good reading.

Mr. Gallard pleads for more publicity of the affairs of mining companies, and with regard to periodical reports and statistics, correctly assumes that "if statistics are not provided the shareholders will know the administration is not anxious to be closely examined."

The author has had twenty years' experience of the journalistic side of mining and connection with the Stock Exchange, and his conclusions appear to be that the chief hindrance to mining investment and reputable mine promotion is lack of accurate publicity, a great part of which he attributes to the apathy of shareholders.

The opinions expressed with regard to the profitableness of re-opening old mines, the usefulness of finance and exploration companies, and the good results of amalgamation and reconstructions, are not enthusiastically favorable.

BRITISH FUEL ENGINEER FAVORABLY IMPRESSED BY ALFRED PEAT BOG.

Profesor Pierce F. Purcell of Dublin University, says that the Alfred peat bog near Ottawa gives the greatest promise of commercial success of any plant he has ever seen. The enterprise is at present in the experimental stage. Up to the end of 1919 the scheme had cost about $110,000, the expenses being equally borne by the Dominion and Provincial Governments. Last year twenty thousand tons of peat were turned out, finding a ready sale in Montreal and Ottawa. The price in the latter city is $6 per ton.

PERSONAL.

Mr. H. Mortimer Lamb, the Secretary-Emeritus of the Institute, is fruit-farming at Burnaby Lake, near Vancouver City, and is much benefited in health by outdoor occupation. Mr. Lamb has recently been appointed Secretary of the British Columbia Division of the Institute, taking the place of Mr. Charles Camsell, the Deputy Minister of Mines, now resident in Ottawa. Mr. Lamb is still, as always, interested in advancing the welfare of the Institute and increasing its activities.

Relative Safety of Gauzes for Miners Lamps

Requirements of the United States Bureau of Mines Covering Flame Safety Lamp Gauzes — Description of Test of Steel, Brass and Copper Fabrics — Steel is Superior for High Temperatures — Comparative Efficiency of Various Lamps.

Flame safety lamps have been used for about one hundred years in coal mines where a dangerous accumulation of explosive mine gas (methane) might occur, and thus render the use of ordinary unprotected flame lamps dangerous. Flame safety lamps are not only used for illumination, but also for detecting the presence of dangerous percentages of methane mixed in the air of the mine.

The safety of the lamp depends chiefly upon the cooling qualities of the wire gauze used to permit free circulation of the air through the lamp. If one enters a part of the mine where methane is present in the air, the methane enters the lamp and, coming in contact with the wick flame, is ignited, and continues to burn within the gauze without igniting the methane surrounding the lamp. If the air within the mine is travelling at a velocity of several hundred feet per minute the burning gases may be driven through the gauze by the air current. If the gauzes are properly designed and of the proper material these burning gases will be so cooled as they pass through the gauze that they will not cause an ignition of the gas surrounding the lamp. In order to test the effectiveness of a given safety lamp, tests are made in moving explosive mixtures of gas and air arranged to simulate mine conditions.

The Bureau of Mines investigated many features relative to the safety of flame lamps, and in 1915 established an official schedule known as "Schedule 7," whereby flame lamps having certain prescribed qualifications would be approved as permissible for use in gaseous mines.

Among the schedule regulations are the following requirements covering flame safety lamp gauzes:

"The lamps must be provided with double gauzes or with some other adequate arrangement serving the same purpose. Every gauze must be of steel or best charcoal annealed iron wire of not larger than 27 Brown and Sharpe gauge (0.014 inch in diameter), with 28 meshes to the lineal inch (784 to the square inch), nor less than 29 Brown and Sharpe gauge (0.0125 inch in diameter), with 29 meshes to the lineal inch (841 to the square inch)."

Frequently the use of brass or copper as a flame lamp gauze fabric was advocated, and one company thinking that the kind of material had no bearing on safety, without notifying the Bureau, substituted brass for steel in lamps stamped with the Bureau's approval.

The gauze specifications outlined above, relative to material and construction, were, in the main, based upon European experience and practice and upon reports of European investigations.

The purpose of the investigation herein reported was to conduct a limited number of check tests in order to determine to what extent European result should apply to American types of flame lamps and, consequently, whether or not the present gauze specifications of Schedule 7, needed revision.

The selection of gauzes for the tests included steel, brass and copper. Steel is used quite widely in the American type of flame safety lamps, used in general service, brass has been used to some extent for lamps designed for the use of officials and inspectors, and copper has been used by surveyors because of its non-magnetic properties.

The tests chiefly involved the subjecting of the lamp, equipped with one of the several gauze materials under investigation, to currents of explosive gas and air moving in a horizontal direction, the lamp being suspended in the path of the air mixture. The lowest probable velocity at which an explosion would result was ascertained for each gauze material. This data was secured with respect to the several types of lamps and with respect to different percentages of gas in the air mixture. Tests were likewise made using the same gauze in successive trials to determine the effect of oxidation as affecting the safety of a given gauze material. Physical measurements were made to check the dimensions of the gauze material used, and measurements were made of some of the gauzes before and after tests to determine the charge in physical condition due to oxidation. The tabulated results of the tests can be obtained on application to the U.S. Bureau of Mines.

The behaviour of the different gauze fabrics has, in a general way, checked the results obtained by foreign investigators. When the differences in the materials tested, together with possible differences in the test conditions are considered it is remarkable that these results, in so many cases, follow so closely the conclusions of European investigators.

For conditions of high temperature, steel proved superior to either brass or copper. For low temperatures, the advantage of steel over brass or copper is small. Brass or copper might be preferred by some, although one who knows the insecurity of such gauzes at high temperature might be unwilling to trust them even though the probability of high temperatures was remote.

Brass proved more satisfactory than copper. However, it should be remembered that the brass gauzes tested were of a good quality material, having a high proportion of copper and, therefore, may have given much better results than would have been obtained with some other brass.

In concluding the tests on the gauze fabrics under various possible conditions of service, there were certain points brought out very forcibly with respect to the comparative safety of different types of lamps. The least safe of all the lamps tested is the single gauze unbonneted lamp of the Davy type. In fact when compared with a bonneted lamp of modern design it should not be classified as a safety lamp. The condemnation of the Davy lamp as a safety device for present day conditions does not belittle the great work done by Davy. On the other hand almost every modern lamp uses for its protection principles advocated by Davy.

*By L. C. Islsey (Electrical Engineer, Bureau of Mines), and A. B. Hooker (Junior Electrical Engineer, Bureeau of Mines).

The double gauze unbonneted lamp is somewhat safer than a single gauze lamp, but not dependable in high velocity air mixtures.

The single gauze bonneted lamp proved safer than either type of unbonneted lamp, the omission of a gauze being more than offset by the bonnet.

The safest lamp tested was the double gauze bonneted lamp. In such lamps there is the protective features if the single gauze bonneted lamp, with an additional safety or another gauze in case either gauze of a pair should become damaged in any way. (Although in this investigation the Hailwood combustion-tube type of lamp was not tested, previous tests by the Bureau have shown it to be equally safe as compared with a double gauze bonneted lamp of the Koehler type).

One object of the investigation was to determine whether the gauze specifications of Schedule 7 needed revision. The results indicated that present specifications, while perhaps not sufficiently detailed, were laid on a sound foundation and a lamp meeting these requirements would have a high standard of safety. It may later be deemed best to permit the use of brass gauze in bonneted lamps, but until the subject is investigated further that schedule lamps only should be admitted as permissible for use in gaseous mines could well be added as a step toward greater safety.

The possibility of using monel-metal or nickel for flame gauze has been suggested, since these materials have a higher melting point than steel, have about the same heat conductivity and resist oxidation at atmospheric and high temperatures. Whenever time permits these materials should be investigated.

SOME SOURCES OF HELIUM IN THE BRITISH EMPIRE

Early in 1915, Dr. J. C. McLennan, head of the Department of Physics in Toronto University, was requested by the Board of Invention and Research, London, to investigate the helium content of the various natural gas supplies within the Empire, it having been suggested that if a sufficient supply of helium gas could be obtained it would prove more suitable than hydrogen for use in lighter-than-air flying machines, owing to its inert character. The British Admiralty has authorized Dr. McLennan to make public his investigations, and the manuscript being offered by him to the Mines Branch for publication, on the recommendation of Dr. A. W. G. Wilson, the engineer in charge of investigation of chemical industries it has been published as Bulletin No. 31 (publication number 522). The Bulletin has several sections, the larger one dealing with the helium content of the natural gases of Canada. Section 2 is devoted to determinations of the radio-activity of the natural gases of Canada, and other sections deal with helium contents of natural gases from New Zealand, from various localities in England and with a gas from Pisa, Italy.

Dr. McLennan's investigations, which involved some new departures in physics, and the designing of new apparatus, have demonstrated that the natural gas from the Bow Island district of Alberta contained the highest percentage of helium observed in any of the natural gas samples tested, and these included every known source in Canada, and in addition the outside localities previously mentioned.

The possible uses of helium are only just commencing to be discovered, but in addition to its use in aeronautics, it is suggested for use in gas-filled incandescent lamps and gas arc-lamps.

Dr. McLennan in his preface states:—"The solu-"tion of the problem of producing helium in large "quantities was, before the beginning of the war, one "which would have been considered by many vision-"ary and chimerical, but through the enthusiastic "support and financial aid received from the British "Admiralty, and from the Bureau of Mines and Naval "and Air Boards, Washington, the possibility of pro-"duction on a large scale has been realized."

Incidentally, the Report is an excellent survey of the gas wells of Canada, and is fully illustrated by maps showing the petroleum and gas wells, and pipe lines established in producing districts.

Dr. McLennan's Report records a distinct scientific achievement, with very practical results in application. The prominent part taken in the investigation by Canadian workers is a matter for legitimate pride, and from this standpoint, as well as because the investigation has established the existence and availability of an entirely new natural resource in Canada, the Mines Branch has done well to give the Report to the public.

EXPLORING FOR RADIUM ORE IN BUTT TOWNSHIP

Last summer the announcement that pitchblende, an important ore of radium, had been discovered in Butt township, Ontario, caused a number of prospectors to visit the area. Several claims were staked, but comparatively little work was done on these claims because the most promising discoveries were still undeveloped. A number of the claim owners did some exploring work, but most of them have been unable to raise funds to thoroughly test the properties.

There being so little information available to prospectors for radium, it is not surprising that they are anxiously waiting for the results obtained when the known deposits are opened up. It is stated that some of the claims are now being thoroughly explored. If good results are obtained in developing one deposit, there should soon follow vigorous prospecting throughout the area.

The formations in which the pitchblende occurs in Butt township are not of a type that the Northern Ontario prospector regards highly. The rocks are granite and diorite gneisses. The pitchblende occurs in dykes of coarse pegmatite that cut the gneiss. Prospectors for precious metals in Ontario have had little cause to value highly such pegmatite dykes. In Eastern Ontario some such dykes yield feldspar or mica in commercial quantities, but the Northern Ontario prospectors cannot be expected to do much work on such dykes until one of them is proven to contain appreciable quantities of precious minerals. It is to be hoped that the results of development of the Butt pitchblende deposits will be satisfactory for it is very likely that there are many such deposits in Ontario.—R.E.H.

The Kingston Smelting and Refining Company, Limited, has been granted incorporation by the Ontario Government with power to lease or purchase mines and to engage in a general mining and smelting business. Among the incorporators are Alexander MacKinnon of Kingston and E. D. Chaplin, J. M. Israel, J. P. Aguayo and V. S. Gavito of New York. The authorized capital is $200,000.

The Business of Radium

By HAMILTON FOLEY,
Standard Chemical Co., Pittsburgh, Pa.
(*From "Chemical Age.*)

The United States is the foremost radium producing country in the world. This ascendency has been gained notwithstanding that five hundred tons of American ore is required to produce the one gram of radium that has been obtained from five or six tons of European ore. A gram is about a thimbleful.

The recovery is made with regularity and precision. In the different steps in the process and in even the most general statement of the difficulties that have to be overcome, there is a new chapter of American contribution to chemical progress. There is also much to show why the market price of radium is $120,000 a gram.

The radium ore fields of the United States are in the southwestern part of Colorado and south-eastern Utah. They cover a territory of about eight hundred square miles. This district is about sixty-five miles from any railroad and so mountainous that in many places there is a rise or fall in the local trails of two thousand feet in a mile.

Prior to the World War carnotite ores from these Colorado deposits were shipped abroad for French and German production of radium on a small scale. The embargoes on shipping stopped this export completely, although it had been falling off in quantity.

The recovery of radium in this country, as a commercial proposition, began in 1911, when the Standard Chemical Company, of Pittsburgh, was organized by Joseph M. Flannery, for the express purpose of mining carnotite ores and producing radium. Up to the present time it has produced almost one-half of the estimated supply of radium in existence.

Transport of Radium Ore.

The infinitesimal radium content of the ore, making necessary the handling of enormous volume and weight of ore, the remoteness of the deposits from civilization and the long freight haul from Colorado to Pittsburgh, enforced efficiency methods to a high degree. Pack animals transport the hand-sorted ore in 100 lb. bags from the various chains to the concentrator. Here high grade ore is separated from ore of quality uneconomical to remove as such from the ore district. Milling reduces 500 tons of the hand-sorted ore to 125 tons in a pulverized condition, containing about 4 per cent of uranium oxide. The concentrate in 100-lb bags is transported by wagon, train or motor truck 65 miles to a railroad at Placerville, Colo.; thence 2,500 miles to Canonsburg, Pa., near Pittsburgh, where the Standard Chemical Co. operates a reduction plant for the recovery of the radium, uranium and vanadium.

The vanadium finds a ready sale as an alloy for high speed tool steel and the experimental work being done with it as an alloy for use in other classes of steel suggests that it may be more generally adopted.

Reduction.

The chemical treatment of carnotite concentrates at Canonsburg, involves greater difficulties than the collection and first concentration of the ore. In part these difficulties inhere in the treatment of an exceedingly finely divided material; in greater part, they involve working out efficient processes for the recovery of a material present in so small a proportion as one part in a hundred million, this being, approximately, the concentration of the radium in these concentrates. As they are further reduced chemically these concentrates yield what is called "raw sulphate." This consists, essentially, of silica together with sulphate of radium, barium, calcium, iron and aluminum. After freeing this mass from impurities and transforming to a soluble salt, there is obtained a soluble radium chloride.

Plant Control.

The reduction plant keeps trace of the minute modicum of radium in the ore in process of reduction by the application of the most refined scientific measurements known. These measurements make it possible to know just where and in what quantity the radium is at all stages of the work. Remembering that when it reaches the reduction plant there is only one portion of radium for very hundred million portions of ore and that if this small quantity is not watched for very closely it may be lost and with it all the expense that has attended the shipment of five car loads of ore all the way across the continent, the details by which it is followed may not be without interest. Every day the reduction plant sends to the laboratory at Pittsburgh, samples of each batch of ore it is proposed to handle for the first time that day, samples of each batch of ore in each stage of the reduction process and samples of each batch of residue it is proposed to discard. Chemists reduce these to solution. If there be any radium in any or all of these solutions it will generate the gas known as radium emanation. Inasmuch as this emanation emits the rays emitted from radium and as these rays carry electrical energy, each sample in turn is placed in an electroscope so the electrical energy it may liberate may be ascertained.

The electrical energy from equal quantities of radium is always the same by comparison, therefore, of the electrical energy obtained from any one of these samples with that obtained from a known quantity of radium, it is a matter of accurate calculation to know the quantity of radium in the batch of ore represented by the sample.

While scientifically trained minds know that the emanation from a gram of radium is not larger in volume than the head of a pin, it may surprise some readers to know that the measurements described detects with extreme accuracy quantities of radium as small as a billionth of a gram, or one five hundred millionth of a pound avoirdupois; and that such extremely minute measurements are made not once, but sometimes twenty and even thirty times a day in the laboratory of the Standard Chemical Company.

Radium Products.

In the form of radium barium chloride the one-half ton of concentrates that is left after the Canonsburg reduction plant has eliminated the rest of each mass of five hundred tons of ore, is brought to the laboratory at Pittsburgh. Here by successive fractional crystallizations of the radium chloride, and at a later stage, of the bromide, most of the radium is obtained in a salt containing over 90 per cent of pure radium

bromide. A second or smaller amount of radium in the form of a salt of five to ten per cent purity is also obtained. By further chemical treatment the bromide is converted into the sulphate or the chloride and in the therapeutic use of radium these two salts find the largest use. The lower grade material, because of greater ease in handling and weighing out small portions with a definite radium content, finds use in the commercial world in the manufacture of the radium luminous compound more popularly known as luminous paint.

Volume of Production.

The first radium obtained in the United States was obtained in 1913 in the laboratory of the Standard Chemical Company. Since then the production of this company has been as follows:

	Grams (Radium Element)
1913	2.1
1914	9.6
1915	1.7
1916	5.0
1917	7.0
1918	13.6
1919	11.8
Total	50.8

Writing of the production of radium by this company, a scientific writer has recorded the opinion that:

"In the midst of industries whose output is measured in thousands or millions of tons, an industry whose total output in nearly five years is about one ounce, is likely to seem small, yet this production of radium by the Standard Chemical Company of Pittsburgh is the most notable in the world. This is more than a third of the estimated stock of the world's high purity radium, and to the efforts of this one company belongs the credit of starting and so establishing the manufacture of radium from low grade ore so that the medical and scientific professions may count upon an ever increasing supply."

In the ore fields the Standard Chemical Company maintains a force of several hundred men. Nearly as many are required at the plant at Canonsburg. In the laboratory at Pittsburgh there is another large staff. The activity of all of these men is necessary to make it possible for the radium in any quantity of ore to be obtained about three months from the time the ore was first mined.

Radium Standards.

Radium preparations in the United States are spoken of and measured in terms of radium element. Until recently European scientific men have adhered to the term radium bromide. Crystalline radium bromide when pure contains only 53.6 per cent of radium element. This fact and the method of measurement of radium preparations in Europe prior to the adoption of an international radium standard, had not a little to do with the earlier unsatisfactory work with radium. There was no common standard. The original method of measuring radium, consisted in comparing its activity with that of uranium. During the fourteen years this system of measurement prevailed scientific men spoke of radium as "two million times more active than uranium." Trained minds, of course, understood that what was meant was that the quantity of electrical energy emitted in the rays of the radium, small though it was, was two million times greater than that contained in the rays from uranium. Such a ratio of comparison was entirely unsuitable for use especially with small quantities, and about 1912, by common consent, Madame Curie was asked to prepare what would be an international radium standard. This is deposited at Paris. Duplicates are in the leading capitals of the world, and radium preparations are now measured by comparing the electrical energy carried by the gamma rays from the preparation to be measured with the energy carried by the gamma rays of the international standard, or one of the certified duplicates of it. In 1914, the United States Bureau of Standards at Washington obtained a certified duplicate of the international radium standard and practically all quantities of radium in this country have been measured by comparison with it.

Uses of Radium.

In the industrial world interest in radium has always been limited by the small amount available. This was especially true of the ten years following its discovery. During that period some attempt was made to use the action of radium in causing a spontaneous and continuing luminescence in substances such as zinc sulphide, to make what is called luminous paint. In the United States attempts were also made to manufacture a similar product, but prior to 1913 this effort was practically negligible.

Radium and radium minerals are not generally luminescent. Tubes containing radium glow from impurities present which the radiations from the radium cause to give light. The World War created a most unexpected demand for radium. The necessity of illumination that would not betray presence to the enemy in the various branches of the fighting service made radium luminous material the most satisfactory and dependable light. The demand for the luminous watch dial alone raised one use for this material to a fair-sized industry.

Radium Therapy.

Therapeutically, there has been a gradual and steady increase in the use of radium since 1912. With this increased demand the production of radium has kept pace. The earlier over-enthusiastic statements of the value of radium in the treatment of cancer have not been wholly confirmed and radium is far from being the panacea in the treatment of diseases. Nevertheless the use of radium in certain types of advanced inoperable cancer gives palliation by the relief of pain and freeing from foul smelling discharges. This degree of palliation can be attained by no other treatment and, if used for this purpose alone, radium would be considered invaluable. In other types of cancerous growths radium has produced cures and surgeons throughout the world are gradually admitting that radium is a necessary adjunct in the treatment of cancer, giving in some cases more satisfactory results than any other treatment.

TAR SANDS RESERVED ALONG ATHABASCA RIVER.

An Order-in-Council reserves the lands along the Athabasca containing the tar sand from sale, settlement or other disposal, the Order being based upon a recommendation made by Mr. Meighen when he was Minister of the Interior.

The Government's action is taken to indicate that some means of utilising the tar sands has been worked out, or that a solution of the problem of concentration is in prospect.

REVIVED INTEREST IN COAL MINING IN INVERNESS CO., CAPE BRETON

A revival of interest in coal mining in Inverness County is being brought about by the heavy demand for coal and the high selling prices obtainable at this time.

Inverness County has for a good many years been slipping backwards in coal production, and it is a part of the Nova Scotia coalfields that more than any other has suffered from imaginative promoters, unwarranted capital investments and unskilful management. Much more money has been sunk in coal mining in Inverness County than has ever been recouped.

About ten years ago there were three companies working in the county, namely, the Inverness Coal & Railway Co., the Port Hood & Richmond Coal Co. and the Mabou Company. The Mabou Colliery was flooded in 1909 because an opening was made in the seam at a point where only 110 feet of strata intervened between the roof of the seam and the bottom of the sea. The strata was moreover not of a character to warrant the opening, even with a much thicker cover. The flooding of the Mabou mine was distinctly the result of poor judgment.

The Port Hood Colliery was flooded in 1911, the water entering at a point where pillars were being drawn in the lowest level, the solid cover intervening between the roof and the sea bottom being 942 feet. The inrush in its initial stages is estimated to have amounted to 3,000 gallons of water per minute. The water is salt, and there is a small daily rise and fall of the water in the time corresponding to a delayed reflex of the tidal action along the shore line. The connection with the sea is admitted, but the nature of the connection has always been a matter of debate and remains undetermined.

For some time, Messrs. Malcolm Beaton and associates have been mining coal from the Port Hood seam in a rise area above sea-level, and it is now reported that an attempt will be made to pump out the flooded mine. There is reason to believe that with pumps of large capacity the mine may be unwatered, or, in other words, the presumption of success is sufficient to warrant the attempt, if the financial arrangements can be made. The writer has never been able to credit the possibility of a vertical break 942 feet in depth communicating directly with the sea, or that such a break could occur from the extraction of a seven-foot seam of coal. The delayed reflex action of the tides on the water in the mine indicates that the point of initial entrance of the sea-water lies between high and low-water mark, and would also appear to indicate that the channel of entrance was a restricted one. The level above the one that was first flooded was very extensively robbed of its pillars, so much so as to raise the presumption of a "crush" and a shattered condition of the roof above. The stratification of the coal seam and the accompanying shale is inclined seawards, and the bedding planes of the strata lying immediately above the coal seam crop successively between high and low water mark along the shore. It is reasonable to presume a percolation of water along all the outcropping bedding planes, and the accumulation of a considerable body of water in the crushed area. When the pillar was drawn at a point which was approximately the lowest in the mine, this body of water continued downwards along the lines of stratification and under much pressure due to its head, broke through the weakened roof rapidly inundating the mine, which was not provided with any water lodgment and had small pumps with a capacity of only 110 gallons per minute. It was not proved that the inundation was uncontrollable, and, writing solely from a technical standpoint without regard to financial questions, it has not been proved that the mine cannot be unwatered.

From a financial point of view, it is doubtful whether any large expenditure on pumping is warranted, and probably a new submarine winning in solid coal, leaving a barrier against the flooded workings, may some day be undertaken.

The Inverness Colliery has for some time been operated under conditions of much physical difficulty, and, in view of the financial condition of the company, which was for years in the hands of the bondholders, much credit must be given to the ex-General Manager, Mr. John Macgillivary, for keeping the property in operation through some very trying years. With new management, relieved of some of the heavy interest charges that were formerly carried, the property may do well so long as selling prices and demand remain good.

There are important undeveloped inland coal seams in Inverness County, and it is understood there is a posibility of a consolidation of these with properties already operating.

The same reasons that forced a consolidation of the independent companies in the Sydney coalfield exist in favor of a complete consolidation of the Inverness County companies, where, because of physical conditions, the costs of coal prodnction must always be relatively higher than they are in the Sydney field. The chief market of the Inverness coals is the domestic trade of the Maritime Provinces, in particular of Prince Edward Island, a purpose for which the coal is better suited than for metallurgical uses.—F.W.G.

COAL MINERS' WAGES IN NOVA SCOTIA.

The Royal Commission appointed to investigate wages and working conditions in the coal mines of Nova Scotia is taking evidence.

The demands of the miners were presentd to the Commission at its opening session in Glace Bay on July 21st. Their far-reaching character may be gathered from the following summarised list.

Closed Shop Conditions Asked.—Under the term "self-determination" the men ask for a drastic form of the "closed shop," the clause reading: "That each local union shall have complete jurisdiction in union matters over the mine or plant where its members are employed, and may determine by the vote of its members at any of its regular meetings whether any new employee shall become a member of the union." A recent strike was called to force non-union men to join, so that refusal of the union to allow a new employee to join is equivalent to selection of workmen. The union asks that this right of "self-determination" shall not be abridged by any official of the employing company.

Working Conditions.—Better distribution of miners' tools, better air-pressure, abolition of "pushing," or manual movement of mine cars are asked. Four rooms to each machine cutter, and not more than two miners in each working place are demanded. The employer is asked to bear all onus of machinery breakdowns and accidents preventing work. Any man reporting for work, and not receiving work that day is to be compensated. If pit stops before 11 a.m. all day-paid

men are to be paid a half shift, and if pit runs till 12.30 before stopping, day-paid men to receive a full shift. Penalizing extra rates are asked for all night-work, and extra tonnage rates are asked for double-shifted places. Riding rakes are asked to be placed in operation in all collieries after twelve o'clock each day, so that men who finish early, that is after five hours' work, can go out of the mine. A maximum of 25 feet for shovelling down coal in a working place is asked. Time and a half for overtime and double time for Sundays and holidays is asked. $6.00 per day is asked for new work, pending the agreement upon a tonnage rate, and men doing company work in default of ability to obtain a helper are to be paid $5.50 per day.

Increased Wages.—One dollar flat increase for all day-paid men, and 24 cents per ton increase on existing tonnage rates is asked. Yardage rates, dead-work and timbering rates to be increased 25 per cent. Where through a shortage of men, two men do the work of three, it is asked that time and a half be paid.

This is probably the most drastic demand ever presented to the coal operators in Nova Scotia. The wage increases asked are not so important as the alterations asked in working conditions, particularly those clauses of the demands intended to prevent double-shifting of the mine and night work, and the other clauses limiting the number of men in a working place, and asking for four rooms for each machine cutter. These demands, in actual practice, involve an enlargement of the number of working places, or expansion of the mine workings; accompanied by a restriction upon production limiting the productive use of the mine workings and equipment to the working time of the individual miner, which, as is plainly contemplated by the demand for riding rakes after twelve o'clock, may not be more than five hours in each twenty-four hours.

In no other coalfield in the world do the conditions under which the mines are operated call for so large a number of working places, for so few producing miners, for so few hours in the working week. In the submarine districts, it is already impossible to keep the development work sufficiently in advance of the producing faces, and the extension of working territory has become a pressing problem, inasmuch as it involves greater expenditure in haulage, ventilation, upkeep, examination, transport of men and materials, and every item in underground costs. The submarine districts can only be profitably worked under a system that will concentrate the working area, reduce the haulage, pumping, ventilation timbering and upkeep to a minimum, and enable the mine equipment to be utilized for at least sixteen hours out of each twenty-four, not 30 hours a week, as is only too often the case today. If the Nova Scotia collieries are to compete against districts which more completely utilise the capital investment sunk in the colliery plant and development, it will be necessary to introduce similar methods in Nova Scotia; and, if the policy of the United Mine Workers should debar the local operators from adopting ordinary commonsense systems of mine operation, then the collieries cannot compete against districts which, in addition to more intensive production methods, have far more favorable natural conditions.

The increase in wages is the least of the burdens that complete acceptance of the miners' demands regarding working conditions would entail upon coal production and its cost.

SOME NECESSARY CHARACTERISTICS OF THE EFFICIENT MINE OFFICIAL.

By J. R. McNeill, Sydney Mines.

A great deal has been said relative to the efficiency of a mine official and still a great deal can be said. I wish to point a few characteristics that in my opinion go to make a successful and efficient mine official, and more specifically a man fitted to be an Underground Manager or Overman.

An efficient mine official must be a good organizer. He must have the knack of putting the right man in the right place. It is no small task to match men so as to give the best results working together. It requires the exercise of the best judgment on the part of the official. To succeed well with the men and avoid the many troubles that arise in mines, an official must have a mild temper and a way that will draw men to him and make them his friends. It must be recognized that all good workmen have minds of their own and do not relish being "bossed" by a man who makes this feature his most prominent characteristic. Men do not need to be "bossed" so much as to be acquainted with the details of the work to be done. An official who gives instructions in plain, simple language will get more and better work done than the "boss" who gives his orders in a commanding tone, designed to impress on the workmen the importance of his position.

Again an official should understand his manager or superintendent, learn his nature so as to interpret his ways and manner, which will often avert trouble arising from misunderstanding each other. There should be perfect harmony between the manager and his under officials. They should be in his confidence. When officials co-operate with one another they produce greater economy and increase the output of the mine.

The efficient mine official must understand and have a practical knowledge of mining methods and mining machinery. He should be able to judge of what a fair day's work is in coal mining. He must be strictly honest with his employer and with the men under his charge. While he must watch every cent of outlay, he must see that full time is given each man in the performance of his work; and faithfully fulfill all his obligations and promises. He must not fail to make improvements in ventilation, drainage and haulage, when he believes the outlay will bring good results for the money expended. In the daily operation of the mine he must keep his eyes constantly on every detail relating to the safety of the men. There should be no waste of material, which is often the case where the official is careless or inefficient.

To sum up my opinion of what constitutes an efficient mine official is: That he is one who can produce a maximum tonnage of clean marketable coal, of maximum quality at a minimum cost with due consideration for the safety and welfare of the men under his charge, and the safety, proper ventilation and maintenance of the mine under his charge. He must be fair, impartial and honest in all his dealings with everyone.

MINERAL PRODUCTION OF BRITISH COLUMBIA.

1919 and 1918 Figures Compared.

That the monetary value of the mineral output of British Columbia for the year 1919 was $33,296,313 as compared with $41,782,474 for 1918 is shown by the official figures given in the Annual Report of the Minister of Mines, which has just been issued and is now available for distribution.

The decrease, while considerable, is not serious when placed against the greater decline in mineral production shown by returns from the various States south of the line where the mining industry is an important factor. In fact from this viewpoint it is indicated that this Province did not feel to the same extent the falling off in demand for metals following the cessation of war.

An interesting comparative table is published which, in part, follows:

Quantities and Value of Mineral Products for 1918 and 1919.

	1918		1919	
	Quantity	Value $	Quantity	Value $
Gold, placer, ounces	16,000	320,000	14,325	286,500
Gold, lode, ounces	164,674	3,403,812	152,426	3,150,645
Silver, ounces	3,498,172	3,215,870	3,403,119	3,592,673
Lead, pounds	43,899,661	2,928,107	29,475,968	1,526,855
Coper, pounds	61,483,754	15,143,449	42,459,339	7,939,896
Zinc, pounds	41,772,916	2,899,040	56,737,651	3,540,429
Coal, 2240 lbs.	2,302,245	11,511,225	2,267,541	11,337,705
Coke	188,967	1,322,769	91,138	637,966
Miscellaneous Products		1,038,202		1,283,644
		41,782,474		33,296,313

One interesting feature of the above is the interest shown in silver production, reflecting the increased quotations for the metal and, to some extent, the opening up of promising northern fields. Another worthy of note, but not of such an encouraging nature especially from an industrial standpoint, is the marked decline in coke manufacture. That, however, no doubt will be remedied as new mining projects, now in the development stage, are further advanced.

The report includes the usual detailed accounts of mining activity during the year in the several districts of the Province by the Resident Mining Engineer.

THE GREAT CANADIAN WEAKNESS

Ottawa reports refusal by Canadian manufacturers of huge orders from Australia and Brazil, owing to the shortage of coal. Canada's foreign trade, at the very period when the contest for world markets has begun steadily drops until the country soon may once more be creating debits abroad.

And Canada possesses undeveloped coal deposits of untold richness and value! A great source of wealth remains inactive, like money foolishly left buried in Canada's backyard, while factories throughout the Dominion take what coal they can get from the United States or go without.

Every new day brings its pointed reminder of the grave loss Canada suffers owing to her failure to use her own coal. It is the great national weakness which threatens this country with the loss of much to which Canadian war prestige entitles this generation.—Montreal Star.

CANADIAN ABRASIVE CO., BRITISH COLUMBIA

The Provincial Department of Industries of British Columbia has loaned the sum of $22,000 to the Canadian Abrasive Co., which will manufacture sand, emery and other abrasive papers. This industry has hitherto been controlled by manufacturers in the United States, and it is understood the industry is a new one in Canada. The abrasive materials used will be obtained locally, and the works will be in Victoria. Paper made in a local paper-mill will be used. The plant is regarded as an experimental one.

Natural abrasives, more particularly corundum from Ontario, have been produced in Canada during the past twenty years, and the production of artificial abrasives in electric furnaces is an important industry at Niagara Falls.

ADVERTISING ALBERTA COAL

The Government of Alberta is continuing its advertising of Alberta coal, and in a recent issue gives a series of common queries regarding Alberta coal with the correct answers. Some of the more arresting statements made are as follows:—The Province of Alberta uses Alberta coal entirely, Saskatchewan uses it for half its needs, and Manitoba is using more every year. Alberta has mines equipped to furnish 12,000,000 tons of coal a year. There is now mined about 6,000,000 tons year.

In years to come, if copies of such advertisements are in existence, they will be interesting proofs of what our descendants will find it extremely hard to believe, to wit, that it was once necessary to advertise that Western coal is suitable fuel for domestic use. After all, the Alberta Government is only taking a leaf out of the book of the anthracite operators, who not so many years ago, found it necessary to carry on a campaign of advertising to prove that anthracite would burn. In many western towns, the choice of fuel lay between domestic soft coals and imported anthracite, and the anthracite man got there first. It seems almost laughable now, but no later than the Spring of 1917, at a fuel conference called in Ottawa by Sir Geo. E. Foster, considerable incredulity was expressed by Winnipeg delegates of the suitability of Alberta coal for domestic purposes in Winnipeg, and the Alberta men waxed very wroth at an assumption which they frankly could not understand.

Our Northern Ontario Letter

THE SILVER MINES.

The prospective Cobalt silver area of Cobalt was added to on July 20th, when, by an Order-in-Council passed by the Ontario Government, the Gillies Limit was thrown open for prospecting. Intimation of the decision first came on July 17th, through press dispatches. This resulted in many prospectors not being on hand to share in any advantages that may result. The greater percentage of prospectors engaged in this part of Northern Ontario are either doing assessment work on their claims at this season or are on prospecting expeditions. The lack of due consideration for these most active of the prospecting fraternity has aroused a large amount of criticism in the North. It is common knowledge that during the war a movement was set on foot to have the Limit thrown open for prospecting, but a reconsideration caused these lands to be left tied up pending the return of the men from overseas, so as to give all an opportunity to share in whatever might be found. Only a small and practically valueless part of the territory was then opened. In spite of this early consideration for all concerned, the present government has in local opinion shown disregard for all and has dealt unfairly with prospectors. This, whether the Gillies Limit ever yields an ounce of silver, or not.

Production from the McKinley-Darragh is being maintained at an average of between 55,000 and 60,000 ounces of silver monthly. The indications are that output for the whole of 1920 will have a value of about $800,000. Current net profits are adequate to meet current dividend requirements of 3 per cent. quarterly, in addition to which the treasury surplus amounts to more than a full year's dividend requirements. The mine, up to June 31st, has produced 18,907,250 ounces of silver, and has paid its shareholders $5,821,591 which is equal to 262 per cent. on the company's issued capital. This output has been the result of doing a little over twelve miles of underground work, and from an area little more than fifteen-acres in extent.

Ore from the dumps of the Kerr Lake mine is now going to the Dominion Reduction plant for treatment. An average of from 125 to 150 tons are being treated daily. It is still too early to estimate the importance of this source of revenue, but from the returns so far the treatment of from 75,000 to 100,000 tons of this low grade material indicates a fair margin of profit. The price of silver will, of course, have a vital bearing on the extent of the profit to be derived from this source.

On August 1st the Coniagas will disburse a dividend of 2½ per cent., amounting to $100,000. This makes a total of $400,000 paid so far this year, and brings the grand total up to $10,040,000. The mine is producing at the rate of between 800,000 and 900,000 ounces of silver annually, and has produced a total of over 28,000 ounces. Ore reserves are being maintained about three year's in advance of the present rate of output.

The Mining Corporation has commenced the erection of campbuildings on a group of claims in the township of Butt. It is planned to carry out a considerable amount of surface exploration.

Recent information from Butt township, tends to indicate that the radium-bearing material is high grade, but that it occurs in more or less widely separated patches. The question of commercial success, it is said, will probably depend upon whether the pitchblende, which contains the radium element, occurs in patches close enough together to make mining feasible.

Premier Drury, having stated that the present Government has investigated the Department of Lands and Forests and found it "positively rotten", and that the Department of Mines may be the next in line for investigation, has aroused mining men to such an extent as to cause a general demand for the investigation to be made at as early a date as possible. The great majority of leading mine operators in Ontario stand sponsor for this statement to the Ontario Correspondent of the "Mining Journal":—

"Mining interests are strongly of the opinion that there is nothing to hide in so far as the mines are concerned and that all their operations and dealings with the Department of Mines has developed nothing that might be considered embarrasing on the widest possible investigation and are taking the stand that not only do they welcome such an investigation, but that, suspicion having been aroused by one in so responsible a position as that of the Premier of this Province, that necessity now demands an investigation and such is asked at the earliest possible moment."

The Ontario Mining Association, through Balmer Neilly, Secretary-Treasurer, has used the Government to institute a search of records and general investigation at once, mining men not desiring to remain under the stigma of suspicion created by the Premier's unreserved announcement.

Work is well under way on the White Reserve mine at Maple Mountain in the Elk Lake district. Work has been confined to close to surface, but it is now planned to re-open the 140-ft. level. A new motor boat has been placed under the water route from Latchford to Lady Evelyn Lake, and has improved transportation facilities.

It is stated that financial arrangements have about been completed for re-opening the Paragon-Hitchcock property at Elk Lake, some New York capital having been secured. It is also reported that the Laurier Mining Company with property in the township of James, is being re-opened and that a small steam-driven mining plant is being installed. The enterprise is backed by Sarnia business men. The address of the company is Elk Lake, Ontario.

A Cobalt mining company as well as United States mining men have made an examination of the Delvin property in the Elk Lake district, and interested parties believe there is fair promise of this promising silver prospect being re-opened.

Ore and Bullion Report.

During the week ended July 23rd, five Cobalt companies shipped six cars containing approximately 463,650 pounds of ore. Following is a summary:—

Shipper	Cars	Pounds
O'Brien	2	129,795
Northern Customs	1	96,800
La Rose	1	87,400
McKinley-Darragh	1	83,657
Coniagas	1	65,998
Totals	6	463,650

Bullion.

During the corresponding period, the Mining Corporation was the only bullion shipper, sending out a large consignment containing 99 bars weighing 110,-224 fine ounces.

THE GOLD MINES.

Everything seems to point toward a continued increase in activity in the gold mining areas. Dividend disbursements from the leading mines continue at the usual rate, while work on outlying properties is taking on increased proportions. On August 11th the Hollinger Consolidated will pay its usual eight-weekly dividend of one per cent., amounting to $246,000. Labor is still reported to be considerably below requirements.

Cabled advice is expected shortly from London in connection with the recent offer made by a Toronto syndicate to underwrite 600,000 shares of the Porcupine V.N.T. Mines treasury stock. The offer was graded, 15 cents each to be paid for 200,000 shares, 30 cents each for 200,000 and 50 cents each for 200,000 shrares. It is believed the offer will receive favorable consideration, in which case the necessary working capital would be made available, and the property could then be placed on a producing basis.

At a depth ranging from 100 to 200 feet below the tenth level on the Dome Mines adjacent to the Dome Extension property, a large amount of ore containing average values of upwards of $10 to the ton has been cut by short diamond-drill holes driven from the tenth level. The management considers it probable that this body dips easterly into the Dome Extension. From these facts, it is generally believed the Dome will take over the Dome Extension property in September. It is learned that a meeting of the directors of the Dome will be held in August. Provided the deal goes through the holder of Dome Extension shares will receive one share of Dome for each thirty shares of Dome Extension held. One of the diamond drill holes shows an ore body 17 feet wide and containing $25.41 to the ton. Another hole shows the presence of an ore-body 19 feet wide and containing $18.84 to the ton. One hole shows 40 feet of $7.63 ore and nine feet of $20.03 ore. These figures are all entirely official.

During the month of June, according to the regular annual report of Manager R. C. Coffey to the president and directors, the Lake Shore mine treated 1,535 tons of ore and recovered $37,546, the average recovery being $24.46 from each ton treated.

This compares with 1,636 tons in May from which $41,-187 was produced. In explanation of the slightly lower tonnage is the following note in the report: "The low tonnage was due to the electric power being off 8.2 per cent. of the possible running time."

For the first six months of the current year, the output from the Lake Shore mine has totalled $244,-710, or at the rate of nearly half a million a year, the average production being $40,785 monthly. Complete official figures up to June 31st show that the mine has produced $923,394 since commencing production in March, 1918, and that the million mark will be reached by about the end of August.

Capitalized at $2,000 000 made up of 2,000,000 shares of the par value of $1 each, and treating ore averaging over $24 to the ton, and producing an average of $40,000 a month, conservative unofficial estimates place the present earning power of the Lake Shore at a little over one per cent. net profit every thirty days, one per cent. amounting to only $20,000 or a little less than fifty per cent. of gross production.

Of outstanding importance in connection with the mine, is the recent decision to extend the underground workings from a depth of 400 feet to at least 800 feet, with an intermediate level at a depth of 600 feet.

On the Dome Mines, at a depth of 850 feet, some very spectacular ore is being encountered, some of the ore being equally as rich as that found at surface and which in the early days was called the "golden sidewalk."

One of the leading gold mining companies of Porcupine recently sent a representative to Montreal for the purpose of hiring newly arrived immigrants. It has been found, however, that nearly all of these men are coming from Europe to fill pre-engagements. One whole boat load had been previously engaged to work on one of the leading Canadian railways. It is believed, however, that as these new arrivals gradually work out their passage, they will begin to find their way into all lines of work.

During the fiscal year ended April 30th, the Teck-Hughes treated 17,277 tons of ore of an average grade of $8.60 to the ton and recovered $127,771. Before providing for financial charges on bonds, and extraordinary expense in connection with a labor strike, the operating costs amounted to $6.01 a ton. The scheme to re-organize the company in such a way as to retire the $500,000 bond issues as well as $70,000 of defaulted interest, is progressing and is likely to take the form of a large increase in issued shares.

The Tough-Oakes mine is still idle, pending the arrival of scrip in the new company, the Kirkland Lake Proprietory, 1919. The stock was mailed from London early this month, and its arrival will enable the holders of Tough-Oakes shares to transfer into the new company on the basis of two shares of Tough-Oakes for one share of Proprietary. Once this transfer is made, work will be commenced.

Delayed equipment for the Hunton-Kirkland mine has arrived and is being installed, thus making it unnecessary for the company to borrow equipment temporarily from the Elliot. The new plant will be ready to operate within the next week or so.

The first diamond-drill hole on the Carveth property in the township of Thomas lying east from Night Hawk Lake has been completed, and the consulting engineer, Mr. Horace F. Strong is at the property making an examination and report.

A deputation of mining men from the Kirkland Lake, Larder Lake and Boston Creek districts presented a request to the Ontario Government to build a branch line of the T. and N. O. Railway from Swatiska to Kirkland Lake, with the final object in view of extending it east through Lebel and Gauthier townships to the Argonaut mine, and finally to Larder Lake. The premier told the deputation the Government would consider the matter provided the mine owners were willing to allow government engineers to enter the mines and report on the resources. If these warrant the road, it will be built. The Kirkland Lake companies appear to be agreed that such should be done, and the mines will permit inspection. As regards Larder Lake, however, the only operation is the Associated Goldfields, and it is known that this company on a former occasion ignored such a suggestion from the Ontario Government. In the meantime, the Canadian Light Railway Construction Company is endeavoring

to secure rights to construct a light narrow gauge line to Kirkland Lake. It is believed no definite action will be taken until such time as the mines grant official consent to the governments proposal to inspect all important properties.

PERSONALS.

Mr. J. S. De Lury, professor and acting head of the department of geology in Manitoba University has been appointed to represent the mining industry on the Bureau of Industrial Research now being organized in Manitoba. Professor De Lury is a graduate of the University of Toronto. He was in 1906 on the staff of the Ontario Bureau of Mines. He resigned to accept an appointment as professor at the University of Idaho and was there for some years before returning to Canada and joining the staff of the University of Manitoba. He is at present making investigations in the Rice Lake gold area, Eastern Manitoba.

Mr. Jas. McEvoy is returning to Toronto after completing an examination of coal properties in Alberta. His address will be Gorge St. Arcade, Toronto, where he established an office before going west.

Mr. Cyril Knight of Toronto is one of the candidates for the position of secretary of the Canadian Mining Institute. He acted as secretary at the March meeting in Toronto. Mr. Knight is at present making geological investigations at Cobalt for the Ontario Bureau of Mines. Mr. Knight is well known here and in the United States for his work in Pre-Cambrian areas.

Mr. J. C. Gwillin, for many years professor of mining engineering at Queens University is reported to be still in poor health. His many friends, including a large number of former students regretted to learn that he has not sufficiently recovered to permit him returning to his former duties. He resigned the professorship at Queens sometime ago.

Mr. M. W. Hotchkin is operating the Colonial silver mine, Cobalt, under lease. Mr. Hotchkin was superintendent at the Tough-Oakes gold mine some years ago and recently in charge at the molybdenite mine at Quyon, Quebec.

Mr. John T. Stirling is reported to be recovering from his recent serious illness. Mr. Stirling is chief inspector of mines of Alberta and is one of the best informed persons in Canada on Alberta coal mines. He is an active member of the Canadian Mining Institute and has represented his district on the Council of the Institute for several years.

Mr. J. B. Tyrrell of Toronto is in the Rice Lake gold area, Manitoba. Mr. Tyrrell is consulting engineer for some of the companies developing properties in this area.

Mr. E. P. Mathewson is returning to New York after spending some time at the Anyox smelter, the Granby Company's plant which treats the ore from the Hidden Creek copper mine.

Mr. D. A. Dunlap, vice-president of Hollinger Consolidated Mines, has returned to Toronto.

Mr. H. H. Sutherland is returning to Toronto after being for some months in England.

Mr. Richard Pearce of Cobalt is in Toronto. He has been recently visiting the Lightning River gold area.

TORONTO MINING STOCKS.

Following are the average quotations for gold, silver and miscellaneous stocks on the Standard Stock Exchange, Toronto, for week ending July 24:

Silver:	High.	Low.	Last.
Adanac Silver Mines, Ltd.	3	2⅞	2¾
Bailey	4½	3½	3½
Beaver Consolidated	43	42½	42½
Crown Reserve	25	23½	25
Gifford	1⅜	..	1⅜
Great Northern	2½	..	2½
Hargraves	2	..	2
Kerr Lake	3.50	..	3.50
La Rose	40	38	38
McKin.-Dar.-Savage	57	55	55
Mining Corp. of Can.	1.95	1.85	1.85
Nipissing	9.90	9.75	9.75
Ophir	1⅝	1½	1⅝
Peterson Lake	13½	13	13
Silver Leaf	2	..	2
Temiskaming	35	..	35
Trethewey	30	28	28
Gold:			
Apex	1½	..	1½
Atlas	12	..	12
Dome Extension	29½	25	27
Dome Lake	5	4⅞	5
Dome Mines	11.50	11.00	11.40
Gold Reef	2 6-10	2½	2¾
Hollinger Cons.	5.70	5.55	5.55
Hunton Kirkland G.M.	11½	10	11
Inspiration	3¾	..	3¾
Keora	16½	16	16
Kirkland Lake	50	48	49½
Lake Shore M. Ltd.	1.20	1.19	1.19
McIntyre	1.90	1.82	1.90
Moneta	9	..	9
Porcupine Crown	29	26½	26½
Porcupine V.N.T.	24¼	22	24¼
Preston East Dome	2¼	2	2¼
Schumacher	21	19	21
Teck-Hughes	11	8½	8½
Thompson Krist	9	7¾	7¾
West Dome	6 6-10	6½	4½
West Tree Mines Ltd.	5	..	5
Wasapika Gold M. Ltd.	11½	10½	10½
Miscellaneous:			
Ajax Oil	30	..	30
Eureka	30	..	30
Petrol Oil	1.35	1.15	1.17
Vacuum G.	28½	27	27

METAL QUOTATIONS.

Fair prices for Ingot Metals in Montreal July 28th 1920.

	Cents per lb.
Copper, electro	24¼
Copper castings	23¾
Tin	57
Lead	10½
Zinc	10¾
Aluminum	36
Antimony	10

A Toronto newspaper states that coal-mining is a cumbersome process, and that the chief hope of relief lies in the development of electrical power and its application to heating purposes.

It is a faint hope. The application of electricity to domestic and industrial heating has a very limited field, and it is a most expensive and wasteful method of utilising even the electricity developed by water power.

BRITISH COLUMBIA LETTER

Stewart, B.C.

The road work to be undertaken by the Provincial Government in the Portland Canal District will be started and carried forward with all possible expedition under the supervision of G. A. Young, of the Public Works Staff. Perhaps the most important of his season's operations will be the construction of a road from the Premier Mine to provide transportation facilities for the Big Missouri and Mineral Hill Claims. Repair work on the Bear River Road already has commenced and there is much trail clearing and improving arranged for both in the Salmon River and Bear River sections, special attention being given the tributaries of the Bear, along which there is much prospecting and mineral improvement.

A strong lead of a good grade of ore is said to have been struck on the Unicorn Group of Mineral Claims, Salmon River, and ore of high grade has been brought into Stewart from the Glacier Creek Property. An open cut has been driven 20 feet on the latter and is in mineral carrying galena and iron sulphides.

Rossland, B. C.

The Josie Mine was closed temporarily recently, but only until another copper furnace was blown in at the Trail Smelter of the Consolidated Mining & Smelting Co. Considerable shipments of ore from the Mandy Mine, Le Pas, Manitoba, together with the usual run of company and custom ore, more than overtook the then furnace capacity of the plant.

Trail, B. C.

Vancouver (B.C.) Board of Trade recently arranged that a party of its members should make a tour of interior British Columbia in order that businessmen of the Coast City should be brought into closer touch with the activities of residents of other parts of the Province and the natural resources of other districts. The result is that an affiliation of the Boards of Trade of Eastern and Western British Columbia has been effected and one of the first joint efforts is to be to secure a market for the surplus zinc production of the Trail Smelter of the Consolidated Mining and Smelting Company.

During the war the Company went into the production of zinc on a large scale. Now, with an annual output of 20,000 tons of this metal and the total annual requirements of Canada not exceeding 10,000 tons, some profitable means of disposing of the excess must be found and, also, if possible, some avenue through which the greater output of the Company's plant, if worked to its full capacity, can be marketed.

Vancouver has promised its assistance in the solution of this problem.

The tourists included in their itinerary most of the mining centres of the Kootenays, among them Slocan City, New Denver, Denver Canyon, Silverton and Sandon. They found throughout the silver belt but little mining activity, in a comparative sense, because of of the trouble still persisting between operators and miners regarding the recognition of the labor organization known as the One Big Union. Generally, however, the trip is having the important effect of creating a better spirit between the two sections of the Province and assuring, for the future, more co-operation and team work.

Trail, B. C.

The ore receipts at the Trail Smelter for the week ending July 7th were 9,035 tons. This creates a record for the year. Of the total the contribution of the company's properties amounted to 7,218 tons, which also is a record.

Nelson, B. C.

Four of the levels of the Blue Bell Mine, Riondel, B.C., are being unwatered by a pump just installed and constructed at the Nelson Iron Works from drawings furnished by S. S. Fowler, manager of the New Canadian Metal Co., Ltd. As soon as this is accomplished the levels will be actively mined. Last year the Blue Bell shipped to the Trail Smelter 1,249 tons of crude ore and 36 tons of concentrates. To date the property is credited with shipments aggregating 730 tons.

Sandon, B. C.

In order to side track the famous slide on the Cody road to the Noble Five Mine a "cut-off" is to be constructed, work on which will commence shortly. The Washington, Argo Fraction, Majestic, Hope, Black Colt, Silver Hill, Cinderella, Chicago and Climax are properties situated in the Sandon District on which development is in progress this season.

Princeton, B. C.

The Princeton Mining & Development Co. is proceeding with the work of placing its mine property, situated five miles east of Princeton on the Great Northern Railway, on a permanent shipping basis. There are three full claims on which the ledge has been opened by three tunnels, varying in depth from 48 to 480 feet. The vein is reported to have been traced for about 4,500 feet on the surface and the operators assert that they have a large body of concentrating ore averaging 4 per cent in copper and 1 ounce in silver. A three drill compressor now is in use by means of steam power and another is to be installed electric power to be secured from Bonnington Falls by tapping the line running to the Copper Mountain Mine of the Canada Copper Co. The intention is to instal a concentrator later on.

Considerable interest is evident in British Columbia in the annual report of the Canada Copper Co. This shows that, with a share capital of $5,441,046 and a bonded indebtedness of $2,920,650 there was a dividend distribution of $622,518 for the year 1919, as compared with $3,625,247 in 1918. The Company invested in nineteen properties in British Columbia last year. Both the Greenwood Smelter and the Motherlode Mine have been dismantled. On construction at the Copper Mountain Mine and the Concentrating Mill at Allenby $1,112,000 was expended. Work on the Mill and the Railway to the Mine is making good headway. It was held up by labor trouble, otherwise it is likely that 2,000 tons of ore a day now would be coming from the Mine to the Mill. The ore will be concentrated to a 25 per cent. copper content and the concentrates will be shipped to Trail B.C. to be refined.

The quarterly report of the Chief Inspector of Mines for British Columbia shows that fatalities in the coal and metalliferous mines over that perod totalled five, four in coal mines and one in the metal mines. In the corresponding period last year fatalities were two in coal mines and one in the metalliferous mines. For

the first six months of the year coal mine fatalities numbered eight compared with two in the same period last year and in the metal mines one as compared with a like number in 1919. Coal mine fatalities up to June 30, were distributed as follows:—Two in the mines of the Canadian Western Fuel Co. at Nanaimo, two in the Coal Creek Mines of the Crow's Nest Pass Coal Co., one in the Reserve Mine of the Canadian Western Fuel Co. and one in each of the mines of the Crow's Nest Pass Coal Co. at Michel, No. 4 and No. 6 Mines of the Canadian Collieries (D) Ltd. Four miners were killed by falls of rocks, two by falls of coal, one by mine cars and one by falling material in shaft. The single fatality in metal mines occurred at the Nickel Plane Mine, Hedley District.

To obtain first hand information regarding the accident which resulted fatally at least in two instances, to five men forming the rescue team of the Pacific Coast Coal Company's Black Diamond Mine, State of Washington, Hon. Wm. Sloan, Minister of Mines for British Columbia, instructed James McGregor, Chief Inspector of Mines, to visit the scene of the occurrence and to personally follow any investigation that might be instituted. The circumstances, as given by press dispatches, are that the team, equipped with rescue apparatus, entered an abandoned mine, known to be filled with black damp, to ascertain the depth of water necessary to be cleared and incidentally for the purpose of drill. As the men did not return within reasonable time another rescue party was called with the result that two of the first party were found fatally overcome and the other three in serious condition. Mr. Sloan explains that he is interested because it is of importance to the coal miners of this Province that all the available details should be known.

It as learned subsequently that there were three deaths, two being members of the first party to go underground and the other victim being a member of the second and the rescuing party. As to the former it is stated that the cause of their loss was lack of an adequate supply of oxygen in their apparatus. No explantion has been ventured as to the reason for the death of the third man. An inquest, it is understood, has not been considered necessary.

W. H. Armstrong, for the past three years director of coal operations for the Province of Alberta and the Southeast of British Columbia, denies the charge that the Dominion Government has been attempting to force the coal miners to enter a foreign (U.M.W. of A.) organization. Mr. Armstrong states that the United Mine Workers, which is in affiliation with the American Federation of Labor, three years ago entered into a two year agreement with the Western Canada Coal Operators Association. The agreement was carried out amicably on both sides and at its expiration was extended a year without formal renewal. On April 1st last theagreement was formerly renewed, but a provision for the "closed shop," which did not exist in the old agreement, was made. Formerly, the operators, if they so desired, could employ non-union men but under the new agreement the demand for the closed shop principle was recognixed. An agreement between the men and the operators, such as is common in many other industries, was made for the collection of dues. The wage scale is based on the selling price of coal which is now, for instance, at Drumheller, Alberta, $6.10 per ton at the pit mouth. This agreement was ratified by the men by a vote of nearly three to one. "So far as the Dominion Government is concerned" said Mr. Armstrong, " it had nothing whatever to do with the arrangement between the United Mine Workers and the operators. The agreement was solely between the men and the employers and statement by the O.B.U. or others to the contrary was beyond the facts." Mr. Armstrong added that the mines were all working and the men apparently were satisfied with the scale of wages and the conditions.

The coal operators of the Province of Alberta resent the statement published in Eastern Canada that the mines of Western Canada already market all their product. They state that the facts are that all domestic coal mines of Alberta, owing to lack of orders, are working to only 25 per cent of their capacity. This applies particularly to Drumheller.

A reconnaissance party representing the Grand Trunk Pacific Railway is making a survey of a route of railway incidentally, would open Coal Fields, Northern B.C. Such a railway, incidentally, would open up a section rich in copper and silver-lead mineral resources. Its chief object, however, would be to develop the coal area which is extensive.

Mr. H. S. Monroe, the new General Manager of the Granby Consolidated Mining & Smelting Co., is quoted as stating that the coking ovens recently installed at Anyox for handling the coal of the Cassidy Collieries, Vancouver Island, have proved a success. From 420 tons a day of this coal there are being produced 300 tons of metallurgical coke and the by-products include 5,000 gallons of coal tar, 800 gallons of motor fuel and 5 tons ammonium of sulphate daily. The coal tar is shipped to a Vancouver Company for the manufacture of creosote, while the ammonium sulphate is available for the production of artificial fertilizer or the preparation of other ammonium salts for industrial uses. It further is pointed out that present rate of consumption of Cassidy coal, namely 420 tons a day, is the capacity of the ovens while the percentage of by products recovered is high. This statement sets at rest the assertions made that the Vancouver Island coal had proved a failure in the production of metallurgical coke in by-product ovens and that the Company had been compelled to resort to the importation of Eastern British Columbia or Alberta coal.

The appointment of John Macdonald, of Middlesboro, B. C., and John G. Biggs, of Cumberland, B. C., to vacancies on the staff of the Chief Inspector of Mines of the Province is announced by Hon. Wm. Sloan, Minister of Mines.

These positions were thrown open, respectively, through the death of H. Lancaster, Inspector of Mines in the Fernie District, as a result of an automobile former Chief Inspector of Mines, and the promotion accident, and by the retirement of George Wilkinson, to his place of James McGregor, the present Chief.

Both the new officials possess all the necessary qualifications and besides are men of long practical experience in connection with mining in this Province. Mr. Macdonald was eleven year in the differet coal fields of Scotland, two years in the State of Ilinois, and has been identified with coal mining in the Nicola Valley Field, B. C., for the past ten years. Mr. Biggs started coal mining in the Newcastle District, England

as a young man, and for many years has been associated with the business in a practical way. In England he acquired a 2nd Class Certificate and on coming to this country was soon in possession of 1st and 2nd Class Certificates. He has been Secretary of the Board of Examiners in the Cumberland District for about five years.

WAGE INCREASE TO ALBERTA MINERS.

An agreement has been come to between the United Mine Workers in Alberta and the operators which is to remain in operation until March 1922. The increases are retroactive to April 1st 1920.

The details are arranged on the basic agreement of 27 per cent. increase in contract tonnage rates in the bituminous fields and 20 per cent. on dead work, which includes the occupation of timbering and handling of refuse; 24 cents a ton increase in the lignite fields and 20 per cent. on "dead" work, and all day wages increased 27 per cent. The miners are also to receive $1.17 a day cost of living bonus. The increased rates will mean that a contract miner can earn between $7 and $10 a day, while day workers will run from $2.97 to $5.58 for boys and $5.58 to $7 for men.

The eight-hour day will be observed on the surface and eight hours from bank to bank in the mines.

INTERNATIONAL PULP AND PAPER ACQUIRE NEW BRUNSWICK COAL MINES

The International Pulp and Paper Co., has purchased the properties of the King Coal Co., the Northfield Coal Co., and A. D. Taylor near Minto, N.S., for a consideration reported to be in the neighborhood of $150,000, and a first shipment has been made to the new pulp mill at Van Buren, Maine.

The New Brunswick coal seam—as there is only one—is an example of the relative value of coal in districts where its occurrence is scarce. The New Brunswick seam would not be looked at in one of the Nova Scotia coal fields, but occurring as it does at a point distant from any other source of coal, and, owing to its shallow depth being comparatively easy to mine, it is a valuable local asset, with a restricted zone of distribution, and, if extensively worked, not a long life, as coalfields go. The seam nowhere exceeds two feet in thickness, and is usually under this thickness, and the cover does not exceed fifty or sixty feet.

FIND NICKEL AND COPPER CLOSE TO LAC DU BONNET, MAN.

The Winnipeg Free Press announces that Nickel and the copper deposits essentially similar to the Sudbury type are to be found in the vicinity to Bear Lake, near the Maskwa river, not far from Lac du Bonnet, according to Dr. R. J. Colony, of Columbia university, who, with E. McDonald, also of New York, and J. S. De Lury, professor of geology, University of Manitoba, has just returned from an intitial survey of the deposits.

No development work has been done, Dr. Colony said, but from what has been seen of the minerals, prospects appear unusually good. Many claims have already been staked and assessments made, and it is thought that development of the claims will be started before long. Dr. Colony and his party are leaving on another expedition into the Long Lake country in the early part of next week, to make further investigations.

TUNGSTEN ORES: IMPERIAL INSTITUTE MONOGRAPH.

The monograph on tungsten ores in the series of Imperial Institute Monographs on Mineral Resources, which has just been published by Mr. John Murray, has been prepared for the Mineral Resources Committee by Mr. R. H. Rastall, M.A., F.G.S., University Lecturer in Economic Geology, Cambridge, and Mr. W. H. Wilcockson, M.A., F.G.S., Lecturer in Geology in the University of Sheffield. It is divided into three chapters, the first containing a general account of tungsten ores, their characters, occurrences and origin, their mining and concentration, valuation and price, with a brief description of the metallurgy of tungsten and its employment in steel manufacture and other purposes, with a short discussion of the composition and characters of the remarkable non-ferrous alloys of which it is a constituent. The second chapter contains a detailed account of the geological features of tungsten deposits, and the mining and production of tungsten ores within the British Empire, including numerous statistical tables of output; while in the third chapter the tungsten resources of the rest of the world are treated in a similar manner. The relations of the British Empire and United States output to the world's total and the production of tungsten ores in the chief producing countries of the world are also shown by means of graphs,

The table giving the world's production of tungsten ores for the years 1910-1917, arranged by countries, shows that the British Empire produces a very large proportion of the total supply. Until about 1910 the United States headed the list, but about that time Burma rapidly came to the front and for several years showed the largest total. In 1916 the United States experienced an extraordinary tungsten boom, when prices soared to unprecedented heights and production was greatly stimulated. This in its turn stimulated the production in various South American States, especially Bolivia and Argentina. Before the war the smelting of tungsten ores was mainly in German hands, and the greater part of the British ore was sent to Germany for treatment. The enormous development of the manufacture of munitions in this country and elsewhere led to a great demand for high-speed steel for cutting tools, and a syndicate of thirty of the largest steel manufacturers at Sheffield formed a company to undertake the preparation of tungsten metal at Widnes. This company also acquired an important mine in Burma. The manufacture of metallic tungsten and of ferrotungsten was also undertaken on a large scale by several other firms in this country, in order to provide high-speed steel and other products for the needs of the British and Allied armaments. In order to ensure a sufficient supply or ore and to regulate the markets, the export of tungsten ore from within the Empire to foreign countries was forbidden by agreement of the various Governments concerned and the price was controlled. At first the rate was fixed at 55s. per unit (1 per cent of WO_3) per ton for concentrates of 65 per cent, and upwards, afterwards raised to 60s. per unit. This usually worked out to about £200 per ton for good average concentrates. As was naturally to be expected, the world's production of tungsten increased largely during the war years, rising from 8,000 tons or thereabouts in 1914 to over 20,000 tons in 1917. One of the most remarkable features was the sudden development of output in

China, from sources of which little is known, the output for 1918 being over 4,000 tons.

In the British Isles wolfram is a by-product of the tin mines of Cornwall, and the big demand for it proved of great importance to many of these mines. Strenuous efforts were made to keep up the output of both metals in spite of scarcity of labour owing to the demands of the army authorities for men. Several promising new occurrences were developed, and old ones resuscitated. By far the most important feature of the Imperial production of tungsten in the last few years was the great development of the Tavoy district in Tennasserim, Lower Burma, which in 1917 exported no less than 4,553 tons of concentrates. The greater part of this appears to be from various forms of superficial deposits, though lode-mining is now making important progress. In the Malay States, both Federated and Unfederated, as well as in the intervening Siamese territory, the geological conditions are very similar, though here tungsten is subordinate to tin. An important quantity of ore also comes from Queensland and New South Wales, with lesser amounts from Tasmania and New Zealand, the latter Dominion producing mainly scheelite. Some unimportant resources have also been discovered in South Africa, especially in Rhodesia.

The chief European producer in Portugal, while large resources undoubtedly also exist in Spain, where the geological conditions are very similar. In both these countries methods are primitive and often wasteful, and a good deal of smuggling undoubtedly went on during the war.

The tungsten resources of South America are undoubtedly very large, the ore occurring in large quantities along with tin in the mineralised belt of the Andes, especially in Bolivia and Peru; this appears to be of Tertiary age, while the tin-tungsten ores of Western Argentina are of much earlier date, being associated with Palaeozoic granites. The mines of Argentina before the war were controlled by German interests.

The tungsten ores of the United States, situated mainly in Colorado, California and Nevada, show a remarkable contrast to those of the rest of the world, in that they are not associated with tin. The largest producing districts of all are Boulder County, Colorado, where the ore is wolframite, and the Atolia district of California, where it is mainly scheelite. The third producing State is Nevada, while smaller quantities have come from Arizona, Utah, Idaho, Missouri, Montana, South Dakota and Alaska. In the latter only the ore is associated with tin.

The foregoing brief summary indicates the sources from which at the present time supplies of tungsten ore are mainly obtained. Occurrences of little or no commercial importance in many other parts of the world are briefly touched on in the monograph, because in some they show points of scientific interest, and some of them may in the future be found worthy of further development. From a detailed study of the geological features of all known occurrences, one point stands out clearly, namely, that tungsten ores almost invariably owe their genesis to masses of intrusive igneous rock, in nearly all cases granite. Exceptions to this rule are few and important. Almost all the important occurrences are associated with tin, and commonly accompanied by ores of copper, arsenic and molybdenum. It is a curious fact that the world's largest producing districts in Colorado and California should be almost the only exceptional and unusual occurrences.

The monograph concludes with a bibliography giving references to all the important publications on tungsten ores that have appeared up to the end of 1918.

OBITUARY

JOHN MACOUN, BOTANIST

The death at the age of ninety years is announced from Sidney, British Columbia, of Professor John Macoun, botanist, naturalist and a pioneer explorer of the Canadian West, and one of the old guard of the Geological Survey, in which for many years he was Assistant Director and Naturalist.

Prof. Macoun was born in Ireland in 1831 and came to Canada in 1850 with his mother and two brothers, settling near Campbellford, Northumberland Co., Ontario. From 1863 to 1879, Prof. Macoun was teacher of Botany and geology at Albert University, Belleville. In 1872 he accompanied Sir Sandford Fleming across Canada on the surveys for the proposed railway to the Pacific, and commenced a series of journeys and explorations that made him an acknowledged authority on the natural history of the West.

In 1875, on a second expedition to the Coast, Prof. Macoun nearly died of hunger, but was rescued near Fort Chipewyan by an Indian who gave him fish and potatoes. In 1882 he joined the Geological Survey.

Prof. Macoun was a Fellow of the Linnean Society, and an original Fellow of the Royal Society of Canada. His catalogue of Canadian birds is the authority on this subject. The Winnipeg "Free Press" in editorial mention of Prof. Macoun's death refers to him as "Canada's greatest botanist." The Victoria "Times" states that "His death leaves a vacant place among that brilliant roster of the men of the Canadian Geological Survey who gave to Canada the story of the West in the unvarnished lore of science." In the death of Prof. Macoun, writes the Victoria paper "the country has lost a distinguished public servant, the Province a highly esteemed citizen, and the cause of science a capable and zealous investigator."

EMANCIPATION OF MINING COMPANY'S PROPERTIES BONDED BY VANCOUVER SYNDICATE.

Acting as the agent of a group of Vancouver business men, Dr .Edwin T. Hodge was bonded for a sum said to be in excess of $100,000 the properties of the Emancipation Mining Company.

The Emancipation Mine is situated a little over one hundred miles from Vancouver on the Kettle Valley Railway (C.P.R.).

The claims bonded comprise thirteen and a fraction surveyed claims situated between the upper portion of Emancipation Mountain and the valley of the Coquahalla River. Most of the development work has been done at an elevation of 2,670 feet, or 1,200 feet above the railway tracks.

A small amount of development on these properties has yielded very high-grade ore. Selected mining along the veins has yielded 1,250 tons of rock which has averaged $28.57 per ton. Of the high-grade material, 118 tons is stated to have yielded values exceeding $300 per ton.

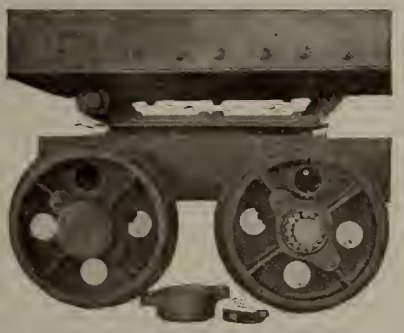
The property is as yet only a prospect, but it is regarded as a promising one, and from a transportation point of view it is unusually accessible.

Showing position when dumping at the side.

ROLLER BEARING
Rotary "Scoop"
MINE CARS

Will dump at either side or either end.

Showing car closed and ready for loading.



Showing the Roller Bearings supplied in all four wheels of our Mine Cars. Note the dust-excluding cap, with ample capacity for holding grease or oily waste.

This is only one of the many types of cars we make for the use of mines. We make these Scoop Cars any size or capacity you want.

Send for your copy of our Mining Catalogue showing many other types of Mine Cars. It will repay you.

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An Improved Self-Sharpening Bit for Coal-Cutter Chains

By C. E. KING.

Great progress has been made during the past fifteen years in increasing the efficiency of the coal-cutting machine, but little or no improvement has been made in the cutting chain. Realizing that the cutting ability of a mining machine depends largely upon the cutting chain, the Link-Belt Company's engineers have, during the past seven years, made a very exhaustive study of this method of mining coal, and have developed an improved cutting-chain which is proving successful.

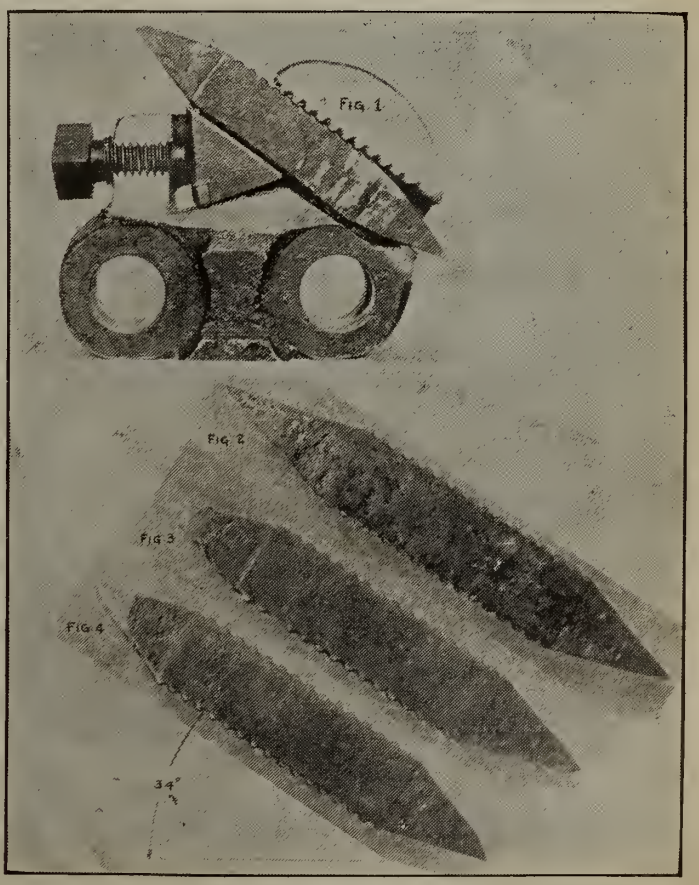
The writer who has been active in the development of this chain, believes that the principles involved will be of interest to all engaged in the preparation of coal at the mine, and takes opportunity to describe the improved cutting-chain, only recently placed on the market.

The vital elements which govern a successful coal-cutting chain are:

(a) The angle at which the bit engages the coal. The bit must have sufficient cutting clearance to eliminate the excessive friction which is caused by a dull cutting edge dragging the coal. The bit should cut, and not scrape.

(b) The ability to hold the bit in this desired position.

(c) The chair must be so proportioned and manufactured that it will withstand the hardships im-



posed when encountering pyrite concretions, and hard dirt bands in or adjacent to the coal seam.

The principal feature of the Link-Belt chain is the self-sharpening bit. The angle at which the bit engages the coal is such that, while the top side of the bit is wearing from contact with the body of the coal, the bottom side of the bit point is being sharpened. A sharp cutting edge is always available by merely turning the bit over sidewise. This sidewise turning of the bit can be repeated until the point of the bit becomes quite blunt; and as the bits are double pointed, they can be turned endwise when one end has become dull.

Figure 1 shows the assembled lug in partial section. The edges of the bit are corrugated, and fit into corresponding corrugations in the lug, thus eliminating all possibility of slip. An effective method of clamping the bit is the insertion of a malleable-iron wedge between the bit and set-screw. This wedge relieves the set-screw of the vibrating action of the bit, thus eliminating the annoying tendency of the set-screw to work loose. This is an important factor, since three to five per cent of the ordinary bits drop out of the lugs because of the set-screw working loose. Also, the point of the set-screw is not injured, as it is in cases where it engages in the hard steel bit. The set-screw is a snug fit in the lug, and a comparatively light pull on the set-screw is sufficient to hold the wedge and bit in place. The set-screw is not twisted off by the destructive pressure always required when it directly engages a smooth bit. Though very accessible for repairs, the wedges can not drop out of the lug, even if a bit is dislodged. There is ample room between the end of the wedge and the casting to release the bit, and the cutting dust finds a ready exit through the escapement hole provided for this purpose in the lug.

The advantages gained by this method of clamping the bit are:

1. Ability to hold the bit in its desired position.
2. Reduction of the loss of bits occasioned by set-screws working loose.
3. Prolonged life of the set-screw.
4. Increased efficiency of the machine men.

Figures 2, 3, and 4, show the bits in their working position. The bit shown in Figure 2 is in its forged condition, and ready to be replaced in the lug. Figure 3 show the same bit after it has cut approximately three times the amount of coal cut by the ordinary or curved type of bit. Note that the point has been worn similarly to a point obtained by holding the bit against an emery wheel. If the same bit be turned over, as shown, in Figure 4, a sharpened edge with renewed cutting clearance is presented.

The correct cutting angle is always assured, since its position in the lug link is fixed; and as the bit is straight, less of skill and time is required by the bit sharpener. The ability of the bit to sharpen itself is dependent entirely upon the angle at which it engages the coal. Steel of ordinary grade is used for the bits, and unusual tempering methods are required.

The lugs are cast from special steel. The chemical analysis and heat treatment of this casting have been developed by a very careful investigation of results obtained in actual service. The lugs are hot pressed to size (not machined), so as to improve the physical condition of the metal before heat treatment. The wearing surfaces are case hardened.

The strap links are made from a medium-carbon steel, drop forged. All engaging surfaces are accurately machined to fit the guides.

The chain has seven positions, the assembly or lacing of the chain being governed by the nature of the coal to be cut.

Chains can be supplied for all existing machines, and used without altering the cutter arm or sprockets.

It is claimed this chain will give greater production, with less power and prolonged life of bits and chain.

Coal is, and will continue to be, the main source of heat, light, power and fertilization of the earth, apart from the Sun. It is indeed fossil sunlight, and has no known substitute.

FOR SALE

We offer for Immediate Shipment the following New Equipment at Prices Below Cost:

1—5′ x 5′ Ball Mill
1—5′ x 16′ Tube Mill
4—Bouchardt Concentrating Tables
1—Duplex Groch Flotation
1—Dorr Thickener
1—6″ x 7″ Aldrich Vertical Triplex Pump
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:-: EDITORIAL :-:

NEWSPAPER ADVERTISING OF MINING STOCKS.

Humor is omnipresent to those who cannot divest themselves of the sense, and nowhere is it more often encountered than in reading the financial pages of our newspapers, and in the satellitic advertising it is usual to find on these pages, sometimes openly displayed for what it is, and at other times decently, or discreetly—as the reader prefers it—concealed.

As an example of advertising, naked and unashamed, and of humor also, to those who are merely watching but are not sitting in at the game, despite many invitations, we like the most recent announcement of the Little Gem Mining Company of Alaska, in Montreal's staidest newspaper. At the "instigation" of the brokers who are selling the stock of the company (the word is not ours, but we believe it is felicitously employed) a Mr. Robert Burns, whose qualifications for the work are not stated, but may be surmised, has been despatched to the mine in Alaska "for the sole purpose of definitely proving the value and prospects of the Little Gem Mine." Mr. Burns reports that the shipload of machinery is at Wasilla, from which it may be deduced that it escaped the earthquake that was suggested as being the only thing that could prevent the delivery of the machinery to the mine; and in his telegram states: "Miners enthusiastic over big developments and rich "quality of ore found. Picked several pieces myself, "no need to pan, can see gold plainly without glass "piece. One inch square contained twelve pieces of "gold on surface." Mr. Burns' acquaintance with gold-ore sampling and the use of the pocket lens may be deduced from internal evidence. The brokers state they do not consider it necessary to add anything to their client's report, and trustfully state: "We leave the matter in your hands as to whether you consider the proposition a desirable one or otherwise." The decision will be, as we imagine Mr. Burns' report to be, chiefly influenced by the reader's knowledge of the principles of gold recovery. There are gold mines in Canada, producing large quantities of gold monthly, where the most assiduous use of a "glass piece" would not reveal twelve pieces of gold on many inches of surface, and there have been mines also which have produced ore with "pieces of gold" as obvious as the plums in a pudding, but they did not pay dividends. We would not consider that Mr. Burns' telegram has "definitely proved the value and prospects of the Little Gem Mine."

As an example of discreeter advertising, is a paragraph in a Toronto newspaper regarding a property in Porcupine having "immense ore deposits which in size and formation greatly resemble those of the Hollinger Consolidated." Familiar phrase. "Con- "sidering the proven fact that values in the Porcupine "Camp generally become more consistent, more even- "ly distributed and somewhat higher with depth," the paragraph enlarges on the possibility of greater values at depth than are indicated by assays of surface channellings. Is this feature of the Porcupine Camp a proven fact? If so, it is one of the most interesting developments of mining operations in that camp we have had occasion to come across.

A further piece of information is that the conditions in the Porcupine Camp resemble those of the South African fields, a fact that does not seem to have received previous prominence in Canadian circles, but, which, if admitted, would permit of much speculative comment.

Just below this upsetting paragraph is the advertisement of Peace River Petroleums Ltd., which takes comfort in the discovery of oil in the No. 1 well, Peace River Town, and in the fact that an enquiry for crude oil for local consumption has settled the question of "What will be done with the oil?" Is not that rather beside the question? The statement is made that No. 1 well "has oil and plenty of it" and that within thirty days a pump test will be made and the quantity of oil announced. The question that investors should ask following an announcement of this kind should be, not what will be done with the oil, but, how much oil will the wells yield? Any concern in Canada that has a well producing anything like a heavy flow of oil will not require to offer "last chances" on shares at fifty cents each.

There is something about the sale of mining and oil stocks in Canada that is distinctly repugnant, but is not easily definable in words. The nauseating mixture of reading matter puffs with apparent paid advertising is a procedure that does not enhance the good reputation of any newspaper, and it is in effect a fraud upon the reader who is credulous regarding those things upon which he is uninformed, and who is not in a position to distinguish between obvious advertising and reading matter that, whether newspaper men admit it or not, carries with it editorial endorsement in default of any notice to the contrary.

Any publication in Canada that attempts to give an opinion on the worth of mining stocks meets two dangers, the possibility of adversely criticising a potentially profitable offering, or of endorsing a flotation without merit, and therefore the task is—with some notable exceptions—shirked. But, apart from the very real difficulties of intelligently appraising flotation values, it cannot be said that many of our newspapers perceptibly discourage the appearance of dubious flotation advertisements, or exercise any rigid censorship in protection of their readers.

THE COMMISSIONER OF MINES FOR NOVA SCOTIA.

The result of the Nova Scotia provincial elections shows that still another part of Canada is disposed to try the political experiment of group government. The opposition will be composed of a Labor and Farmer group, but whether they will coalesce remains to be seen. There are some irreconcilable differences between the farmer and the trades unionist in Nova Scotia. There has for many years been a fight in Nova Scotia between the two schools of labor thought, namely those who believe in general representation of the people through a candidate not bound to any particular social group, and those who believe in a straight labor ticket, and the preamble of a union constitution which declares as its first principle that "all wealth belongs to the producer." Both federal and provincial politics will hear much of the miner-labor group in the next few years.

Disclaiming entirely any political bias, and expressing a viewpoint based entirely upon his personal qualifications for the office, we regret the defeat at the polls of Mr. E. H. Armstrong, the Commissioner of Mines for Nova Scotia. Not himself a miner, and representing the constituency furthest removed from active mining operations, Mr. Armstrong by devotion to the duties of his office and from a sense of its importance, has assiduously studied mining practice and mining laws, and has carried through some much needed reforms in connection with mineral holdings in Nova Scotia, where the mineral grants and reservations are much involved by reason of the long history of mining in this province. In particular is Mr. Armstrong to be thanked for his courageous and active attitude towards the undersea coal leases. This subject bristled with difficulties and dangers, but Mr. Armstrong studied the problem from the viewpoint of provincial interests, and it is largely because of his insistence that the life of the undersea coalfield should not be endangered by conflict of corporate interests, and the general acceptance of his viewpoint in Nova Scotia, that the Dominion Steel Corporation and the Nova Scotia Steel & Coal Company have merged their coal holdings, thereby solving a difficulty which would otherwise have had to be remedied by legislative enactment.

Nova Scotia has been most unfortunate in lack of continuity of administrative and technical direction of its mining problems, both in government and in corporate circles, and, if Mr. Armstrong's laboriously gained knowledge of the Department of Mines is lost through his failure to be returned as a member of the Legislature, it will be necessary for some other person to begin where he began, and all who know Nova Scotia will admit that already sufficient has been lost by the necessity to educate new men for positions in which training and experience are not less important than ability.

The management of technical departments of government by laymen is one of the weaknesses of our form of government, and we believe that the appointment of a mining engineer to the position of minister of mines, and of a farmer to the position of a minister of agriculture is as logical and necessary as the appointment of a lawyer to be attorney-general. The Commissioner of Mines for Nova Scotia has, however, earned initiation into the profession of mining, and his place will be hard to fill.

LENIN ON THE INTELLECTUALS AND THE ENGINEER.

The "Social-Demokraten" of May 14th, reports a conversation between Jakob Friis, a noted Norwegian socialist and Lenin. The proletarian autocrat is described as having brown eyes, "with a little touch of red." "He is a little deaf in one ear, and therefore talks loudly. When he wishes to bring out an important point, he closes one eye while he thinks, and at the same time a knowing smile comes over his face." There is no trace of humor in Friis's account of this engaging personality with the pensive wink, for he describes Lenin's doorway as the "entrance to the Holy of Holies," and remarks "one never for a moment notices Lenin being conscious of his own greatness. So great is he." Lenin criticises the intellectual doubters who "confuse the mass of workers." "Can you demand," asks Friis, "the same revolutionary clarity in other countries as in Russia?" "Ah!" replies Lenin, "the *war* has been such a teacher."

After further conversation, during which master and disciple discuss murder, revolution and the destruction of the fabric of society as it now exists in the academic and detached way that takes away the breath of the unitiated, Lenin expresses himself thus:

> "Revolution is coming unavoidably in every country. But it will be probably easier in the countries of Western Europe than with us. There they have entirely different organized forces in their hands than we have. Temporarily Russia has taken the lead. But when the revolution is over in Western Europe, Russia will quickly lag behind in development. How is it with the intellectuals in Norway, are they strongly reactionary?"

"They have become better recently. Especially the French *Clarté* movement has awakened much interest. When the French authors begin to be Bolshevist the Norwegian authors will follow close behind them."

"Hm. I don't suppose that such a following of the fashions is much to trust to."

"Perhaps not, but at least among the engineers I think that there is a real important movement discernible."

"Yes, they are more or less on our side everywhere. In Germany there is almost an engineers' proletariat, so to speak. It is of the greatest importance to get the engineers on our side. In this country they had, for the most part, purely capitalistic interests. It will also require many years to build up industrial life here anew. It is to be hoped that you will have an easier time of it in Norway."

Lenin looked at the clock. I got up and thanked him for all his kindness to me during my stay in Moscow."

We live in difficult times, and world currents are moving, the origin of which is not always known to those who are carried along by them. An "engineers' proletariat" strikes us as a phrase of evil omen, proceeding from an evil source. Should the engineer abandon the traditions of service, and those constructive ideals that have placed him in the forefront of progress and all that pertains to the welfare of mankind, and run after the strange gods of selfishness and greed, and consort with those who have adopted as the war-cry the equivalents of "More and still more" and "Ourselves alone," there would be little hope for the world. The entrance of the engineer into political life has been a significant event of recent years, and we believe that, if the best minds of the profession realize their responsibility and do not hold aloof from a duty of citizenship that is innately repugnant to the scientific engineer, the political influence of the engineer will be a cleansing and stabilizing element in the melting-pot of North America. There is just a danger, however, that minor and inferior elements in the profession, if not dominated by its intellectual leaders, may stray into the wilderness of chaotic thinking that has engulfed so many at this date, and has not by any means run its epidemic course.

SULPHUR IN ILLUMINATING GAS.

Much discussion is taking place in Montreal on the alleged sulphurous character of the illuminating gas supplied by the Montreal Light, Heat & Power Company, which the company attributes to the unusually poor quality of the coal it is forced to use, because of the shortage of suitable gas coal. It may be remarked that the question of sulphur in city gas is not new in North America. At the meeting of the American Institute of Mining & Metallurgy in Chicago last September a symposium of papers was read on the occurrence of sulphur in coal, and there was a general agreement among the members who took part in the discussion—most of whom, of course, were coal operators or representatives of coal operators—that the gas companies could not expect much longer to continue to receive coal containing as little sulphur as was the case formerly. One speaker strongly advocated the enlargement of the purification plants to enable them to deal with a larger percentage of sulphur in the gas coal supplied. This is equivalent to stating that there has been much exhaustion of the coal seams with low sulphur content, and that with higher sulphur coal on the market operating conditions will have to be made to suit. The elimination of sulphur from coal gas is more or less complete, according to the extent of purifying surface over which the gas passes, and the frequency of the removal of the spent oxide, all of which means larger purification installations and large expenditure.

NEWS OF THE ASBESTOS MINES

By Courtesy of "ASBESTOS."

H. W. Edmonson, formerly with the Federal Asbestos Company has been appointed manager, and about 100 hands are now employed.

W. A. Janitsch, formerly with the Government survey, Ottawa, and having had four years overseas service, has been appointed as superintendent of the Federal Asbestos Company, as successor to H. W. Edmonson.

Asbestos Mines, Limited, East Broughton, have about finished repairing the milling plant on the Boston property and are commencing to produce fibre. The mill is, at present operated with steam power, but the intention is to change this to electric power immediately, this change to be made while the old steam plan is in operation.

As the mill is about three-quarters of a mile from the pit, a track and locomotive haulage is in contemplation, but until this is ready, teams and auto trucks are used to convey the rock to the mill. A steam shovel is being used to load the rock into the teams, and later into cars.

The Quebec Asbestos Corporation of East Broughton, have recently added another 1-½ yard steam shovel to their pit equipment. This will allow the mto load enough additional rock to operate their mill to full capacity day and night.

They are also installing a new set of rolls, using them as auxiliary crusher, and it is expected this will materially increase their production.

The plant is one of the best equipped in the East Broughton district, and is under the able management of E. E. Spafford.

Jos. Poulin, who about three years ago built and equipped a small mill and plant in East Broughton, and has been operating this successfully since, has sold out to Mr. Samuel W. Cohen and associates.

This plant is situated near the Fraser Mine of the Asbestos Corporation of Canada. G. P. Angus, until lately engineer with the Consolidated Asbestos Ltd., has been appointed manager.

GRAPHITE

New Mines Branch Monograph on an Important Canadian Mineral

(Photographs kindly loaned by the Department of Mines)

From numerous enquiries for copies of Report No. 18, Graphite, Its Properties, Occurrence, Refining and Uses," by F. Cirkel, the "Journal" has known that there was a demand for an authoritative monograph on this important Canadian mineral to take the place of the previously mentioned Report, now, and for some time past, out of print. It is therefore a matter of some importance that a new and up-to-date monograph on graphite has been issued by the Mines Branch, and preliminary reference was made to Mr. Hugh S. Spence's Report in the editorial columns of the last issue.

The annual production of graphite in Canada, as recorded in the annual statistics of the Mines Branch, is as follows:—

Annual Production of Graphite in Canada, 1886-1918.

Calendar Year.	Tons.	Value.
1886	500	$4,000
1887	300	2,400
1888	150	1,200
1889	242	3,160
1890	175	5,200
1891	260	1,560
1892	167	3,763
1893	Nil	Nil
1894(a)	3	223
1895	220	6,150
1896	139	9,455
1897	436	16,240
1898	...	13,698
1899	1,130	24,179
1900	1,922	31,040
1901	2,210	38,780
1902	1,095	28,300
1903	728	23,745
1904	452	11,760
1905	541	16,735
1906	387	18,300
1907	579	16,000
1908	251	5,565
1909	864	47,800
1910	1,392	74,087
1911	1,269	69,576
1912	2,060	117,122
1913	2,162	90,282
1914	1,647	107,203
1915	2,635	124,223
1916	3,955	325,362
1917	3,714	402,892
1918	3,114	248,970
1919	1,322	92,241

(a) Exports.

The increased production during the war years came mostly from the Quebec mines, but during the year 1919 production from this source was virtually suspended, and the output came almost entirely from Ontario.

Imports of graphite into Canada are as follows:

Calendar Year.	Plumbago, not ground.	Ground and manufactures.	Crucibles, clay or plumbago.
1910	$4,867	$55,090	$52,896
1911	4,940	51,192	56,814
1912	7,249	65,911	82,324
1913	9,375	72,887	73,971
1914	801	49,478	49,913
1915	3,436	41,681	106,761
1916	3,231	99,919	520,341
1917	47,218	123,991	798,004
1918	93,956	132,821	113,856
1919	6,604	80,970	59,914

The sharp increase in the imports of crucibles from 1915 to 1918 reflects the requirements of Canadian munitions industries, and the much increased value of graphite crucibles.

Attempts have been made to manufacture crucibles in Canada, in connection with which readers are referred to an article in our issue of January 16th last (see page 33) describing the plant of the Dominion Crucible Co. at St. John's, Quebec, a subsidiary of the Dominion Copper Products Co. The decreased demand for crucibles, and the lack of tariff protection, coupled with the 7½ per cent war tax on imported graphite (now removed) placed this young industry in a difficult position. The Dominion Copper Products Company is being wound up, having disposed of its assets to the Canadian Explosives Co., and the future of the crucible plant is uncertain. There is a possibility, however, that it may be used to manufacture foundry facings. It would be a pity to see the work of this plant discontinued, as it is so far virtually the only plant in Canada that has attempted to manufacture graphite crucibles.

DOMESTIC CONSUMPTION OF GRAPHITE

From data furnished to the Mines Branch in 1912-13, the total annual consumption of graphite by Canadian manufacturers at that time amounted to 950 short tons. Of this amount, 192 tons represented domestic, and 785 tons imported graphite.

The bulk of the graphite used went to the foundry facings, stove polish and paint trades. The following table shows the consumption by industries:—

	Number of firms using graphite.	Domestic tons.	Imported tons.	Total tons.
Explosives	2	..	9	9
Foundries	267	78	351	429
Lubricants	13	1	17	18
Stove polish	12	20	270	290
Paints	18	81	109	190
Rubber goods	1	7	..	7
Various	6	5	2	7
Total	319	192	758	950

The above list of industries has since been increased by at least three, namely, dry battery, crucible, and pencil. The first-named uses chiefly artificial graphite produced at Niagara Falls, Ont. In crucibles, both domestic and imported graphite is used, and in pencils, imported amorphous graphite.

Prior to 1915, a certain amount of Ceylon plumbago was imported for use in the best grades of foundry facing, but the trade at the present time uses chiefly Mexican, Korean, American and domestic graphite.

The paint trade uses both artificial and imported amorphous graphite.

In powder and shot polishing, Mexican amorphous graphite is used.

Both flake and amorphous graphite is employed in lubricants. In addition, the Acheson Oildag Company, at Sarnia, Ont., manufacture so-called "deflocculated graphite"—a very finely divided artificial graphite—for use in their lubricating compound.

General Review of the Industry.

The great increase in the price of crucible flake, due to the war, did not lead, in Canada, to the increased mining activity that perhaps might have been anticipated. No new mines or mills came into operation, and a large proportion of the existent mills were idle or in only intermittent operation. This may be ascribed to a combination of causes, amongst which figures prominently the lack of success which has for years past attended efforts to evolve efficient mill processes for the refining of graphite in this country. This, coupled with great general increase in the cost of labour and materials in the last few years, has effectually discouraged the investment of capital in an enterprise which, while offering possibilities during a period of excessive, war time prices, in ordinary times has yielded only slight returns and then only with the most capable of management and under exceptionally favourable conditions. In a number of instances, large mills, out of all proportion to the size of the ore-bodies as determined at the time of their construction, have been erected at great expense, and owing either to lack of ore, expense of running, or a combination of these causes, have been in only intermittent operation ever since.

More Efficient Concentration Processes Necessary.

Most of the mills erected in recent years have been equipped with a dry process of concentration, consisting is repeated crushing by rolls of flour mill type, with screening between successive crushing operations, as well as treatment on dry tables. Such an installation required an excessive amount of floor space and often an elaborate system of elevators, added to which the ore required to be kiln-dried prior to milling. The above called for a mill building of large size, relatively high power consumption and a large expenditure for fuel for firing the boilers, heating the plant in winter, and drying the ore. While wood fuel can usually be obtained in the vicinity of the mines, coal has sometimes been used for firing the boilers; this involved considerable expense for haulage, since many of the mills are situated at a considerable distance from rail.

Wet Concentration Displacing Dry Methods.

Dry methods for the concentration of graphite first came into prominence in Canada about the year 1906, and between 1906 and 1912 nine mills were installed with dry concentrating machinery. The process was

Open cut above workings of Globe Graphite Mining and Refining Company, concession VI, lot 21, township of North Elmsley, Ont. The banding in the limestone is well shown, and a well defined fold is exhibited in the cap rock above the shaft. Graphite bodies tend to occur at the crest of such folds.

adopted to supersede the wet system of buddles, originally employed in the older mills of the Buckingham district, in Quebec. Speaking generally, while there may have been some exceptions, dry concentration of graphite by the above methods has proved a failure in all respects. The expense involved has been high; a high grade of product has been obtained with difficulty and generally at the expense of an excessive loss of graphite in the tailings and the destruction of an undue proportion of the larger flake in the ore. Recent experience in the Alabama field, where a number of dry mills using similar or modified styles of concentrating machines have been erected in the last two or three years, has been along similar lines, and in various instances the dry installations have been discarded in favour of some form of wet concentration.

Some part of the failures that have attended efforts to develop the graphite industry in Canada has frequently been ascribed to the impersistence of the ore-bodies. While this is doubtless true in the case of a number of properties upon which mills have been erected, it is not to be inferred that all or even the majority of the known deposits are of such nature, and any such statement requires certain qualifications. For one thing, up to comparatively recently, few attempts to prove ore-bodies by diamond-drilling had been made, and opinions on the extent of deposits were based merely on outcrops or an insignificant amount of surface work.

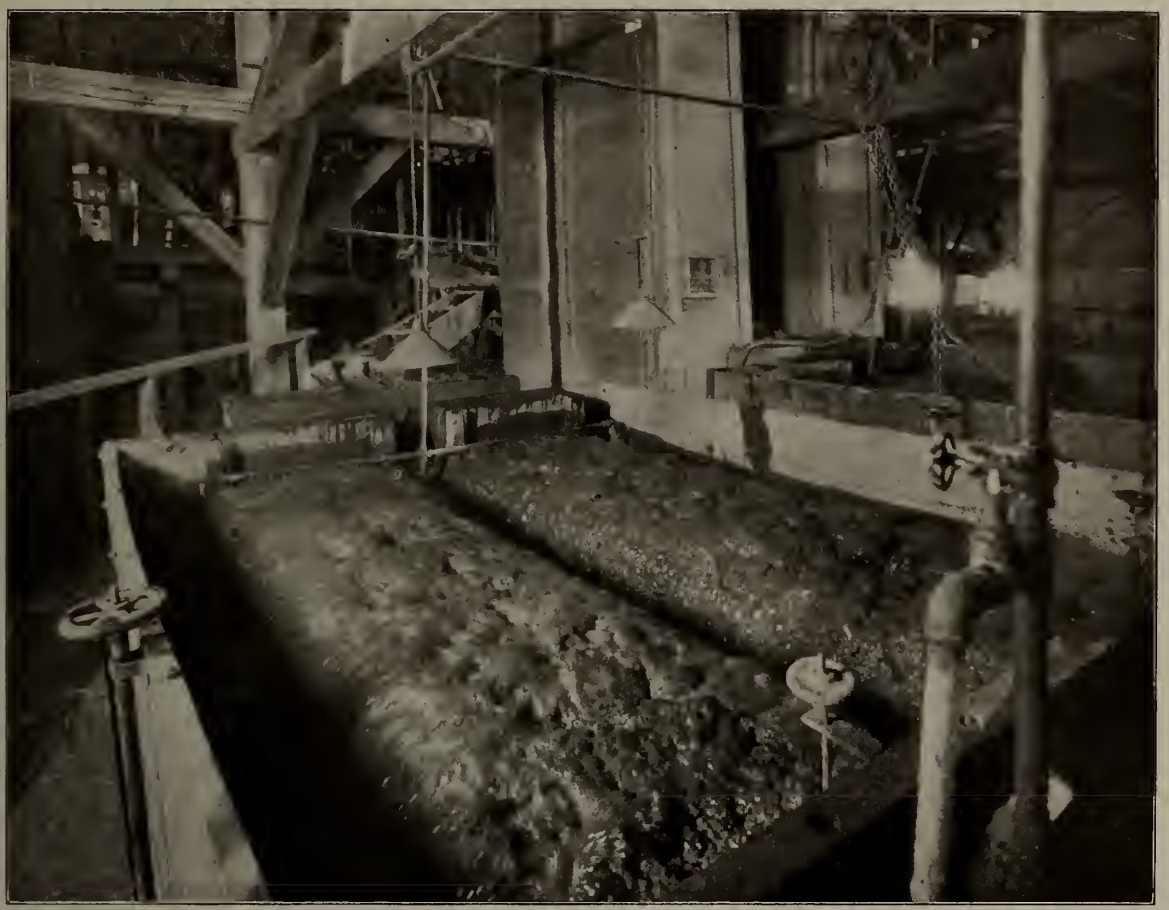
The great majority of Canadian graphite deposits are represented by graphitic gneisses and limestones, originally bedded sediments, which have been subjected to an extreme degree of dynamic and contact metamorphism accompanied by intense squeezing, folding, fracturing, and intrusion, so that they together with the rocks intrusive into them, now form an exceedingly complex series with most involved structural relations. It is evident that little that is definite can be learned about the size and form of ore-bodies forming an integral part of such a complex from mere surface indications and even underground work will often fail to reveal anything of a really definite nature. Little underground mining has been carried out, however, the majority of workings being shallow and open-cast, so that our knowledge of the deposits is necessarily scanty. What holds good in the case of any one particular deposit, also, could probably not be taken as a criterion in the case of another, owing to local variations in the structural relations of the rocks.

Diamond Drill Prospecting Advocated.

Hence, apart from actual mining operations, diamond-drilling is the only reliable method of ascertaining the extent of graphite ore-bodies, and it is apparent that this fact is becoming recognized, five properties having been drilled during the past few years—three of them in the last half of 1918.

An additional feature that has some bearing on the question of the impersistence of ore-bodies is that Canadian graphite deposits, as a general thing, are apt to vary considerably in richness, and that operators usually confine their attention to the better class of ore (10-20 per cent grade) and regard the leaner

Graphite-lined bushings.



Callow pneumatic flotation cells in operation, showing concentrates passing over in froth.

Section of mill, showing Krupp-Ferraris tables, slime-tables and hydraulic classifiers, New Quebec Graphite Company, Buckingham, Que.

Typical high grade, Canadian flake graphite ore, 15-20 per cent carbon, from the Buckingham district, Que.

Foliated plumbago, range III, lot 18, township of Low, Que. This plumbago is of good quality, but is hardly as dense as that from Ceylon.

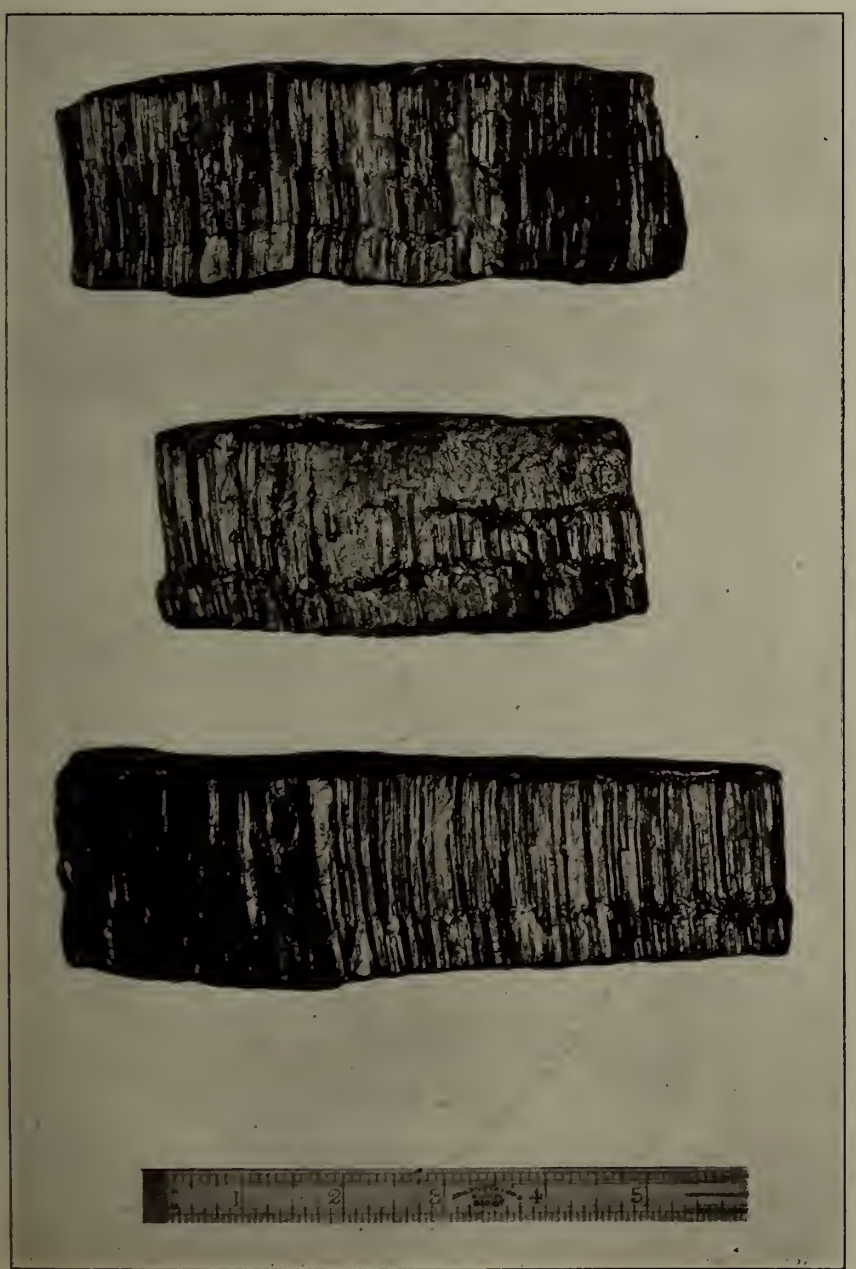
portions of an ore-body as not worth taking out. This practice has arisen through the difficulties and expense attending the concentration and refining of graphite, it being found that ore running over 10 per cent of graphite might be considered of commercial grade, while anything much under this percentage was too expensive to treat. Frequently, in the case of the graphitic gneiss ore-bodies, the rich ore occurs as a succession of streaks or lense-shaped bodies, that gradually merge into the adjacent non-graphitic country rock, and are separated along their strike by patches of lower grade ore or barren rock. With cheaper methods of concentration, much of this lower grade ore (5-10 per cent graphite) might very well be utilized; in this connection, it may be noted that the milling ore in Alabama does not average over 3 per cent of graphite, the Pennsylvania ore from 3 to 5 per cent and the New York ore 5 to 6 per cent. The two former are, however, soft and extremely easy to crush, whereas the Canadian gneiss ores are unweathered and hard.

While, therefore, the statement that Canadian graphite ore-bodies are generally small and impersistent is correct in the sense that what has heretofore been considered milling ore is apt to occur in rather small and irregular bodies, such bodies are often bordered or connected by masses of ore of lower grade, representing material whose graphite content may possibly be capable of profitable recovery by improved methods of concentration.

Oil Flotation.

Much interest has been shown in the last year or two in the possibilities of oil flotation for the concentration of graphite ores, and it has been demonstrated that by this system flake graphites can be treated both cheaply and efficiently. The elimination of the preliminary drying of the ore, necessary in all methods of dry concentration and in surface tension or film flotation, is an important consideration from the standpoints of expense and mill capacity. Additional features are, that a much smaller mill building, involving less initial expenditure, is required to treat an equal tonnage of ore as compared with dry concentration; that there are fewer machines and appliances requiring constant attention and repairs, and that a smaller force of men is required for operation of the plant. A number of the graphite mills in Alabama are employing oil flotation machines of one type or another at the present time, and the system has also been applied successfully to Pennsylvania ore. In both cases, the ore treated is of relatively low grade, carrying only 3 to 5 per cent of graphite. Oil flotation has also been installed recently (September, 1918) at the mill of the American Graphite Company, in New York state, and is reported to be giving every satisfaction. The New York ore is similar in its general characteristics — hardness, texture and associated minerals— to the Canadian graphitic gneiss ores. A number of tests with oil flotation have lately been made on Canadian ores, and a Callow plant was installed in August, 1914, at one of the mines in the Buckingham district. Unfortunately, however, the mill was destroyed by fire before the system had had an opportunity of being properly tried out. Three Canadian mills have since been equipped with this system of oil flotation.

Thus, while it must be admitted that graphite enterprises in Canada in the past have been attended by numerous failures, this result has, in many cases, been due



Fibrous or columnar plumbago, range VII, lot 21, township of Buckingham, Que.

largely to inefficient and expensive methods of concentration that rendered profitable the treatment of only the richer portions of ore-bodies; could not be depended upon to produce either a clean or a standard grade of product; made poor recovery of the graphite in the ore; necessitated frequent shut downs of the mills to effect repairs. In not a few cases, also, capital was expended on the erection of mills without proper investigation of the amount of ore available.

A pronounced recrudescence of interest in the possibilities of Canadian graphite has lately been evidenced, and it is to be hoped that, with efficient management and a proper appreciation of the difficulties attending the development of deposits and the treatment of graphite ores, the industry may recover from its depression, and the production of flake graphite proceed on more profitable lines than heretofore. The fact, however, must not be ignored that the prices that have obtained for crucible flake graphite during the war period have been abnormal, and that with reduced ocean freight and insurance rates, Canadian and American graphite generally may expect to find a serious competitor in Madagascar flake. The production of this material has risen rapidly during the last four years, despite embargoes and transportation difficulties, and the resources of graphite appear to be very large. Cheap native labour, also, even with the somewhat crude concentrating and refining methods that are largely employed, enable the Madagascar product to be placed on vessels at a very low cost.

The fact, too, that in steel melting, electric furnaces have in recent years come into decided prominence in the United States (hitherto, the principal market for Canadian graphite) and that there are indications that in the brass industry, also, electric melting may ultimately largely supersede crucible melting, must not be lost sight of when the development of the Canadian graphite industry is considered.

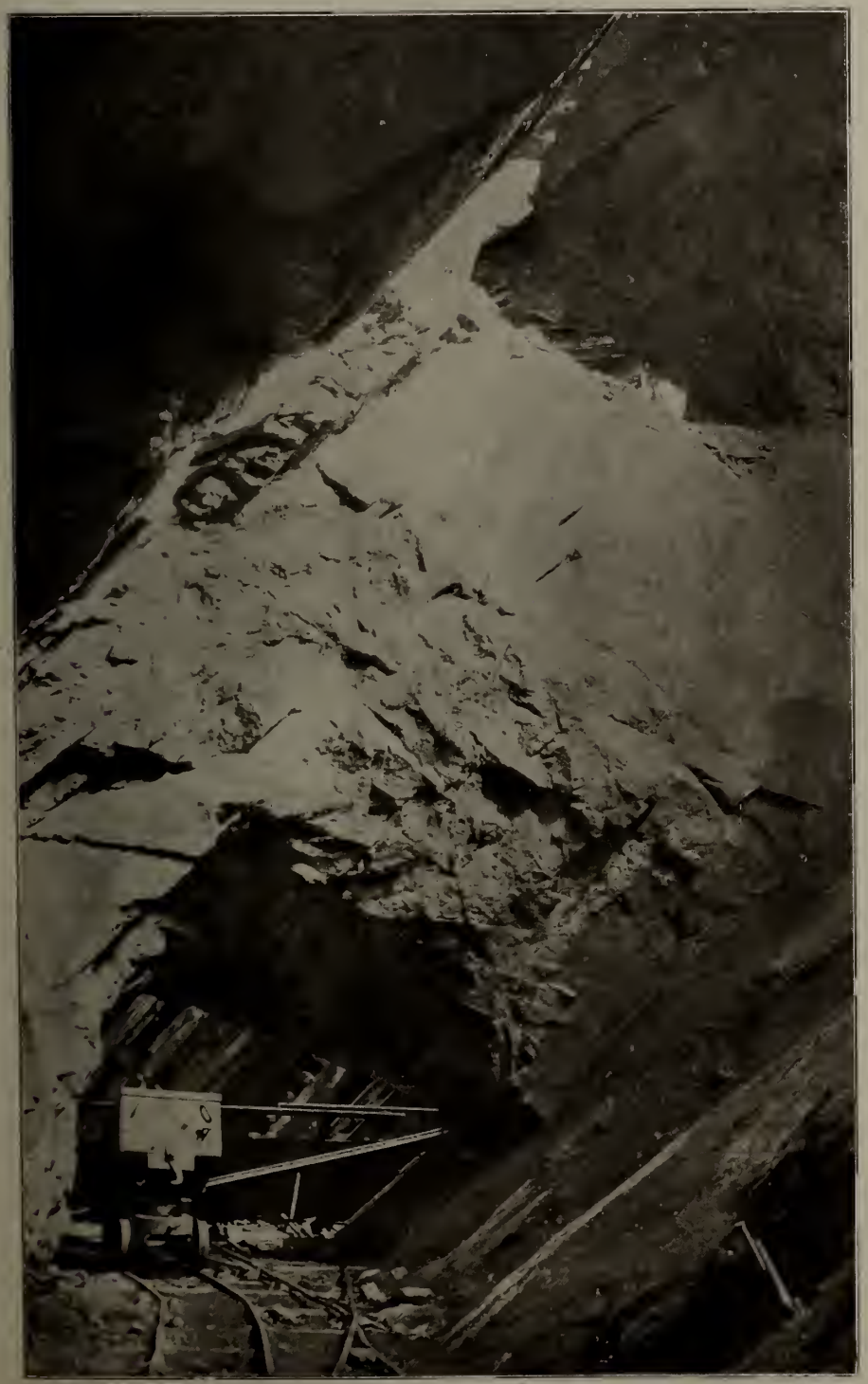
Review of Market Conditions, 1914-1918.

Graphite, at the present day, is employed in so many branches of industry that the supply can hardly meet the demand. At the same time, any one particular type of graphite (crystalline, flake, amorphous, or artificial) is particularly adapted to certain lines of work, and thus the various industries have come to utilize only that kind which best suits their needs. A case in point is the crucible industry. In the first crucibles made, Bavarian flake graphite was used, but, with the discovery of the Ceylon plumbago deposits, flake graphite was largely discarded in favour of the crystalline form. In the same way, pencils were formerly made from either crystalline or flake graphite, but are now manufactured almost solely from amorphous graphite. During 1918, in the United States, curtailment of imports of Ceylon plumbago led to the use of an increased proportion of flake graphite in crucibles, and experiments have been undertaken by the Bureau of Standards with a view to

Main pit of Miller mine, range V, lot 10, township of Grenville, Que. The ore-body is stated to have followed the well defined slip face on the far side of the pit

determining whether plumbago cannot be replaced to a still larger extent by flake without any serious detriment to the quality of the crucibles so made.

Thus, while in many of the industrial uses of graphite, a certain type of graphite is considered essential for best results, in those industries which consume the bulk of the graphite used, some one of the other forms of graphite than that at present employed could probably be substituted, either wholly or in part, without serious detriment. (See A. V. Bleininger, Chemical and Metallurgical Engineering, Sept. 27, 1918, p. 467.)



100-foot level at mine of Globe Graphite Mining and Refining Company, concession VI, lot 21, township of North Elmsley, Ont. The pillar indicates the thickness of the ore-body in the east workings.

The Report points out the dependence of Canadian producers of graphite on the United States market, and reviews at length the war-time restrictions intended to discourage the importation of foreign graphite and encourage domestic production in the United States and Canada. The two countries seem to have worked as a unit, and, whether domestic producers in North America can hold their own against importations from Ceylon and Madagascar or not, it is certain that as a result of the impetus of the war a great deal more is known about the graphite deposits, and their economic possibilities than was the case before the war.

All restrictions governing the importation of foreign graphite and the required use of twenty per cent or more of Canadian or Domestic flake in the United States were removed in January, 1919. Restrictions against importation of foreign crucibles were also removed.

Limitation of Economic Possibilities of Graphite Deposits.

Summarizing the economic possibilities of graphite deposits, in which, of course, local factors such as transportation, fuel costs and labor supply play an important part, the Report states that commercial flake graphite ores may be said to range all the way from 3 per cent carbon content upwards, although 3 per cent ore would be of exceptionally low grade, and only to be regarded as of economic importance in the case of large ore-bodies. The average content of the ores worked in Canada is 10 to 15 per cent, which is considerably higher than most of the deposits in the United States.

"The economic importance of a "flake graphite deposit is in "very large degree dependent "upon a cheap and efficient "concentrating process. Should "oil flotation prove the solution "of the difficulty which has long "embarrassed the flake graphite "industry in this country, large "quantities of material, hitherto "considered of too low grade to "work will be converted into "milling ore."

Graphite Occurrences and Mines in Canada.

The Report deals very fully with every graphite occurrence, mine and mill in Canada, and, as is proper because of the dominating position of the property in the industry, pays considerable attention to the Black Donald Mine in Renfrew Co., Ontario. The occurrences as summarized are referred to as follows:

The graphite occurrences in Canada that have hitherto received any measure of attention lie in the eastern portion of the country. The disseminated flake deposits are found in the Provinces of Ontario and Quebec, and within a radius of 150 miles of Ottawa. The Canadian graphite industry at its inception (1866-70) centered in the more or less immediate vicinity of Buckingham, Que., about 25 miles east of Ottawa, but the earlier mills in this district have long been out of operation. In recent years, some half dozen mills have been in more or less intermittent operation in the Buckingham area, all engaged in the production of flake graphite. Crystalline graphite, or plumbago, also occurs in this region, but the veins, as a general thing, have been regarded as too narrow for profitable development. In more recent years, several flake graphite properties have been exploited in Ontario, in the region lying immediately to the west of Ottawa, and five mills have been erected in this section. Little, if any, crystalline graphite has been reported to occur in this district, the graphite all being of the flake variety. The occurrence on concession I, township of Brougham, in Renfrew county (Black-Donald mine), of a mass of high grade flake ore is noteworthy, since such a graphite body is probably unique among known graphite deposits. The ore consists of rather small flake, the greater part of which is too small for the requirements of the crucible trade, but containing local streaks of larger flake. The richness of the ore varies from 0 to 80 per cent graphite carbon, and the ore-body, which dips approximately vertically and is enclosed in crystalline limestone, has an average width of about 40 feet.

Flake graphite has also been reported from several points in British Columbia, but none of the occurrences have been worked. Crystalline graphite has been found at various localities in the Northwest Territories and Labrador, and a deposit of this material was worked during 1917 and 1918 on the south side of Baffin island. A small tonnage was secured during these operations and shipped to the crucible trade. The material is reported to be equal to the best Ceylon plumbago for this class of work.

Amorphous graphite was worked a number of years ago near St. John, New Brunswick. The ore here consists of impure, graphitic shales and slates, and the material found employment in foundry facings and paint stock.

The number of graphite mines and mills in operation during the last few years has averaged about half a dozen; in addition to which there has been intermittent work on a few deposits which, for one reason or another, have not reached the producing stage.

Mining Methods.

There is nothing unusual about the mining methods at Canadian graphite mines, and no really deep openings or shafts have been undertaken. Detailed particulars, with sections of the mine workings in illustration are given of the mine of the Globe Graphite Mining & Refining Co. North Elmsley Ont. and of the Black Donald Graphite Co.

Foliated plumbago, from near Lake harbour, Baffin island. This material is reported to be the equal of Ceylon plumbago for crucible work.

Concentration and Refining of Graphite.

Concentration of graphite is different to the concentration of metals from ores inasmuch as the value of the concentrate depends largely on the shape and size of the individual particles or flakes, and while the percentage of carbon content is, of course, an important consideration it is not more important than the separation of graphite from the ore in the form demanded by commerce.

The Report goes so fully into the various methods of concentration used that condensation is not possible, and those who are interested should obtain the Report for perusal. Film flotation, which is practised in the Alabama field, has been tried in Canada, but the presence of associated mica particles lessens the selective efficiency of this method in many Canadian ores. A desideratum appears to be the minimum amount of coarse grinding and the least possible attrition of the graphite particles in the separation processes.

Uses of Graphite.

The outstanding physical properties of graphite, namely its refractoriness, inertness, high electric and thermic conductivity and resistance to attack by chemical agents render it of extreme importance in a variety of modern industries, while its lustre, complete opacity even in the thinnest flakes, softness and slipperiness, are additional properties that have extended its usefulness to several important branches of industry.

In order of present importance, the principal uses of natural graphite are in the manufacture of crucibles, lubricants, pencils, foundry facing, paints, stove polish and dry batteries while small amounts are also used in electrotyping and as a boiler scale preventive. According to a competent authority, the world's production of natural graphite is divided among the more important of the industries mentioned above, approximately as follows:—

	Per cent.
Crucibles	75
Lubricants	10
Pencils	7
Foundry facing and stove polish	5
Paints	3

It is obviously impossible to ascertain the proportions with strict accuracy, and the consumption of several of the minor industries will doubtless reduce the above percentages slightly, without, however, materially altering the ratio.

The Report goes very fully into the manufacture and uses of graphite crucibles, but mentions that the growing use of electric furnaces is displacing the crucible process.

The pencil industry, now firmly established in the United States to the displacement of Austrian and German goods, is a considerable user of graphite, most of which comes from the Santa Maria Mines, near La Colorado, Central Sonora, Mexico. The Report states that there are no known Canadian deposits of graphite that provide a material for pencils comparable with the Mexican product.

Both in quantity and richness of the ore, the Black Donald Mine excels all other reported Canadian deposits, and the Report states that the annual production of refined graphite of all grades from this source has greatly exceeded the combined production of all other Canadian refining plants. The deposit "is the richest and largest body of flake graphite so far known in either the United States or Canada." The average graphitic content of the ore of 65 per cent, but zones of material ranging as high as 80 per cent occur locally. Much of the ore secured, therefore, has been pure enough in its natural state to find employment in foundry work.

Artificial Graphite.

Artificial graphite is made on a very large scale at Buffalo and Niagara Falls by the Acheson Graphite Co. in electric furnaces from anthracite. During the last three years the Acheson Co. has made an average of ten million pounds of artificial graphite annually. (See "Journal," July 16th, page 577.) This quantity represents only the manufactured graphite that comes into competition with natural graphite, and is used chiefly in the manufacture of graphite, electrodes, graphite brushes, and in the filling of dry batteries.

Summary.

The conclusions indicated by a perusal of the Report are that the domestic producers of refined graphite in the United States and Canada, if the production is not to still further decline from 1919 figures, will require tariff protection against imported materials; and that, comparing the United States and Canada only, the Canadian producer is not unfavorably situated because of the relatively higher graphitic content of the ores in Canada.

The bulk, if not almost all of the various grades of refined graphite produced in Canada, is exported to the United States, and Canada herself is required to import a not inconsiderable quantity of manufactured goods in which graphite plays an important constituent part. The extension of our graphite industry to include a modicum of domestic manufacture of such goods is plainly suggested, the graphite mining industry being in this respect analgous to asbestos mining. There are, indeed, several instances where graphite and asbestos are combined in articles imported into Canada, both materials being in all probability of Canadian origin.

PERSONAL

Hon. Robert Drummond, Editor of the Maritime Mining Record, has sailed for England, and expects to visit the mining fields of Scotland and England, to obtain first-hand knowledge of conditions. The "Journal" wishes Mr. Drummond a pleasant visit and a safe return to Nova Scotia.

METAL QUOTATIONS

Fair prices for Ingot Metals in Montreal, August 4th, 1920:

	Cents per lb.
Copper, electro	24½
Copper castings	24
Tin	55
Lead	10¼
Zinc	10½
Aluminum	9½
Antimony	9½

Northern Ontario Letter

THE SILVER MINES.

Althoug the price of silver has strengthened considerably, the silver hoard at the mines of Cobalt continues to increase. The leading producing companies apparently are not yet satisfied that quotations have found the high level which appears to be warranted by the law of supply and demand.

Early in the week, intimation came from New York that the antagonism of those interests which have been "bearing" the price of silver had been withdrawn, but the advice did not leave an altogether favorable impression at the mines of Northern Ontario, where it is generally conceded the antagonists are confined to Great Britain and her far-flung influence in the Far East.

In regard to the silver situation, however, mining men who claim to be in touch with the activities of British metal brokers and metal authorities are not quite sure but that a gamble in silver may yet materialize that might reasonably send quotations to a higher level than ever before reached. This, of course, is conjecture on their part, and cannot be offered as a prediction. Attracted by reports of a new silver discovery in the Harricana River district south from Amos in Northern Quebec, a large number of prospectors from the Cobalt and Haileybury district joined in a rush to the new field. Returning prospectors allege that the so-called find consisted of some leaf silver placed by artificial means in a crack in the formation. They are thoroughly convinced that the thing was "salted," and have accordingly returned without staking any claims. A number of those who joined in the rush, however, have remained in the district to prospect for gold, the formation being attractive.

Flotation equipment is being installed at the Temiskaming mine for re-treating the large pile of sand tailings which has accumulated from past operations. With the present improved methods of treating the material and with silver at the present high price, it is believed the margin of profit per ton treated will be considerable and that by late September the work will be well under way.

Quick liquid assets of the Nipissing Mining Company as of the middle of 1920 were $5,065,211. This is the highest on record for the company. It is made up of $3,362,214 in cash and United States and Canadian war bonds, together with $1,702,997 in ore in transit on hand and in process as well as bullion stored at the mine. It is the plan of the company to accompany its October dividend of 5 per cent with a bonus of equal amount. The January dividend will also be accompanied with a 5 per cent bonus. This is the usual custom and will call for the disbursement of $1,200,000 in the two distributions—October and January.

Considerable activity is taking place in the recently opened Gillies Limit. The number of mining claims recorded is not large, but quite a number have been staked and are being systematically prospected before being recorded. Those interested in the new field are quite optimistic about the outlook.

A discovery of peculiar interest has been made at a depth of 800 feet on the Crown Reserve mine. It consists of gold in quartz, occurring in quantities of as high as $12 to the ton. There is not much of the gold-bearing ore and the find is not regarded as of any material importance. This is the second similar freak occurrence in Cobalt, a small showing of gold having been found some years ago on the Kerr Lake mine.

It is learned this week that the Crown Reserve Company is extending its activities to the Harricana River district in northern Quebec, and has a number of men engaged in exploring a prospective gold property south from Amos station on the Transcontinental railway. The property lies on the mainland at a point close to the Siscoe property which is located on an island.

Published reports in such papers as the "Toronto World," "Mail & Empire," Toronto, and "Northern Miner," relative to a big new silver find having been made on the Miller Lake O'Brien at Gowganda are not correct, according to authoritative advice to the correspondent of the "Journal." It is stated that the company recently shipped a large specimen of silver ore to the Royal Museum, Toronto, the sample having been taken from the main vein which has been worked for a number of years. This appears to have given rise to the erroneous and misleading reports concerning a big new discovery.

Good headway continues to be made on the Keeley Silver Mines in South Lorrain, where the installation of an 80-ton mill should be completed within the next two months or so. Underground developments are satisfactory and the indications appear to be that the mine will be on a steady producing basis before the year is out.

At the Dickson Creek property, situated about seven miles from Cobalt and located along the shore of Lake Temiskaming at a point about half way between Haileybury and New Liskeard, a station is being cut at the 250-ft level preparatory to carrying out lateral operations. The vein dipped from the shaft at a depth of 200 feet, and it is estimated to lie about 25 feet from the shaft at the 300-ft. level. Work is confined to conglomerate formation, the underlying diabase being estimated to lie at a depth of about 350 feet. The operation is conducted by English interests, the address of the mine office being Haileybury, Ont.

The Mining Corporation of Canada is negotiating for the purchase of a certain part of the Right-of-Way Mines lying adjacent to the McKinley-Darragh, Princess, Silver Queen and Mining Corporation territory. It is believed the deal will reach successful consummation. It does not involve any very great amount of ore, and it is believed that the purchase price will be moderate.

At the 150-ft. level on the Oxford-Cobalt property, the cross-cut has reached the vein and drifting operations are now under way. The vein is about eight inches in width and contains smaltite together with other mineral. Silver values at the present point are low. It is planned to drift about fifty feet each way continuing the shaft another 100 feet in depth.

Ore Bullion Shipments.

During the week ended July 30, two Cobalt companies shipped an aggregate of four cars containing approximately 311,388 pounds of ore. The Nipissing alone sent out three cars containing nearly a quarter of a million pounds.

Following is a summary:

Shipper.	Cars.	Pounds.
Nipissing	3	245,388
Dominion Reduction	1	66,000
Totals.	4	311,388

During the corresponding period, no bullion shipments were made, from which fact it is clearly evident that the great hoard of silver in the vaults of the local mines is steadily increasing.

The policy is one which if adopted in a general way by producers in other countries would probably quickly break the attempt of big financial interests to hold the price of silver down. The vaults at the mines of Cobalt actually contain an aggregate of around three million ounces of silver, which is equal to about 125 tons or more than four carloads of silver.

THE GOLD MINES.

The acute shortage of labor at the leading producing gold mines is being relieved only gradually, although the next few months promises to bring greater relief in this respect than any previous period since the war caused general curtailment.

As a result of the increased pay which the mining companies gave to their men last spring, the cost of mining has shown a substantial increase at the big producers where large forces are employed. The indications are that mining costs at the Hollinger Consolidated for this reason may show an increase of between 50 cents and $1 a ton. At the same time, however, it was only because of this increase in pay that the company has been able to secure forces with which to work the mine at two-thirds capacity. Had the old wage scale been continued, it is obvious the operations would have been reduced to perhaps well under half capacity, with a corresponding decline in profits. The increase in pay is generally believed to have been wise and has assured the company of net profits adequate to cover dividend requirements at least at the rate of seven per cent annually and is tiding things along until such time as general re-adjustment takes place.

Official announcement is made that the Porcupine V.N.T. directors have accepted the offer made by Toronto and London interests to underwrite 600,000 shares of treasury stock. A block of 200,000 shares were immediately taken up at 15 cents each, and the recommendation has been made to resume work at once on the strength of the $30,000 thus secured. The syndicate has an option of six months on the second block of 200,000 shares at 30 cents each, and an option on the remaining 200,000 shares for ten months at 50 cents a share.

August promises to prove a vital period for the Dome Mines as well as for the Dome Extension. With the Dome option on Dome Extension up for consideration and final decision by September, the August meeting of the directors of the Dome promises to be of much importance.

As a result of the extensive deposits of ore being opened up at depth on the McIntyre-Porcupine, the physical condition of the mine is being added to at a rapid rate. The mine is firmly established as the third largest producer in the Dominion and may even be a close contestant with the Dome Mines for second position. At a depth of 1,125 feet an ore shoot nearly one-quarter of a mile in length has been opened up in vein No. 5. At the succeeding levels, 1,250 and 1,375 there is every reason to believe similar results will be achieved. In addition to this, recent diamond drilling operations have indicated rich ore at a depth of 1,600 feet. With one main haulage level established at a depth of 1,000 feet to which all the ore from the upper levels falls through chutes, the McIntyre management is establishing another main haulage at a depth of 1,375 feet for the purpose of handling all the ore between that depth and the 1,000-ft. level. By this method of mining, the ore falls through chutes, is drawn off into cars, conveyed by miniature electric railway to the main shaft and hoisted to surface from where it passes over an aerial tramway to the mill with a minimum of manual labor, plus that required to operate the mechanical equipment.

A deputation of Kirkland Lake and Larder Lake mining men which waited upon Premier Drury recently, requested the Government to construct an extension of the Temiskaming and Northern Ontario Railway to Kirkland Lake with a view toward extending it right on to Larder Lake by way of the Argonaut mine in Gauthier township. The Premier told the deputation the Government would build the railway provided the property owners permitted a Government appointed engineer to enter the mines and report to the Government as to the resources, and to form an estimate of the amount of traffic indicated. The Kirkland Lake mining men, as well as the manager of the Argonaut Gold Mines appear to be satisfied that the offer is a good one, and are content to let the Government engineer enter the mines. Such does not appear to be the case, however, in regard to the Associated Goldfields. It is reported that Dr. McKay, of the latter company, does not desire to submit the property to an independent examination and is understood to have told the Premier that if the Government would build the railway to the Argonaut, the Associated Goldfields would itself build the line from that point to its property at Larder Lake. Just what attitude the shareholders will take in this matter is difficult to say, but it seems obvious that suspicion will be aroused in connection with the property if the President turns down a chance of having the Government build a railway, the cost of which would be at least $40,000 a mile. Several miles separate the Goldfields from the Argonaut, and the cost might reasonably amount to close to half a million dollars. It is pointed out that if the recent annual report of the Associated Goldfields is correct, the attitude of the President is difficult to understand.

Construction work on the Wright-Hargreave mill at Kirkland Lake is progressing rapidly, the building itself being almost completed. The work of installing equipment is also well advanced, and the earlier estimates promise to be fulfilled and the mine placed on a producing basis during the last quarter of this year.

Reports are current that a consolidation may be arranged between the Orr Gold Mines and the Hunton-Kirkland. The negotiations have not advanced very far at the time of writing, but the prospects of something of the nature being done are said to be favorable.

During the course of continuing the main shaft of the Bidgood Gold Mines from the 200-ft. level toward the 300-ft., a large vein has come into the shaft from

the south, and is believed to be a 24-foot vein which shows on surface a short way south of the point where the shaft was commenced. Channel assays are being taken and the mineral content of the body will be ascertained within the next few days. Once a station is established at the 300-ft. level, it is proposed to carry on lateral operations along this wide vein as well as on another vein some seventy-five feet farther north and which at the 200-ft. level had a width of close to sixteen feet.

The directors of the Lightning River Gold Mines have just concluded a visit to their property and are optimistic over the outlook.

With regard to the shower of writs which farmers in the Sudbury district have issued against the International Nickel Company with a view to recovering various amounts for alleged damages from sulphur fumes, considerable discussion is heard among mining men.

One prominent mining man who has had experience in other countries, stated to the writer that without any intention on his part to venture an opinion as to the justice of any or all of the claims entered against the International Nickel Company, he nevertheless was of the opinion that the matter should be quite easily adjusted. His opinion and comment was thus:—

If the claims entered are found to be unjustified after having been thoroughly investigated, then a general dismissal of the writs will be in order. On the other hand should these claims be justified in whole or in part, the Government might indeed be well advised to turn to New Zealand for an example as to how to deal with the matter. This mining man stated that in New Zealand, the holder of land values his own property, and is taxed on his own figures. In turn, the Government has the right to redeem this land at such valuation, plus moderate addition for inconvenience caused. At times when such a dispute arises over alleged damage, the owner of the land is prevented from presenting unreasonable claims by reason of that fact that the assessed value of his land is accepted as its value.

It might not be unreasonable to suppose that the assessed value of the Sudbury farms might be averaged up for the past five years, and with a moderate addition for the increased value of land at present might be found to constitute a basis from which to calculate the measure of damage done, if any.

This method, it is thought, might go a long way to curb any attempt on the part of owners of more or less worthless land, turning "sulphur farmers" and imposing an unjust penalty upon the nickel industry, which is of very great importance and benefit to this country.

In referring to this, the gentleman interviewed did not mean to infer that such unjust claims would be made, but events in the past have tended to show that where one individual might have reason for some complaint, others have not been adverse to attempting to profit by entering alleged similar claims for damages.

The MacLeod River Coal Mine is shipping regularly to Prince Rupert. It is located about 800 miles from the Coast on the Grand Trunk Pacific Railway. The present production is 4 carloads a week which is being marketed in Prince Rupert and Edmonton.

BRITISH COLUMBIA LETTER

The Metal Mines

The season's work has been well underway in the Portland Canal district for some weeks. With the snow gone and prospectors and miners in the hills the towns of Stewart and Hyder are almost deserted. On the various properties along the Salmon and the Bear Rivers, however, activity prevails. The only notable new discovery reported is on the Georgia River, a few miles down the river from Stewart,, where a number of gold bearing claims have been recorded. Samples indicate that they are rich but their possibilities must yet be established by development. The Marmot River also is being well prospected and many promising claims have been located. For the rest development work is continuing on all the better known mines and prospects of the Portland Canal and road construction is in progress to assist in the opening up of the mineral zone. The Unicorn Group is to be drilled, a contract having been awarded to Lynch Bros., of Seattle, Wn., and F. P. Stewart, familiarly known as "Pap," has returned to the camp to supervise plans for the opening up of the Mountain Boy Group of Crown Granted Mineral Claims. "Pap" is a pioneer of the Portland Canal District, being credited with responsibility for directing the attention of Sir Donald Mann to the potentialities of the district.

Invermere, B.C.

The Silver King Mining Property, operated by the Toby Greek Mining Co. Ltd., of Vancouver, B. C., and situated near the Jumbo Fork of Toby Creek, is showing up extremely well. At about 90 feet from the surface a cross-cut is being driven towards the overhanging wall of the lead to the south of the tunnel. This cut has opened up a ledge about 80 feet wide of high grade silver lead ore, which is reported to range in value up to $100 a ton, the most important of the mineral content being silver. There is considerable shipping ore already on the dump. From what now is apparent and from the general indications it would seem to have been established that the Silver King Shortly will become one of the regular shippers of the Province. A road is under construction the completion of which will solve the question of transportation.

Trail, B. C.

Ore receipts at the Trail Smelter of the Consolidated Mining and Smelting Co. for the week from July 7th to 14th totalled 4,810 tons, making the aggregate for the year to the latter date 159,368 tons.

Kimberley, B. C.

The mineral resouces of southeastern British Columbia and Alberta is the subject of an article recently published under the name of P. A. O'Farrell who declares that "in the Kootenays, the Kettle Valley, and on the Island of Vancouver there are copper mines which can easily supply all the copper which the British Empire May need for a century to come; that there is more and better coal in Southern Alberta and the Kootenays and Similkameen than in the whole of Europe, including England and Russia; and that there is more iron ore and valuable standing timber in Southern British Columbia, including the Island of Vancouver, than in all Europe." He asserts that "had the Kootenays been located in Europe, Prussia

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and other pirate nations would have spent billions in treasure and rivers of blood for their possesion." Dealing with the mineral resources of the Kimberley District specifically Mr. O'Farrell states that here are found deposits of lead and zinc and iron sulphides which are extensive enough to supply all the zinc and lead which Canada and the Empire will need for a century," for beneath five, six or seven square miles of land on the eastern slopes of the Selkirks a blanket of mineral lies embedded between two layers of quartzite at an angle of 22 degrees from the horizontal." He then goes on to describe operations at the Sullivan Mines. He says, in part:

"The Consolidated Mining & Smelting Company owns 2,500 acres of this mineralized territory. It is driving two long tunnels into the mountain to find how far the blanket of mineral extends. It also is boring two a half miles lower down the valley to tap it at a depth of 2,500 feet. How far this great mineral deposit extends to the east or to the north cannot be fully determined for years, but enough has been done to demonstrate that from Kimberley alone Canada and the Empire can draw all the zinc and lead they require for a generation or two. If this phenomenal continue as constant and as regular as they are made mineral deposit extends five miles down the slope and five miles to the north, and if the ore values the 500 acres already proved up, these ore deposits at Kimberley will make Canada a supreme factor in the lead and zinc markets of the world.

"I have already stated that one stope which I examined, 8,000 feet from the portal of the tunnel, would yield 30,000 tons of ore to the acre. In the other two stopes, 2,200 feet higher up, the distance between the hanging wall and the floor was occasionally 150 feet From each of these stopes they broke down 150,000 tons of ore, or 300,000 tons from about six acres. In other words, 60,000 tons to the acre.

"In one stope the ore ran 50 per cent lead and 10 per cent zinc, and 8 ounces of silver. In the other 30 per cent zinc and 10 per cent lead and 3 ounces of silver. The gross metal and silver values of this ore, therefore, for 800 pounds of metal and 5 ounces of silver at current prices would be $70 to the 2,000 pounds of ore. Under each acre, therefore, were $3,500,000 worth of metals and silver, but the general run of the ore is not so rich nor much more than the average of 20 feet between the hanging wall and the foot-wall. An average for all the ore extracted will be little over 500 pounds of zinc and lead and three or four ounces of silver to every 2,000 pounds of ore. Sixty per cent of the whole deposit so far proved will furnish ore of this average.

WANTED.—Mine Foreman for Nova Scotia mine; must be experienced in drifting, shaft sinking, shaft timbering, etc.; one who can train men to do such work or who can bring a following of experienced men with him. Single man preferred, as mine is twenty miles from railroad and no family houses available. Camp has electric light and good bunk houses. Good board is provided. Write giving references and salary desired, which will be supplemented with bonus in proportion to results achieved. Address—Canadian Mining Journal, Box 17, Gardenvale, P.Q.

"The other third of the deposit is a sulphide of iron containing smaller quantities of lead, zinc and silver which the management does not reckon as of any present value. They mine and ship the iron pyrites to make the sulphuric acid needed in the Company's metallurgy or in the western markets. No effort is made to find and work the big stopes and the rich ore. All the ore is extracted and the whole, as I have already said, will yield 500 pounds of lead or zinc out of every 2,000 pounds of ore. It has taken eleven years of constant research and metallurgical experiment to find the chemical reagents and metallurgical equipment necessary to segregate the zinc, lead and iron sulphides contained in these ores. The Broken Hill ores of Australia are of similar character and the Germans who controlled them made fair recoveries through oil and water and alkali concentration but they never succeeded in making a really pure zinc or pure lead out of the concentrates.

"But the Trail metallurgists have succeeded in making pure electrolytic zinc and electrolytic lead out of the Kimberley ores. At Tadnac (Trail) the zinc sulphide is calcined and then dissolved in dilute sulphuric acid and recovered on plates by electrolysis. If the mineral operation is not complete and particels of lead and zinc sulphides get into the sulphuric acid they remain as tailing or slimes but a way has been found to segregate the zinc in these tailings.

"I am giving these details to show that Canadian and American electro-chemical metallurgists are achieving better results in the recovery of metals than the Germans were able to effect with all their boasted knowledge of chemistry, and it is also interesting to know that at Tadnac was built the first metallurgical plant which manufactured electrolytic zinc for the world's markets."

Hedley, B. C.

There are employed at the Nickel Plate Mine, Hedley, B. C., about 150 men, two third of whom are at work underground and the remainder either at the mill, situated at Hedley, or the power plant. The Company is extracting gold bearing ore running, on average, $9 to the ton. As it costs about $8.50 a ton to mine, the profits are not large, in fact they are so negligible as to be scarcely worth mentioning. This was not so when the ore approximated $12 a ton, and it is stated that considerable development is planned in expectation that a body of richer ore will be encountered. Ore is ation of the richer ore will be encountered. Ore is being taken out of the Nickel Plate at several levels, the upper one being six hundred feet lower still. Ore cars holding two tons run on a narrow guage electric railway for a mile out of the mine. Then the ore is dumped into a tripple at the top of a steep side hill. From the tipple the gold-bearing ore is dumped into cars operating on long steel cables and running down a side hill that seems almost perpendicular. The long slide to the mill in the town itself is made in two sections and passengers who go up or down on the ore trams sit tight and fervently hope that nothing breaks. A trip to the Nickel Plate in one of the little ore cars beats anything in the roller coaster line on any midway.

Victoria, B. C.

That oil has been discovered in commercial quantities in the Peace River Country is the effect of reports, apparently well authenticated, from Peace River Town, near where the Peace River Petroleums Ltd. is operating. Crude oil, it is said, will be delivered to customers before the end of the present season. In No. 1 Well the bore is being enlarged from six to eight inches, which work has progressed beyond the 1,000 foot level. No. 2 Well, two and a half miles below Tar Island, has been started. Drilling equipment is being installed at Hudson's Hope, and on the Upper and lower Smoky River. At the San Joaquaim Well it is said that 20,000,000 cubic feet of gas is escaping daily, that it is a wet gas containing a good deal of gasolene, and that the Well will be capped and provisions made for the recovery of the gasoline and the saving of the gas.

The Department of Mines, Ottawa, claims to have discovered a process by which crude oil may be recovered from the tar sands which occur so extensively in the neighborhood of Athabaska River, near Fort McMurray. A reserve of 55,000 acres of such land has been created.

Nelson, B. C.

The Blue Bell Mine, Riondel, B. C., is the largest property to come under the interdiction of the One Big Union. This organization has demanded for the workers in that mine a scale of wages which, it is said, to amount to an increase of 40 cents per day over what was being paid. The Blue Bell is the oldest mine in the Kootenay, dating back to 1865, and is operated by the New Canadian Metal Company, the manager of which is S. S. Fowler, one of the most highly respected metal mine operators of the Province.

TORONTO NOTES

Mr. Frank C. Loring, Sun Life Building, Toronto, has just returned to the city after an extended stay in London, Eng. in the interests of Northern Ontario mining properties. Mr. Loring states that he has sufficient faith in the standing and reputation of Canadian mining amongst British investors and promoters to return to England and open an office in London, which he proposes to do shortly. Mr. Loring pointed out that South African production was falling off and that Canada seemed to be the only country left in the way of a gold producer. Canada is becoming increasingly popular amongst the financiers in the Old Land, as is evidenced by the space being devoted to Canadian mining and other industrial affairs in the British journals and he predicts that Canadian mining investments are destined to occupy a large place in the British financial world. Mr. Loring will remain in Toronto till October and will then return to London where he will open an office as consulting engineer He will, of course, retain his office in Toronto, which will be looked after by his son.

At a special meeting of the shareholders and directors of the Porcupine V. N. T. Mines, held in Toronto on Tuesday of this week the offer by Hamilton B. Wills, on behalf of a syndicate he has formed, for the purchase of 600,000 shares of treasury stock of the company at an average price of 31¾ cents a share, was accepted. The scheme has been adopted as a substitute for the mortgaging of the property to the Associated Gold Mines of Western Australia to the extent of $50,000, which had originally been proposed. English interests agreed to the proposition so that fresh funds for development purposes will come both from Canada and overseas. It is expected that actual mining operations will be under way by Oct 1st.

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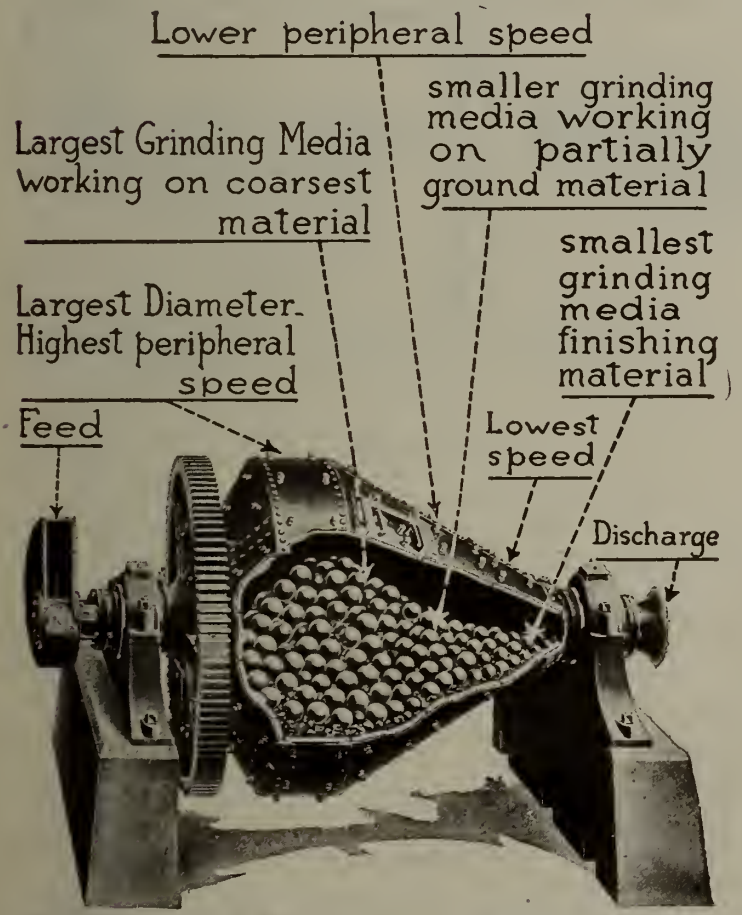
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Largest Diameter. Highest peripheral speed
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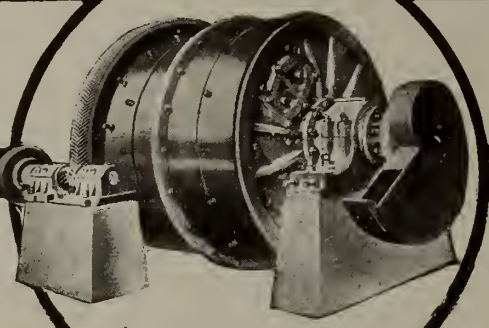
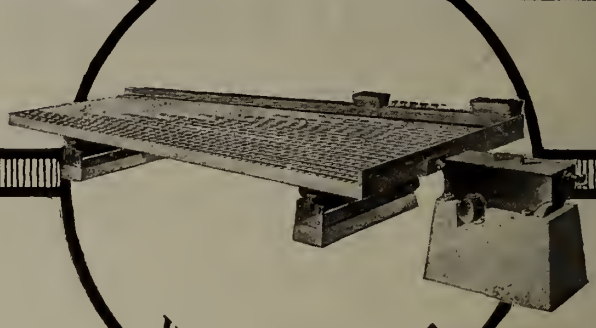
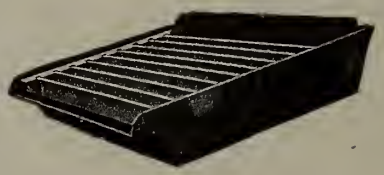


MARCY MILL



WILFLEY TABLE

PERFECTION OIL AND ACID FEEDER



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:-: EDITORIAL :-:

Government Loan to Coal Mining Companies Suggested to Increase Production of Coal

The Government, through the Sub-committee of the Railway Commission, to which has been entrusted the movement of coal at this time, has placed an embargo on export shipments of coal from Nova Scotia, except to the United States and to Newfoundland. This action may have seemed to be unavoidable, but leaving this phase of the matter on one side, it is not constructively helpful inasmuch as it does not in any way tend to increase the production of coal. Actually, it will discourage production by debarring the coal operators from the most profitable market in the history of bituminous coal demand.

During the war period, and without losing sight of the valuable services rendered by the Dominion Fuel Controller or the embarrassments of the Government, we believe the authorities were always much more preoccupied with the idea of reducing the price of coal and controlling its distribution than they were impressed with the necessity for increasing the coal output. The word "control", was in itself a misleading word, and responsible for much misconception. What the coal industry of Canada has required in the past, and urgently requires at this time, is not control, but encouragement. Although coal is much more costly than ever before, it is nevertheless one of the cheapest of raw materials, considering the labor and risks involved in its production. A little shortage reveals that coal is cheap at any price, and, where the root of the problem of fuel supply is—as it is in Canada—a question of deficient production, cost is a secondary matter.

The general attitude of the Canadian public towards the coal producing industry—of which the policies of the large purchasers and any government which happens to be in power is a natural and necessary reflection—has been that when American coal is to be had in plentiful quantity and at low prices the domestic producers must put up with the inexorable functioning of the laws of supply and demand. When a national emergency arises the cry is raised that domestic resources should be reserved for domestic needs, and "control" of the industry is at once instituted. Briefly, this means that in slack and easy times the coal industry must take its chance of making money, and in good times it must not be allowed to make profits. A continued course of this treatment cannot but result in enfeeblement of any industry, and is responsible for the present entirely unsatisfactory condition of domestic coal production in Canada.

In Nova Scotia there exists a shortage of coal production that is between two and two-and-a-half million tons annually. The export embargo will affect possibly from 300,000 to 400,000 tons of coal, for which good prices are obtainable. If coal production had been sustained, Nova Scotia could have supplied both Canadian and foreign markets. If the Government prohibits profitable export of coal in order to fill domestic requirements—which it is always admitted is a proper proceeding—it thereby assumes responsibility for the financial condition of the industry which it takes control of, and if, in order to serve a national need, the coal industry is deprived of profitable business the proceeds of which would provide much needed capital for development, then it devolves upon the Government itself to find the capital.

The President of the Dominion Steel Corporation has announced that a sum of $4,500,000 or thereabouts is to be expended on the extension of the collieries controlled by this Corporation, but it must not be assumed that this sum, comparatively large enough it may be, in anything but a small degree represents the capital expenditure necessary to enable the Dominion collieries to produce an output commensurate with the extent of the coal areas, or the domestic demand for coal. An expenditure of $20,000,000 could be conservatively and profitably made upon these collieries, but a really adequate expenditure would be so large that it could not possibly be undertaken by any private corporation.

There are a number of considerations which, cumulately considered, indicate that financial assistance in the development of new collieries should be given by the Federal Government. These considerations include the following. During the war period the enlistment of miners was relatively greater than that of any other class, and enlistments from amongst these most essential munitions-workers were not restricted as they should have been. The praiseworthy desire of the miners to be recognized as war workers—which would have lessened the number of enlistments—was

never acknowledged, although badges were granted to munition workers of far less importance. The coal-freighting steamers of the coal companies were requisitioned for a length of time that has occasioned a discontinuance of coal shipments from Nova Scotia to Montreal of about five years. During the war period the price of coal was controlled in a manner that limited the profits of the companies, but at no time did the Government undertake to increase the coal output by financial assistance as was done in the case of other munitions. The Government did not during the war period, nor has since the Armistice, given tangible aid, or adopted any other attitude but a critical and watchful one, towards the coal industry. We submit that it would have been much better for Canada if the resources of the Government in the shape of financial assistance, of relaxation of immigration regulations, of assisted immigration, of freighting vessels and railway conveyance, and indeed every possible form of state encouragement and aid had been given to the coal industry. The millions of dollars lost in adverse exchanges would have been must better expended on the opening of new sources of coal supply. There is no corner of our national life where endeavor has not been restricted and expansion throttled by the insecurity of coal supply. The problem is not, however, an insoluble one. It may be that only a partial solution will be found possible, but, in that event, the sooner we know it the better.

There are two phases of the coal supply problem before this country today. One is a pressing immediate emergency, requiring emergent measures. The other is a problem that will always be with us, a condition that is part of our national heritage, a congenital weakness that if we do not take steps to end, will eventually end Canada, as a national entity. The actions of the Sub-Committee of the Railway Commission at this time are temporary expedients to avert a threatened crisis, but will not the Government earn the lasting gratitude of our people by forming a permanent body charged with unremitting study of the fuel problem so that we may find out whether or not there is a permanent solution to a permanent problem?

There are a thousand and one loose ends in connection with our fuel question that need tying up. No concentration of the thought and advice of competent men actually engaged in the production, transportation and sale of coal in Canada has ever been attempted, except for snap judgments in emergent situations, and this does not count. It can never be accurately stated that any problem is insoluble until a concerted, determined and prolonged effort has been made to solve it, and this is precisely what has **not** been undertaken in Canada.

Demands of United Mine Workers in Nova Scotia Discourage Increase of Coal Production

The United Mine Workers of Nova Scotia at their own urgent request were granted a Royal Commission charged with enquiry into all phases of the working conditions at the collieries, and in particular with reporting upon the request of the union for a general wage increase in addition to the adjustment of January last. This Commission is sitting, and newspaper reports indicate it is going into matters thoroughly. A session is to be held in Halifax on August 9th, when, it is announced by the U. M. W. leaders, the first demand for an increase of one dollar a day will be replaced by a fresh demand for an increase of two or maybe three dollars a day. It is stated unequivocally by the President of the union that whether the decision of the Commission is favorable or not, it will either be entirely repudiated, or regarded as merely a temporary arrangement. Each successive demand of the United Mine Workers in Nova Scotia has been based on increases in the cost of living, but the actual adjustment made has included many other things, having to do with conditions of employment, that are even more irksome than wage increases inasmuch as they are deterrents to production. The newest demand is like previous ones in this respect.

The President of the union has made some most extraordinarily misleading statements to the newspapers. For example, he is reported as stating that he has the statement of the President of the Dominion Steel Corporation that the Dominion Coal Company can produce coal in Nova Scotia cheaper than either the American or Canadian operator by two dollars a ton. Such a statement could not have been made because it is not true. If it were stated that the American operator can produce coal at from two to three dollars a ton less than the Nova Scotia mines it would be about correct.

It is further stated that the coal companies are reaping vast profits on the world coal shortage. As to this, the Dominion Steel Corporation did not quite earn six percent last year, and any chance it had of making a little more this year has been spoiled by the embargo on export coal.

The new demands of the miners are not forced by necessity to keep up with the increased cost of living. Each agreement with the operators contains machinery for such adjustment as may be required by a continued mounting of commodity prices. The attitude of the men is based on erroneous ideas of the

profits of the operators, and a desire to share in the returns. At the same time the union is doing its best to kill this profitable business by its general policy to restrict production, not as is erroneously proposed by reduction of the individual efficiency, but by opposition to any attempt at intensive production, such as night-work, double shifts, and concentration of workers underground, by the introduction of shorter hours of work, and by determined resistance to any lessening of the number of non-productive workers or the importation of miners from abroad. Increased output of coal, an increase adequate to the demand, would enable the coal companies in Nova Scotia to pay adequate wages, to accumulate adequate financial reserves, to make adequate financial expenditures on new openings and to lay the foundations for steady employment for an increased force for many years ahead. But the present inadequate production, and the inadequate production of the last six years has placed the companies in the weakest position they have been in for many years. The business of a coal company is to produce coal. It is only functioning properly to the extent it produces coal. If the miners would manifest a genuine desire to increase production they would afford an opportunity to the operators to increase wages, but, unfortunately, while they protest with their months against alleged deterrents to production arising from lack of equipment, the greatest deterrent of all consists in their own attitude which imputes all possible blame to the operator, but assumes no tittle of responsibility on the part of the workers themselves.

CERTAIN POST-TIMISKAMING IGNEOUS ROCKS OF ONTARIO FOR WHICH THE NAME HAILEYBURIAN IS PROPOSED.

By Willet G. Miller and Cyril W. Knight.

In the pre-Cambrian of Ontario there is a widespread series of igneous rocks, of greater volume than formerly recognized, that intrudes the Timiskaming sediments but is older than the Algoman granite and gneiss. Descriptions of these rocks have been given in various papers and reports by the authors and their age relations have been discussed. For instance, in a paper published in 1915 the authors said[1]:

"It may be added that basic rocks of the age of sudburite are widespread and have frequently been mistaken for Keewatin[2]. They are represented by the peridotite and augite lamprophyre of the Porcupine region, one hundred miles north of Sudbury, and by the lamprophyres and other rocks of Cobalt, 90 miles to the northeast of Sudbury. For economic purposes, at least, some age name should probably be applied to these basic rocks."

[1]Journal of Geology, Vol. XXIII, p. 590.

[2]Sudburite is a lava, often with pillow structure but frequently schistose, that occurs in considerable volume in the Sudbury area. It has the same relation to norite as that of basalt to gabbro or rhyolite to granite. (Ont. Bur. Mines, Vol. 23, Part I, p. 215).

Diabase that appear to be of this age occur in considerable volume in the vicinity of Cobalt and elsewhere and at times are confused with the later Nipissing diabase. Gabbro-diabase and basic lavas of Hastings and other countries of southeastern Ontario are also of this age. The Correlation Table that accompanied our report in 1915 shows the occurrence of these rocks in several districts[3].

Since the publication of that report and other papers in which we have described and referred to these rocks we have found an age name for them more necessary, especially in connection with structural geology of the mines at Cobalt. In this area lamprophyres and the so-called "older diabases" are of common occurrence and reference has frequently to be made to them. While we are loath to introduce another age name, still as a matter of convenience we now propose to employ the name Haileyburian for these post-Timiskaming and pre-Algoman igneous rocks. The name is taken from that of the capital of the District of Timiskaming, the town of Haileybury. Dikes of certain of these rocks occur in the environs of the town.

Certain of the rocks that we class as Haileyburian are older than others but they are all post-Timiskaming and pre-Algoman.

The following table, with the addition of the name Haileyburian, gives the age classification employed by the geological staff of the Ontario Department of Mines, the names of the igneous systems or series being enclosed in parentheses, thus: (Laurentian intrusives), to distingnish them from the sedimentary systems[4].

Pre-Cambrian Epochs of Ontario and Their Metal Production.

Keweenawan.—Epoch, following basic intrusions, of (a) silver, cobalt, nickel, and arsenic at Cobalt and elsewhere, (b) nickel and copper at Sudbury, and copper elsewhere. Certain gold deposits, not now productive, appear to belong to this epoch.

Animikean.—Epoch of deposition of "iron formation" as a chemical precipitate. Includes the Cobalt and other series of sediments.

(Algoman).—Epoch, following granite intrusions, of gold at Porcupine and at many other localities, and of auriferous mispickel. Deposits of galena, zinc blende, fluorite, and other minerals appear also to have been derived from the granites, but some of them were not formed till post pre-Cambrian time.

(Haileyburian).—Preceding the intrusion of the Algoman granites, basic intrusives, of post-Timiskaming age, give rise to nickel and titaniferous and non-titaniferous magnetite deposits and chromite.

Timiskamian.—Epoch of minor deposition of "iron formation" as a chemical precipitate, with conglomerate and other sediments.

(Laurentian).—Granite intrusions probaly gave rise to ore deposits which have been removed by excessive erosion as is known to be the case with deposits of later origin.

Loganian (Grenville).—Epoch of deposition of extensive "iron formation" as a chemical precipitate, with limestone and other sediments.

Loganian (Keewatin).—Composed largely of basic volcanic rocks, many of which are now schistose.

[3]Ontario Bureau of Mines, 22nd. Report, Part II, Appendix.

[4]Journal of Geology, Vol. XXIII, p. 591.

Third International Mining Convention at Nelson. B.C. July 20th to 24th, 1920

(Reported by Robert Dunn, Victoria, B.C.)

With a large number of delegates in attendance, both from the different mining sections of the Province and from a number of the adjacent mining States, the third annual Mining Convention of Nelson, B.C., opened on the 20th of July and continued until the end of that week.

Those attending were welcomed on Wednesday morning (July 21st) by J. A. McDonald, the Mayor; Dr. W. O. Rose, member of the Provincial Legislature for the city; Hon. William Sloan, Minister of Mines for British Columbia; and R. F. Green, Member of the House of Commons for West Kootenay, the two latter speaking on behalf of the Province and the Dominion respectively.

The feature of the morning session, outside of the formal addresses, was a paper by A. G. Langley, resident engineer for the Kootenays, on general mining conditions in the Eastern Districts of British Columbia.

Mr. Langley reviewed the history of prospecting in British Columbia from the first discoveries of placer gold near Fort Steele by prospectors from the United States, and said that to one who had travelled the rugged mountain regions of the Kootenay district it was really amazing to see the places into which the pioneer prospector has penetrated, without the aid of trails and with his grub and blankets on his back. He advised search for fissures and crushed zones, and a careful look-out for float. He thought the average prospector went out into the hills to look for gold, silver-lead and copper ores and seldom gave the rarer metals a thought. He suggested it might be well for prospectors to familiarize themselves with the appearance of these minerals, and said that each resident engineer had a cabinet of specimens provided by the Government which could be inspected. He referred particularly to platinum, tungsten, pitchblende, tin and molybdenite. As pegmatite veins were often the source of rare minerals, he described the characteristics of these veins. He advised prospectors to get the best terms for properties, but not to hold them too long. Quick action was necessary, and he suggested that the prospector should ask cash for ore in sight, but that for further payments he should allow the purchaser sufficient time to develop and prove the property.

J. W. Mulholland, President of the B.C. Prospectors' Protective Association, gave a short talk on some of the problems affecting prospecting in the Canadian West. He emphasized the need of trails to facilitate the opening up of prospects; spoke of the need of exhibits of the rarer metals in order that those going to search for minerals might become conversant with those varieties not commonly found in B.C.; also referring to the organization of branches of the Prospectors' Association and the good work being done by the same.

In the afternoon, with S. E. Fowler in the chair, Nichol Thompson of Vancouver, gave an address on the possibilities of the Iron and Steel Industry in this Province. Iron, he said, was the basis of all industry and had been so looked upon from the very dawn of History, "for we find that when Croesus, in his ostentatious way was explaining to Solon the riches of his palace, including the gold in the treasury, the philosopher with a prophet's vision said to him: 'My friend, when a man comes along with better iron than thou, he will be master of all thy gold.'" Mr. Thompson pointed out that time had proven the truth of this for it not unfrequently happened that the surest way to a gold mine was through an iron mine.

The speaker traced the development of the iron and steel industry during the past sixty or seventy years, and then dealt more specifically with conditions in this province. He stated that the magnetites of the Pacific Coast were of a considerably higher grade than were found elsewhere in the world, as far as he knew. This was a point that did not seem to be generally appreciated. The statement that the magnetites could not be treated without haematite, was not correct. Such a theory had been exploded.

It seemed to him that the only question now was that of markets, and he did not think that there was any serious need for concern on that score. On this point he had been commissioned by capitalists considering investment in such an industry in the North-West, to make a thorough investigation of local market conditions. The results had been most satisfactory. There seemed to be no reason to doubt that it would be possible to absorb the output of a 250 ton furnace. He mentioned specifically the large consumption in British Columbia of tin plate for canning purposes.

Concluding, Mr. Thompson said, "Get the steel industry started and many other industries will follow. We have the ore and the coal to make coke, and failing coke we have the water power to generate electricity and the timber to make charcoal. All we require is capital and labour to co-operate in making this magnificent province the Greater Britain of the future."

Glenville A. Collins, who was Chairman of the International Mining Convention at Seattle, followed with an address on financing the prospector.

Mr. Collins said the prospector was a man of high ideals, and persistent faith, but he advised that he should learn more of the principles involved in raising money. "If prospectors knew how to deal with business men along business lines, there would be twice as many mines, and as many more mining fortunes owned by their discoverers. Business men lacked confidence in the prospector's knowledge of business principles, and asserted his belief that "any time a prospector approaches a live business man of capital, and demonstrates his knowledge of business principle as applied to mining, he may be sure of his backing."

The speaker said that the old stock company principle was on the wane. "To stock a mining prospect "today with the expectation of raising any consid-"erable sum by sale of shares is almost to guarantee "its failure." The speaker objected to corporate stock issues, and preferred unincorporated joint stock associations with non-personal liability, and proposed

a plan of co-operative prospectors' syndicates. The concluding part of Mr. Collin's novel and suggestive remarks are quoted in full, as follows:

Prospectors" Groups.

In these days of co-operation and collective bargaining, I am going to venture to suggest a plan of finance that so far as I know is new to mining.

Usually in any worthy district there are a number of prospectors working that are more or less accessible to one another. Say any number of such men meet together and organize themselves into a prospectors' joint syndicate. For the purpose of illustration, say there were five prospectors, and they all had several claims each; maybe some were better than others and possibly their idea of values of ore and property were inconsistent. These men come together and associate themselves (not their property yet) into a joint syndicate as trustees, whose object was to work to develop these properties and district. They jointly get together an accurate statement of the district represented, and its resources—this statement to be verified in so many ways as possible, one by the other, if need be; or by a reputable engineer if possible.

Such a joint syndicate could collectively bargain for grubstake, development capital, or sale of property, for any one of its individual trustees without tying up the claims. The syndicate could then apportion to each of its member trustees, on a specific claim or piece of work, such money as seems wise and needed in the judgment of the trustees, and with the proper legal and technical advice.

This kind of syndicate would represent a better speculation for capital than the ordinary individual property, because one would be assured of the honest collective judgment of several prospectors, their attorney and engineer, in making investment of syndicate funds, as against one individual, against one proposition, as in the present method of syndicate.

There are instances where such a plan can be worked out with success and in the financing of a whole group of prospectors, at one time, in ample proportions, and with many advantages as to legal protection, engineering assistance, dealing with smelter, and towards an honest and intelligent winning from nature of its coveted possessions.

These joint syndicate groups could in many instances become factors in a central association, such as your Prospectors' association here at Nelson. And where this is possible a Prospectors' association could work out a syndicate plan of group financing so as to supply funds to these individual prospector groups, thereby greatly strengthening this mode of finance and protection to the prospector at less cost all around.

Prospectors' Musts.

Now gentlemen, I have talked a lot, and said very little; but, to summarize before closing, let me repeat:

The prospector must learn more about business in order to interest capital.

He must be more careful about making his deals by securing proper advice.

He should hesitate before going in on a corporate plan of stocking a prospect.

He can wisely call together his neighbor prospectors and organize a co-operative joint syndicate.

He can work out a plan by such co-operation so as to finance not only himself but his neighbors, and at the same time provide for legal and technical advice and protection, and make better bargains with smelters and stores furnishing supplies.

He can advertise his district or encourage development, promote transportation and do many other such things.

Co-operation among prospectors in an organized manner cannot help but be beneficial to the mining industry, as well as the individual prospector.

On Thursday morning, the Chair was taken by L. K. Armstrong, Secretary of the Columbia Branch, A.I.M. & E., Spokane, who made a few introductory remarks relative to the various problems confronting industrial advance at the present time. He mentioned the development apparent throughout the Kootenays in connection with the lumber business, and emphasized the need of conservation in this connection. He thought it would be well if, in America, some system of re-forestration were adopted. The labour question was one very prominently before all classes, and he did not find it hard to understand the cause of this in view of the fact that the dollar now was purchasing only what two dollars purchased not many months ago. His opinion was that for the sake of the country, for the sake of industry and the general welfare, it would be advisable for employers and employees to get together wherever possible, discuss their differences in a sane and reasonable way and effect an amicable settlement. How they were to do this was a matter he would leave to them, it being his desire merely to give expression to his conviction that the spirit indicated was most necessary.

"Oxidized Lead Ores," was the subject of an address by S. S. Fowler, General Manager of the new Canadian Metal Co., Ltd., Riondel, B.C. When first coming to British Columbia, Mr. Fowler had given some attention to this matter and had concluded that there were no oxidized ores in this province, the action of glaciers having made their existence impossible. Subsequently however, his theory in this respect had been proved erroneous by the discovery of oxidized lead ore at the Bluebell Mine and the Paradise, the North Star and the Electric Point, the latter being situated just south of the line. The shipment of ore from these properties since had become rather an important contribution to the Trail Smelter of the Consolidated Mining & Smelting Co.

In the Bluebell mine he had found oxidized lead ores at a depth of four hundred feet below the level of Kootenay Lakes. His explanation of this, and he took credit for originating the theory, was that the weathering of the deposits preceded the existence of the lakes, there than perhaps having been an inconsiderable river, where now there is a very large body of water.

"Some years ago," Mr. Fowler said, "I found an area utterly barren of vegetation. Not a tree on it more than a foot high. It was about half the size of this hall, and I became curious as to what was underneath it. I opened it up and discovered a body of ore, lead-bearing and decided to ship some of it. It is strange looking ore, showing no signs of value, and when it was shipped the road-master on the railway said whoever sent it ought to be in an asylum, and that he knew where there were millions of tons of such rock. Well! the shipper is still out of the asylum." After giving some account of the development of the Bluebell mine, one of the best known operating properties in the province, Mr. Fowler told something of what he is now doing in experimentation to the end that a greater recovery of the values of this material may be secured.

T. W. Bingay, Comptroller, Consolidated Mining & Smelting Co., of Trail, contributed a paper on the advance in metallurgical practice, with special reference to the Trail Smelter plant for increased production. Much of the information given has already been made available to the public. He told the story of the Trail Smelter, of its efforts towards zinc production during the war; of the additions recently made to the copper refinery; and of the plans in view for the treatment of the ores of the Rossland plant.

Nichol Thompson occupied the chair for the afternoon session, the feature address of which was that by the Hon. William Sloan, Minister of Mines for British Columbia.

Speech of the Minister of Mines.

Mr. Sloan referred to his pleasure at attending the last Convention, expressed his renewed pleasure at being present at a third annual gathering and heartily welcomed the delegates to British Columbia on behalf of the Provincial Government.

He reviewed the mineral production of the province for 1919, which, although showing a reduction of twenty per cent from the figures of 1918, he considered was a good showing under the circumstances and required no explanation, instancing greater reductions in neighboring metal-producing states.

Mr. Sloan drew the special attention of the delegates to the decline in gold production, and he believed that everything possible should be done to stimulate gold output. He explained the changes in the Placer Mining Act designed to open up large areas now idle, and mentioned the removal of the fifty cents royalty formerly collected per ounce of placer gold recovered.

The policy of the Department of Mines in re-division of the mineral survey districts, and the expenditures on opening up trails was enlarged upon, the Minister mentioning that since the enactment of the legislation there had been expended on road and trail construction and on repairs to mines and promising mining properties the sum of $280,000, and that up to date $355,000 had been authorized on similar work. Mr. Sloan said that no application for road or trail construction to a mine or mineral property made to the Mines Department that had received the endorsation of the District Engineer, but was given favorable consideration, and he renewed his assurance to the delegates that this would be the constant policy of the Department under his direction.

The Minister of Mines denied that, as had been stated, all iron ore in British Columbia had been put under reserve. Only a small area carrying iron in the Clinton district had been so reserved under the powers granted him. The large area of iron-ore (limonite and hematite) in the Taseko or Whitewater district, estimated by the Government Engineer to contain possibly fifty million tons of ore had been so reserved, the Government believing that this body of ore, so suitable to be mixed with magnetite, should be held out of possible speculation so that nothing might interfere with the initiation of an iron and steel industry in the Province.

The Possibility of an Iron and Steel Industry in British Columbia.

On this important matter the Minister spoke at length as follows:

It seems to me that the time is propitious for action on the part of capital. There is no question that we have the magnetite ores necessary for the maintenance of a 300-ton a day plant and, if the exploration now in progress in the Taseko River district results as favourably as Mr. Brewer's report would indicate, we will have all the fluxes required. There now are two parties in this district—one having been sent into the field by the Provincial Government, Mr. F. J. Crosland, B.Sc., the well known mining engineer and geologist, being in charge—and the other under Mr. J. D. MacKenzie, of the Canadian Geological Survey. Mr. Crosland's work is to establish as far as possible the tonnage of ore available, and that of Mr. MacKenzie is to make a geological and topographical survey. There also are some high-grade red hematite deposits on the Bull and Sand Rivers, Kootenay District. This ore is known to be of excellent quality, and last year Mr. Langley, District Mining Engineer, was instructed to make an examination of the property. Owing to his many duties because of the extent of his territory he was unable to get the work done but, now that he has an assistant, the inspection will be made and we will await the report with interest.

Six years ago the development of the magnetite ores of British Columbia and their actual commercial utilization involved problems which seemed insuperable because of the advantages of the East over the West in respect of cost of materials, labour, etc. Pig-iron, I am competently advised, now can be produced as cheaply in British Columbia as in Pennsylvania and other industrial centres of America. Ores cost roughly $7.00 a ton at the lower Lake Superior ports, or approximately $7.50 a ton at the Eastern furnaces; the cost of British Columbia magnetites landed at some point within easy reach of fuel could not be more than $4.50 a ton—in fact such a figure would allow those delivering the ore a good profit. As to the cost of fuel—the former difference favoring the East has been eliminated, as coke which before cost the Eastern manufacturers from $2.00 to $2.75 a ton, is now costing them between $11.00 and $12.00 a ton, at which figure it should be possible to secure it in British Columbia.

Two tons of iron ore approximately are required to produce a ton of pig iron. In the East this ore is worth at the furnaces about $15.00, while in this province it could be had for about $9.00, which is a liberal estimate. One and a quarter ton of Eastern coke is necessary to produce one ton of pig iron, which means an expenditure on fuel at present prices of about $13.75, while before the war it cost something like $4.00. Under these circumstances it would appear that British Columbia now would not be at a disadvantage in respect to the production of pig iron.

The cost of production in this province of one ton of pig iron, by blast furnace and under existing conditions as sketched, has been placed at $33.00 as follows:—

Two tons of ore at $4.50	$ 9.00
One and a half tons of coke at $10	15.00
Three-quarters of a ton limestone at $4	3.00
Labor and Overhead Costs, etc.	6.00
	$33.00

For purposes of comparison it is interesting to note that the last Eastern quotations available follow: Bessemer, $42.50; basic, $43.00; foundry, $43.00 to $45.00. While there are no official figures at hand regarding the Western market price of pig iron there is no doubt that with freight and cost of handling added the material would be much more expensive on the Coast. This is proven by the fact that the Purchasing Agent of Yarrows, Ltd., Esquimalt, on inquiry, stated that they paid $75 a ton for their last shipment of pig. As to freight rates per ton of pig from Ontario it runs to $14.80 a ton; from Quebec $15.80; and from seaboard and U.S. points, $16.60 a ton.

As to the market possibilities, which of course is a matter of the utmost importance, it seems to me that there is no doubt that the product of say a 300-ton blast furnace could be absorbed in the Canadian and American West. If there is any doubt of the market now available taking care of this product it seems to me that the time is opportune to ask the Dominion Government to assist by the installation at one of the Pacific Coast terminals of the two National Railways of car shops and all the manufacturing plant that that implies. Hon. J. D. Reid, Minister of Railways and Canals, is in British Columbia this week, and it seems to me that he should be approached to this end. I know that it was the fixed policy of the Mackenzie and Mann interests, had they been able to discharge the vast financial obligations they shouldered, to provide such car shops. Should the Dominion Government do this it would mean that a large part of the product of a 300-ton a day iron blast furnace would be taken care of and, no doubt, the establishment of the industry assured. This would be an indirect, though effective way for the Federal Government to discharge the responsibility it unquestionably has to assist in the opening up of our iron ore resources. As you know, it was mainly through the bounties and bonuses granted by the Dominion that the Eastern Canadian iron and steel industry was put on its present flourishing basis. If we cannot get this treatment it seems reasonable to ask that their railway policy be shaped along such lines as will result in the encouragement of the same industry in the West, where the native resources are of just as high quality and just as extensive. This, too, would

appear to be the moment to strike from the fact that the launching of the British Empire Steel Corporation merger, with a capitalization of $500,000,000, has been announced within the past few weeks. Included in this combination are the iron and steel manufacturing interests of Eastern Canada, and the question occurs in considering the move, whether this tremendously powerful industrial and financial combination will retard or hasten our ambitions for an iron and steel industry in this province. Certainly it is not a time for sleep and British Columbia should not hesitate to strongly press her claims for recognition.

I draw attention to the fact that the Provincial Government has not overlooked or shirked its responsibility. This is evidenced not only by the fact that a bounty now is offered on the production of pig iron from British Columbia and which was last session extended for a period of five years, which, in the case of a 300-ton plant this bounty will entail an outlay of about $1,000,000, but as well by the activity of my Department in the obtaining of all possible information regarding the resources of the province. We have had many applications for assistance for the establishment of an iron and steel industry from private enterprise, but thus far all have required the endorsement of bonds to from 50 per cent to the full value of the plant. The Government's position is that, if it is necessary to go that far, it would be better that the industry should be vested in the people and operated for the people's benefit. The assembling of data is continuing to the end that, if it becomes necessary, the Government will be in a position to give serious consideration, basing the same on authentic information, to the advisability of the announcement of some such policy.

Further remarks of the Minister dealt with the Government's policy to aid returned soldiers, and mentioned that 25 parties of soldier-prospectors are now in the field on a Government grubstake.

Lectures to prospectors during the winter months, and exhibitions of mineral specimens were part of the Government's plan to help intelligent prospecting.

At the request of the B.C. Prospectors' Protective Association the Resident Mining Engineeers have been instructed to furnish brief preliminary reports of properties examined to the owners.

To stop "wild-catting"—which was the Government's aim—legislation has been passed providing that promoters of mining properties shall submit copies of prospectuses and advertising matter to the Resident Mining Engineers.

Mr. Sloan's evident thorough knowledge of the work of his department, and his references to the Government's policy in respect to the iron and steel industry, occasioned much enthusiasm, the Minister of Mines being accorded three hearty cheers on the motion of Mr. Carrington, of the Seattle Chamber of Mines. Mr. Sloan returned the compliment by calling for three cheers for the delegates from the United States.

C. B. Beale, His Majesty's Trade Commissioner, Winnipeg, delivered a very illuminating address, especially in regard to the splendid effort Great Britain is making to recover trade lost during the war, on the subject, "inter-Empire Trade Development." He dealt with the need of close co-operation with the Mother Country in the establishment of stronger inter-Empire trade ties.

W. Pellew Harvey, a former resident of B.C., when he was prominent in connection with the mining industry and for many years established professionally in London, England, addressed the Convention on the question of his mission to B.C. He said that it was generally admitted that the province possessed great mineral wealth, and he was here for the purpose of ascertaining as closely as possible, the position at the present moment; not for the sake of rashly investing, but for the collection of data and where these justified, making recommendations to his clients who might feel justified and willing to come to the support of those interested in mining in the Province. Mr. Harvey referred to the geographical conditions of Kootenay, particularly in the matter of transportation, and compared it with Siberia, where all is open country and transportation, therefore, an easy matter. After complimenting the Department of Mines on what it had done to make the obtaining of accurate information an easy matter, and also on what was being done for the encouragement and assistance of the prospector, Mr. Harvey spoke of the Trail Smelter and the tremendous work it was doing for the mining industry in this part of the Dominion. This plant handled 66 per cent of the total mineral production of the province. It might help, he suggested, if a subsidiary interest could be created, possibly supported by the Consolidated, whereby local camps and districts producing small quantities of ore, although probably large in the aggregate, could have a customs concentrator. Something also might be done in the way of establishing test centres to grade the ores for future treatment by smelters.

A number of resolutions were passed. One of these has reference to the activity of the One Big Union in the Slocan and other interior districts. It puts the delegates on record as emphatically condemning any species of radicalism which is a menace to the prosperity of the mining industry of B.C., and calls upon the Dominion Government to make immediate investigation of the baneful effect of these activities, and to take such action as will restore prosperity by guaranteeing to every law-abiding citizen, "the right to work where, when, and for whom he pleases, safe from the unlawful interference of any kind whatsoever directed by those who seek destruction of the free institutions under which we live, and to which we hereby pledge our continued and unyielding allegiance. And it is further Resolved," the Resolution continues, "That we condemn in unqualified terms any employer of labour who, in furtherance of selfish interests, panders to any organization of disloyalty whether flying the banners of One Big Union, or I.W.W. or the plain red flag of Anarchy."

Copies of this are to be forwarded to the Ottawa authorities.

Another resolution was submitted by the B.C. Prospectors' Protective Association petitioning the Minister of Mines, Ottawa, to throw open the Indian Reserves in B.C. to mining operations for all minerals. It was pointed out that the Provincial Government has amended the Mineral Act and the Placer Act permitting the mining of gold and silver on these Reserves. As, however, the precious metals almost invariably are found associated with the base metals, the privilege granted by the said amendment means very little, if anything.

No account of the Convention would be complete without a reference to the mineral exhibit and to the indefatigible and successful efforts of Fred A. Starkey, who was in general charge of the arrangements and the conduct of the programme, for the entertainment of the visitors.

As to the exhibit, it may be said to have been one of the most complete of the varied ores of the Kootenays it has been the privilege of the writer to inspect. Practically every shipping mine, whether large

or small, was represented, and it was an education in the mineral resources of Eastern British Columbia to make the circle of the tables containing the samples, all of which had been clearly labelled. A large specimen of the Mandy Mine, Le Pas, Manitoba, and a small cabinet of the rarer minerals, many of them not as yet discovered in British Columbia, which has been loaned by A. G. Langley, District Engineer, were among the many features accorded special attenton.

Fred A. Starkey and his energetic assistants are to be congratulated on the success of the Convention from whatever angle it may be viewed.

BOOK REVIEW

A STUDY IN CANADIAN IMMIGRATION. By W. G. Smith. The Ryerson Press, Publishers, Toronto. Linen Boards. 5 by 8 inches. 406 pages Price, $3.00

The preface of this book announces that it has many defects, but a perusal of the work reveals that its defects are not those of its author, but reside in the incomplete character of our vital statistics, and the difficulty of interpreting figures that are incomplete, and of too short a duration to enable critical elucidation and analysis. Not that the mass of statistical information in this work is meagre, for it contains sixty-one tables that must have cost the author tremendous labor to compile.

As an example may be mentioned the attempt to trace the per centage of infirm and defective persons in Canada among the various contributory sources of our population. Statistics of this kind are useless unless they contain data as to the ages of the persons considered, and the large percentage of infirm persons shown by the statistics to be of native Canadian origin is doubtless due to the number of elderly persons included, whereas the immigrant population, at any given time, naturally contains persons that are, in the phrase of the insurance actuary of "effective age," and are, by natural selection, neither very young, nor very old.

The author is an optimist on the ability of Canada as a "melting-pot" of nationalities, but he points out with clearness the dangers of indifference towards the strangers in our midst, and the undesirablilty of allowing foci of extra-national culture to multiply in our midst. He says, with fine fervor, and much truth, "What is needed is a new crusade of young Canadians "in whom the fires of patriotism burn, who will man "the outposts of Canadian nationality." He points out the hardships suffered by the immigrant, who he describes as "the lineal descendant of the forgotten pioneer, and like the pioneer achieves competence and prosperity." The problem of the immigrant is the problem of the Canadian people, who through their Government have advertised abroad and solicited the emigrant at home. The author points out how many millions of money have been spent in solicitation of emigrants, and how little in comparison has been spent to retain and incorporate the immigrant into our national fabric when arrived.

We have always considered that the work of the "Reading Camp Association," now known as the Frontier College, one much needed in Canada, and those who have read "A Handbook for New Canadians," by Mr. Alfred Fitzpatrick, will find in it the answer to many of the questions raised by Mr. Smith's book. As Mr. Fitzpatrick pointed out, and as Mr. Smith intimates also, the newly arrived immigrant in Canada is the prey of his environment and too often of his own countrymen, who because of their knowledge of the immigrant's language are too complaisantly allowed to control their compatriot's housing, supplies and general destiny in Canada. Tutelage in Canadian institutions, in the English laguage, and in citizenship is required to assimilate the immigrant, and Mr. Smith says truly: "A thousand new teachers in as many teacherages would mean the beginning of a new day."

"In time of war a half million of our best were enlisted in a gigantic struggle of destruction. In times of peace can there not be a brigade or two of equally ardent spirits who will engage in the work of construction?" The Frontier College would seem an organization ready to hand for a work that recent events have revealed as desperately necessary.

Mr. Smith advocates restriction of immigration in lean times, and stricter supervision of incomers in good times. He asks for inspection of emigrants at the point of departure, and suggests the throwing of greater selective responsibility upon the steamship and other agencies that earn dividends by bringing emigrants to Canada. He pleads for a large and adequately equipped institutions like Ellis Island at several points of main entrance into Canada, and asks that regulation of immigration shall be planned with a view to the tremendous scale on which it may be expected in years yet to come. Due credit is given to improvements in the Immigration Law, but it is suggested that larger measures are required in the proportion that immigration may be expected to be larger in coming years.

Mr. Smith has presented a lot of problems that he has not attempted to answer, but his book contains many statistics in understandable and convenient form which may lead enquirers to a better grasp, if not a solution, of the individual problem they themselves are faced with in connection with immigration.

We commend the work to officials of Canadian corporations who desire the foreign workman, to employment and welfare officers.

After perusal of the volume we would summarise the desirable conditions in connection with immigration to include the following. Careful selection of the country in which emigrants are to be solicited. Some countries—Finland for example—seem to yield undesirable elements in large proportion. Agreement with the government of the emigrant's country on the lines laid down by the Italian government and designed to protect against exploitation of the emigrant by his own compatriots both during his journey to Canada, and after his arrival there. Examination of intending emigrants at or previous to embarkation for Canada. Enlarged and centralized examination and detention facilities at the point of debarkation in Canada. Continued interest in the immigrant in his sojourn in Canada, and a deliberate and widespread campaign for his Canadianization, including discouragement of all forms of national segregation and the formation of communities in Canada detached from Canadian influences. Unless we Canadianize our immigrants then we risk the un-Canadianizing of Canada.

Coal Supply and Prices in Canada

By The EDITOR

In Nova Scotia the coal companies are selling coal for local domestic consumption at prices which are reasonably low, and netting only a small margin of profit over cost of production, namely at from $5.50 to $6.00 per ton for run of mine coal, with a differential of 35 cents for screened coal. There is no shortage of coal in the Maritime Provinces, and an increased quantity of coal is being produced from small mines having a local sale, particularly in the vicinity of New Glasgow and Amherst.

The cost of coal in Newfoundland is unprecedentedly high, running up to $35 per ton delivered in the consumer's cellar. Prospecting for coal is being actively carried on in Newfoundland under pressure of the demand and high prices, and, while coal mining in Newfoundland can never be a very large industry because of the small and contorted character of the deposits, it will eventually, like the coal deposit of New Brunswick, develop into a valuable local source of supply. Newfoundland, like the mainland is suffering from lessened efficiency of transportation, and during the war suffered a great decrease in the number of vessels available for coal freighting.

The Nova Scotia coal companies have been able to keep Halifax and St. John well supplied with coal, and at Halifax there has recently been a decided falling off in the demand for steamship bunkers.

The situation in Montreal is singular. Many of the local coal merchants have contracted with their customers for coal supply at comparatively low prices, figures in the vicinity of $3.75 at the mine being general. The coal companies are unable to deliver coal at the contracted prices, but there is no difficulty in obtaining "spot coal" at prices double and treble the figures at which deliveries were promised. This refers to bituminous coal.

Anthracite is selling retail at $16.50 per ton in Montreal, and an increase of fifty cents is expected immediately.

The condition of affairs in Montreal is understood to be general in the New England States,, where the same complaints as to non-fulfilment of contracts and the availability of "spot coal" at enhanced prices are heard.

In Toronto, retailers to domestic customers are quoting run mine bituminous at from $14.25 to $14.50 per ton delivered. Anthracite is quoted at from $8.00 to $11.50 per ton at the mines in American funds.

Many of the larger manufacturing concerns in Ontario and Quebec are uncertain regarding their operations duing the coming winter. Stocks are non-existent, and a considerable amount of unemployment is even now being caused by curtailment of operations caused by coal shortage. The position of manufacturers is illustrated by the published remarks of the Purchasing Agent of the Canadian Consolidated Rubber Company, who states that this Company's requirements of coal run to about 80,000 tons annually, and that this quantity will cost approximately $1,000,000 more than it did last year—if purchased. This official stated that he had bought Dominion Coal Company's coal throughout his Company's history, until the supply ceased.

Indication of the cost of U. S. coal in Manitoba is given by the prices at which the provincial government has let contracts for its winter supply. Ten thousand tons of Yougheogheny slack have been contracted for, 7,000 tons for the Government powerhouse at $15.25 per ton delivered and 3,000 tons for the Manitoba Agricultural College at $12.75 per ton delivered. For other provincial establishments at Brandon and Portage la Prairie, Souris run mine is being purchased.

In British Columbia, the collieries are not being pressed for coal so hardly as in the East. In Alberta, not withstanding the appeals of the Government and an extensive advertising campaign, the collieries are not working to capacity, and the members of the coal trade there are very justly indignant at a report which was given wide circulation in the East that the western collieries had a local market which was absorbing all the production. Nothing of course could be further from the truth. Alberta collieries never at any time, even in the strenuous period of 1917-1918, worked to full capacity.

High as coal prices are throughout Canada, they will certainly go very much higher as the result of the new wage agreement in District No. 18, the pending demand of the U. M. W. in Nova Scotia, and the general wage increase in the bituminous and hard coal districts of the United States, added to which there will be the freight rate adjustment required to enable the railways to pay the increase recently granted in the U. S., and the corresponding increase which will be given to railway men in Canada.

There is a phase of the coal question in Canada that is not fully understood, namely, that coal has not in recent years been used as freely as it would have been if supplies had been easier to obtain, and prices lower. There are a great many manufacturing enterprises mooted that have not been able to proceed because the promoters could not see their way to a stable coal supply. It is moreover not appreciated that the capacity for coal consumption, and the per capita use is a growing one. Many past calculations on coal supply have been falsified by neglect to take into account the growing factor of per capita consumption, and it may surprise many persons to know that the consumption capacity of Ontario alone is 12,000,000 tons of bituminous coal annually, or almost equivalent to the entire coal production of Canada. Calculations based on coal consumption rates of several years ago are entirely out of date, and will certainly lead to erroneous conclusions.

With regard to the efficacy of an export embargo in assisting the present crisis it is necessary to take both a backward and a forward view. The outstanding necessity in connection with our coal supply in Canada is to greatly increase the output capacity of the existing collieries, and to provide new collieries. The financial weakness of Canadian coal operators is due to the inconsiderate and almost contemptuous treatment they received at the hands of large coal consumers in Canada in years gone by. They were compelled, in order to hold their organizations together, to sell coal at prices which were actually below the ultimate cost of production, although possible they slightly exceeded the aggregate cost of labor and material at the time of purchase. Today, owing to con-

ditions in Europe very high prices can be obtained for export coal and the coal companies have a chance to make money. The profits thus obtained are vitally necessary to the provision of capital for the increase of production. The actual assistance in tonnage that will be obtained by an export embargo is utterly negligible in comparison with the actual shortage in production. The shortage of production outweighs the export tonnage ten to one, and if, as intimated by the Railway Commission, is should be considered that not only an export embargo, but price control, is to be imposed on Nova Scotian coal producers, it should not be forgotten that the crisis of this year will be the the crisis of 1921, and every year thereafter, so long as Canadian coal production does not appreciably increase.

There has recently been a turn in production in Nova Scotia, and what is more important than anything else, the Dominion Coal Company has announced the resumption of capital expenditure that has been deferred seven years.

This journal has on many occasions pointed out that what is required in Canada is not a coal "controller," but a coal "booster." More men engaged in coal-mining, more money invested in coal mining, more coal produced from Canadian mines, are things earnestly to be desired.

WORLD'S COAL OUTPUT.

The monthly **Bulletin** of statistics of the Supreme Economic Council for May states that in the case of coal the latest available figures for the United Kingdom, Belgium, France, and Germany indicate on the whole progress in the direction of the rate of production of pre-war days. The following table compares the aggregate average quarterly output of these four countries as a whole in 1913 with their quarterly output during 1919 and 1920:—

Period	Excluding German Lignite Metric tons	Comparison with 1913. Per cent.
Quarterly average, 1913 ..	132,000,000	100.0
1st Quarter, 1919	98,100,000	74.3
2nd Quarter, 1919	90,900,000	68.9
3rd Quarter, 1919	92,100,000	69.8
4th Quarter, 1919	105,000,000	79.5
1st Quarter, 1920	107,100,000	81.1

In the case of the United States the quarterly production of coal has increased from an average of 129 million tons in 1913 to 142 million tons in the first quarter of 1919. In consequence of the inability of the United Kingdom to export as freely as formerly, European countries have turned to the United States for supplies, and are now obtaining about 1,400,000 tons per quarter from that source.

TORONTO COAL PRICES.

Toronto, Augnst 11.—Toronto coal dealers have been advised that on August 16th there will be an advance on the freight rates on all classes of coal on the United States side of the line. The new anthracite wage scale has not been announced but reports indicate that it will amount to one dollar a ton under the new scale. The freight advance for the Canadian market will probably be one dollar a ton on anthracite and from 50 cents to 75 cents a ton on soft coal. Prevailing quotations at Toronto; Mine run $14.25 to $14.50 f.o.b. Toronto; smokeless coal $14.50 to $15.00; hard coal $8.00 to $11.50 gross tons at mines, American funds.

STATISTICS OF ANNUAL PRODUCTION OF ANTHRACITE AND BITUMINOUS COAL IN THE UNITED STATES.

The following figures of the annual output of anthracite and bituminous coal in the United States, taken from "Saward's Journal" New York, form a useful reference.

It should be mentioned that the anthracite figures, showing as they do the total production, and being reported as they are in net tons by the Geological Survey, differ materially from the report of tonnage shipped as reported in gross tons by the Anthracite Bureau of Information. Roughly speaking, the Survey figures will be found to be about 25 per cent. more than the Bureau figures, the difference increasing in recent years because of more coal being used at the mines.

Coal Production—Net Tons.

	Coal Production Net Tons Anthracite	Bituminous
1890	46,468,641	111,302,322
1891	50,665,431	117,901,238
1892	52,472,504	126,856,567
1893	53,967,543	128,385,231
1894	51,921,121	118,820,405
1895	57,999,337	135,118,193
1896	54,346,081	137,640,276
1897	52,611,680	147,617,519
1898	53,382,644	166,593,623
1899	60,418,005	193,323,187
1900	57,367,915	212,316,112
1901	67,471,667	225,828,149
1902	41,373,595	260,216,844
1903	74,607,068	282,749,348
1904	73,156,709	278,659,689
1905	77,659,850	315,062,785
1906	71,282,411	342,874,867
1907	85,604,312	394,759,112
1908	83,268,754	332,573,944
1909	81,070,359	379,744,257
1910	84,485,236	417,111,142
1911	90,464,067	405,907,059
1912	84,361,598	450,104,982
1913	91,524,922	478,435,297
1914	90,821,507	422,703,970
1915	88,995,061	442,624,426
1916	87,578,493	502,519,682
1917	99,611,811	551,790,563
1918	98,826,084	579,385,820
1919	86,200,000	458,063,000
1920*	42,780,000	257,010,000

*Six months.

NOVA SCOTIA COAL INACCESSIBLE TO ONTARIO BY RAIL.

In reply to the enquiries sent out by the Windsor, Ont. Board of Commeree, three Nova Scotia coal companies have stated that their coal output is covered by enrrent commitments. The replies received also suggest that the rail carriage from Nova Scotia to Ontario points would make the delivered costs prohibitive.

The Nova Scotia Steel Company, in its letter, stated: "Ontario has never given proper consideration to the "coal question, as it has heretofore been able to ob- "tain all the coal it required from the United States "at a low cost, and therefore, gave little heed to de- "veloping the Canadian coal industry."

NOTES FROM THE NOVA SCOTIA COLLIERIES.

Changes in the Mines Office Staff.

Mr. R. D. Anderson, an official of long service in the Mines Office at Halifax, has taken a position as technical adviser to the Inverness Railway and Coal Co., as newly organized. Before going to the Mines Office Mr. Anderson was connected in official positions with the Glace Bay collieries, and is well eqnipped for his new position.

Mr. Michael Mc. Intosh, for a number of years Inspector of Mines for the Waterford District, has resigned from the service of the Government, and has been appointed to special duties connected with the cost of colliery materials by the Dominion Coal Company. Mr. Mc. Intosh is returning to the Dominion Company, having previonsly been manager of one of the Waterford collieries.

Another official of the Mines Office, Mr. J. J. McNeill, recently returned to a position as colliery manager with the Dominion Company after having for several years been Inspector of Mines in the Glace Bay District.

COAL PRODUCTION.

The Nova Scotia Steel and Coal Company's collieries in July raised 51,472 tons, which compares with 43,713 tons in July 1919. For the seven months ending July the production for 1920 is 315,329 tons, being 82,000 tons in excess of the corresponding period of last year, equivalent to an increase of one third.

The Dominion Coal Company's production from the Glace Bay collieries during July was approximately 268,000 tons, or 13,000 tons below the output for June. For the seven months period the production during 1920 has been 1,883,000 tons, or slightly less than 100,000 tons higher than for the corresponding seven months of 1919. June production of 268,000 tons compares with 224,000 tons in June 1919. The production for August is unlikely to exceed that of July.

British Columbia Letter

THE COLLIERIES

The Cassidy Collieries of the Granby Consolidated Mining & Selting Co. have been closed down for over a week. Just what the trouble is cannot be said although it is known that it has its source in demands of the men. Whther these demands are for increased wages or for recognition of an organization the employers do not care to have anything to do with is the question. It is denied, however, that more wages are asked for and it cannot be that better living conditions are being sought for the Cassidy Collieries are a model in this respect. The only possible difference, therefore, would appear to be in respect of the recognition of some organization among the men. Operation of the mine stopped when the men called a holiday to formulate their demands. The management, thereupon, met the miners by making the desire for a holiday appear unanimons and formally closing down the property. Their explanation is that the bunkers were full and that difficulty was being experienced in marketing the product. Among those familiar with the situation this is not taken too seriously, especially in view of the fact that all the other coal mines of Vancouver Island are working as near to capacity as the labor conditions permit and also having in mind that the orders for the product are far in excess of the output. There, however, still is a holiday at Cassidy. The deputy Minister of Labor is investigating the trouble and it is hoped that his intervention will result in a settlement.

The first British Columbia coal to be shipped to Europe left Vancouver Island on or about July 28th. It consisted of 4,500 tons of the product of the Canadian Collieries (D) Ltd, and is being carried by the motorship Pacific of the Johnson Line to Sweden. J. M. Savage, general manager of the Canadian Collieries, states that many inquiries are being received from Europe as to the possibility of securing coal from the Pacific Northwest. The present prices here are said to be comparatively low and, as the shortage on the continent is acute, purchasers are driven to all possible sources of supply. The development of this new trade between British Columbia and Europe will be watched with interest.

A mass meeting was held recently at Fernie when the question of ratifying the new wage agreement in U.M.W. District No. 18 was considered and the question of allegiance to the U.M.W. of A. and the One Big Union was debated. In view of the fact that the agreement was negotiated between the Operators and the U.M.W. of A. this organization appears to have had the best of the argument. The miners afterwards marched en masse to the office of the Crow's Nest Pass Coal Co. and conferred with the management. What occurred has not been announced, but the mines have up to the time of writing have been working without interruption.

The Wellington—Nanoose Collieries, operating the Nanoose Bay Mine, has been completely re-organized and the mine henceforth will be known as the Lantzville Mine. X. Louis Williams is the chairman of the Board of Directors; F. H. Lantz, the managing director; and J. A. Coleman, the secretary. Over $100,000 has been spent during the past year in improvements to the pithead equipment. New wharves have been built, a new "Link-Belt" screening plant installed, and a new washery capable of handling 500 tons a day erected. The slack from the washery is used for firing the boilers and electric power and light is generated from a 250 volt Robb dynamo, while an Ingersoll Rand Compressor of 150 lbs. capacity also has been installed. Edward Floyd, an English mining engineer with experience in the coalfields of Northumberland, has been appointed superintendent. The Lantzville Mine is situated on a beautiful townsite and it is proposed starting immediately on the construction of such houses as are necessary for the comfortable accommodation of officials and men.

Extensive coal deposits situated in the Copper River District, Northern British Columbia, are being inspected by engineers and representatives of Canadian financial interests with a view to their development. This field is located on Chettleburgh Creek, a tributary of the Zymoetz River, about thirty miles from the town of Smithers. There are seventy-five leases on which two good seams of coal have been exposed, respectively nine and six feet thick. The latter have been slightly developed by short prospect tunnels. A lot of exploratory work has been done and the

measures are exposed on Chettleburgh Creek for a distance of two miles. A diamond drill was taken to the property in 1913 but was never used.

British Columbia's production of coal for the month of June aggregated 239,566 tons, of which the Vancouver Island mines were responsible for 149,973 tons and those of the Mainland for 89,593 tons.

The detailed figures follow:

Vancouver Island Field

	Tons
Canadian Western Fuel Co., Nanaimo	56,474
Canadian Collieries (D) Ltd., Comox	41,426
Canadian Collieries (D) Ltd., S. Wellington	6,887
Canadian Collieries (D) Ltd., Extension	14,087
Pacific Coast Coal Co.	8,662
Nanoose-Wellington Collieries Ltd.	1,427
Granby Collieries, Cassidy	21,010
	149,973

Mainland Fields

Crow's Nest Pass Coal Co.	62,770
Corbin Coal Co.	15,048
Middlesboro Collieries	7,882
Fleming Coal Co.	2,730
Coalmont Coal Co.	1,163
	89,593

Some interest has been created in Southern Vancouver Island through the publicity given to the recent experience of a resident of Victoria in the person of James Rennie who, while exploring the Sooke River Country happened upon the remains of the once thriving mining town of Leachtown. Recalling stories of the placer excitement of the locality half a century or more ago Mr. Rennie decided to put in some otherwise idle moments in testing the sands. Searching he found what appeared to be virgin ground and a little panning brought surprising results. He returned with seventeen nuggets, none very large but some were very much worth while. It is understood that the ground is to be staked and that an effort will be made to perfect arrangements for placer mining operations on a considerable scale.

PERSONALS.

Mr. J. B. Tyrrell has returned to Toronto after visiting gold properties in Northern Manitoba.

Mr. H. H. Sutherland has returned to Toronto after several months absence in England where he has been enlisting capital for the development of gold properties in Northern Ontario.

Mr. J. S. DeLury who has completed an examination of the Rice Lake gold area for the Manitoba Government has returned to Winnipeg.

Mr. Jas. McEvoy has not yet returned from Alberta. His address there is c|o Cadomin Collieries, Cadomin, Alberta.

Mr. A. G. Burrows is in Toronto for a few days. He will return shortly to Gowganda where he is making examinations for the Ontario Bureau of Mines.

Mr. P. E. Hopkins of the Ontario Bureau of Mines staff is working in the vicinity of Schreiber, Ontario. He will later visit some Western Ontario gold areas.

Prof. M. B. Baker of Queens University is making geological examinations in Leeds Co., Ont., for the Bureau of Mines.

INTEREST IN GOLD MINING QUICKENS.

Increased activity in gold mining in the Porcupine district is indicated by recent announcements concerning properties that are not at present producing. Arrangements have been made for the resumption of work at the Porcupine Crown, Vipond and North Thompson which are in the vicinity of the Hollinger and developments at the Dome mine are awakening interest in the possibilities of the neighboring property, Dome Extension. A Toronto syndicate headed by H. B. Wills has undertaken to supply the treasury of the V. N. T. company with a sum that should put it in a position to operate the mine. The shareholders have accepted the offer made by the syndicate and it should not be long before the result of the financing is apparent at the property. It is announced that the syndicate will take of the treasury stock 200,000 shares at 15 cents, 200,000 at 30 cents and 200,000 at 50 cents.

The interest in Dome Extension is a result of the increased likelihood that the Dome company will exercise its option on the Extension property and develop it. The announcements concerning these mines is reflected in the stock markets. The trading in V.N.T. and Dome Extension is much more active than for some time.

The Kirkland Lake gold district is also attracting more attention now than for some time. Good progress has been made in exploring the surrounding area; but the more advanced properties have for many reasons been delayed in development and the outlying properties have not received the attention that they will when the older mines are operating at capacity. There are now rumors that a merger of some of the mining companies is likely to be effected and this is taken to mean that very considerable advantages will accrue to all the operators in the district. Vigorous development of the mines in this area will give new life to the prospectors working in the district.—R.E.H.

In Northern Ontario, the announcement made by Hon. Harry Mills, Minister of Mines in the Ontario Cabinet, that short courses for prospectors would be carried on in a half a dozen northern centres during the coming winter, has been greeted with interest among mining men. The courses are one of the units in the Provincial Government's plan for greater development of the mineral resources of Ontario. Schools will probably be opened in Haileybury, Sudbury, Timmins and one or two other centres. The course will last about six weeks and prospectors who attend will be taught the elementary principles of geology, to provide them with a sufficient knowledge of rock formations to enable them to judge the possibilities of a district with greater facility. General training will be given in sampling ores, testing values, etc, All courses will be free to prospectors. The Ontario Government will probably establish an assay office at Kirkland Lake, miners and prospectors will be able to obtain free assays of any ore they may discover.

The Denver Rock Drill Manufacturing Co., manufacturers of rock drills and accessories, of Denver, Colorado, will open an office at 421 Manhattan Building, Duluth, Minn. It is expected that the branch there will be ready for business on Aug 1st.

Northern Ontario Letter

THE SILVER MINES.

The Cobalt Field.

From available figures, the indications are that silver production from Northern Ontario is now a little under one million ounces monthly. At 95 cents an ounce which is the quotation at the time of writing, and plus 13 per cent premium on New York funds, the value of the output is at the rate of over $1.07 an ounce in Canada, or not far under million dollars monthly.

For the first half of the current year, due to silver having averaged a fraction over $1.18 an ounce, the indicated output had a value of over six million dollars, but with the lower average now prevailing, it is believed the total for 1920 may not exceed eleven million dollars.

Under the circumstances, and in view of the mines being about sixteen years old, the decline above noted is not heavy. The indicated output of $11,000,000 for this year compares with $12,747,621 for last year. Indeed in 1914 the value of the output amounted to only $12,765,461, while in 1915 it was valued at $12,135,816 and in 1916 at $12,643,175. From these figures, it is to be noted that the measure of prosperity being enjoyed in a general way is being well maintained.

Production from the newly opened Bailey Silver Mines has not materialized at as early a date as had been estimated. During the past week, A. J. Young, president of the company, visited the property, and was apparently pleased with the progress made, however. Among other things, financial arrangements have had to be made,, and it is now estimated that ore will be going to the company's mill within the next month or six weeks. In the meantime, the Bailey mill, which was formerly the Northern Custom Concentrator, is realizing quite large gross earnings, and net profits are said to range from $2,500 to $5,000 monthly from treating customs ore.

The La Rose Consolidated will employ a diamond drill for the purpose of exploring certain parts of its Cobalt property. It is planned to move the machine to the property at once, and although the more promising parts of the mine have been pretty well explored, the past history of these old Cobalt properties leaves much room for additional zones of enrichment to be encountered. Those who have followed the history of such mines as the La Rose are not yet convinced that all the ore bodies have been opened up, and any exploration work that may be carried on presents possibilities of new favorable developments.

Reports recently in circulation that the Mining Corporation might purchase a part of the Right-of-Way Mines, lying beneath the railway adjacent to the Mining Corporation, are said to have been unfounded.

A diamond drilling contract is being let on the Cobalt-Mohawk property, situated near Gillies Depot, in the vicinity of Mud Lake. Veins opened up in the early days of Cobalt, contain considerable smaltite, with low silver values. It is planned to tap these veins at depth. Petrolia business men are involved in the enterprise.

Drifting operations are under way at the 150 ft. level of the Oxford-Cobalt. The values at this point are comparatively low, although the vein itself has a width of about eight inches and contains some smaltite. It is learned that the plans are to continue the shaft to a depth of perhaps 300 or 350 feet, at which point further lateral operations will be undertaken. It is believed the chances of finding silver at this lower horizon will be much greater than at the present point for the reason that such work will be fairly close to the contact. The Company has studied the lesson learned at the Temiskaming mine where over 75 per cent of the silver so far mined came from within 100 feet of the contact of the overlying Keewatin with the underlying diabase.

Reports that the Beaver Consolidated has over a quarter of a million ounces of silver bullion stored at the mine, have received official denial, it being stated that the report has no basis in fact.

Ore and Bullion Shipments.

During the week ended August 6th, three Cobalt companies shipped an aggregate of six cars containing approximately 514,123 pounds of ore. The Nipissing, with four cars was the heaviest shipper.

A summary follows :—

Shipper	Cars	Pounds
Nipissing	4	346,718
McKinley-Darragh	1	84,950
La Rose	1	82,452
Totals	6	514,123

During the corresponding period the Mining Corporation and the Nipissing shipped bullion, the Mining Corporation sending out over a hundred thousand ounces on the closing day of July.

Following is a summary :—

	Bars	Ounces
Mining Corporation	99	100,573
Nipissing	15	20,533
Totals	114	121,106

The Elk Lake Field.

In the Cane and Auld township section of the Elk Lake district, renewed activity is taking place. This includes the Cane Silver Mines, the Triangle Silver Mines, and the Legault property. On the Triangle, a plan is being carried out to have 400,000 treasury shares underwritten, and to use the proceeds in further development as well as putting in a mill of small capacity to treat the medium grade mill rock being encountered. On the Cane Silver Mines, the company is said to have bought the original Elk Lake owners out, and to now be preparing to do considerable work. Work was commenced this week on a moderate scale, Jack Byrne, formerly associated with the Bourk's Gold Mines being in charge of the work. An endeavor is being made to interest one of the Cobalt Mining Companies in helping to finance the work. On the Legault property, lying about one mile south from the Cane property, an examination is now being made by J. Houston, and a deal is said to be pending.

In the immediate vicinity of Elk Lake, the Paragon-Hitchcock property is preparing for aggressive work. It is planned to perhaps secure a small plant for handling the ore right at the property. This company may be reached by mail to Elk Lake, Ont., while the address of the Triangle Silver Mines is Kenabeek, Ont.

The Gowganda District.

Uneasiness is made manifest in the Gowganda dis-

trict in connection with the slow progress being made in regard to the proposed light narrow-gauge railway from Elk Lake to the Gowganda field. With the Ontario Government having discontinued work last spring on the macadam road which had been commenced during the previous year, and with no definite assurance as yet of a light railway, the property owners are left to bear the full weight of totally inadequate transportation facilities.

The amount of work being done quietly in the Gowganda district is very considerable. With the Miller Lake-O'Brien serving to spur on to greater extent the hope of other property owners, and with success being met with on the Castle property of the Trethewey Company, and with the Reeve-Dobie on a fair way to make a success of producing silver, together with other favorable results in various parts of the field, it is regarded by mining men as a great pity that the Ontario Government has adopted a policy of indifference to the transportation difficulties of this partially proven and extremely promising silver field.

Another demonstration of confidence, and a real exhibition of that spirit which is conquering the great new problems which confront the pioneers of the mining industry of Northern Ontario is contained in official advice from the Dominico Mines Co. Inc., of Rochester, New York, regarding the Big 4 Mines of Gowganda.

Last spring this company launched a scheme to develop their 155 acres of mining lands in the Gowganda field. More than one year's wood supply having been cut, the company commenced the installation of a steam-driven mining plant. The spring proved to be one of the driest on record, and bush-fires in that district got out of control, completely destroying the plant, as well as burning up the fuel supply. In doing this, the fire appears to have made the property safe from a re-currence of such a fire, and has led the company to decide upon installing more modern equipment. Accordingly, an oil-driven mining plant is to be purchased at once.

The directors have just concluded a visit to the property and were highly pleased with the outlook. The main vein is stated to contain a large amount of the metal cobalt, this running as high as nearly 20 per cent. Silver values are said to amount to around 26 ounces to the ton.

A more or less peculiar occurrence is a large dyke of iron sulphides on the property in which the sulphur content is said to amount to from 40 to 44 per cent. It is believed this deposit may also be worked at a profit.

Among those visiting the Big 4 were the following: Dr. Carl H. Huber, who is president of the company, together with John C. McCurdy, James J. Withall, J. Wilson McCleary, all of Rochester; as well as W. W. Jones, of Albany, N. Y., who is State Mine Inspector, and H. L. Holmes, of Buffalo, N. Y

THE GOLD MINES.

A matter of very considerable concern to gold mine operators in Canada is the announcement to the "Canadian Mining Journal" that the two leading gold mines of Porcupine, namely, the Hollinger and the Dome, have each ordered a carload of low-grade cyanide from the American Cyanimid Company, from Niagara Falls, Ont. These companies will conduct a thorough test with a view to determining whether or not it would be possible for this cheaper material to replace the high-grade cyanide which the mines are now importing from Glasgow, Scotland.

It is estimated that the Dome could save about $15,000 annually by using the low-grade material, while the Hollinger might save at least double that amount, provided, of course, satisfactory recovery results from its use. The recent increase of two cents a pound for Cassel cyanide appears to have caused the Hollinger and Dome to decide to give the American Cyanimid product a trial.

The Hollinger Consolidated being one of the largest gold mines in the Western Hemisphere, and the Dome being the second largest in Canada, the attention of cyanide consumers in general are directed to the result of the experiments now to be undertaken.

Another matter of much interest, although local in its scope, is the decision of British interests to carry on extensive diamond drilling operations on property lying west of the proven Porcupine gold zone, in that part of Mountjoy township lying adjacent to Tisdale. The property to be explored is covered with a heavy overburden of sand, in fact is a veritable sand plain. The diamond drill is expected to show whether or not the geological conditions peculiar to the Hollinger-McIntyre part of the Porcupine field extend west south-west beneath the sand plains. A maximum of ten thousand feet of drilling may be done as the first part of the scheme. The drilling is to be done by Mr. Reid, a diamond drill operator of Timmins, while Ernest Loring of Haileybury will supervise the work.

Rumors are current that the Bewick-Moreing mining interests may re-enter the Porcupine gold mining area, and this time indulge in active mining operations. The plan of procedure has not yet been definitely stated. It will be recalled that this company of speculators entered the Porcupine field in the early days and that had their lead been followed there might be no producing mines in that rich district. One of the chief pieces of work done was to build an elaborate office on the shore of Pearl Lake. The other was to purchase a block of Hollinger stock, which was held until the price went up a few dollars, and then to throw the whole lot on the market. Whether or not the Bewick-Moreing interests expected stock to break in price and then buy in the amount sold is not clear. At any rate, such an opportunity did not develop. Their next line of attack at this late date is expected to be of a somewhat different nature and be along the lines of real development work.

The Kirkland Lake District

Hamilton B. Wills, stock broker of Toronto, is asking the Orr Gold Mines to contribute 810,000 shares to him in return for nearly $200,000 which he claims to have spent through the now liquidated Kirkland-Porphyry Company during the currency of an option held by that concern, and the assets of which have now been purchased by Mr. Wills and Conrad Wettlaufer of Buffalo. It is not stated whether or not the request is based upon legal merit, or finds support in moral right. The Orr treasury contains only a little over 900,000 shares, and such an issue of 810,000 shares to the Wills' interests would leave the treasury in a depleted condition and would perhaps lead to a capital increase of perhaps another 500,000 shares with which to finance work and build a small mill.

The Hunton-Kirkland plant is completely installed and mining operations are commencing this week. It is planned to sink the shaft to a depth of 300 feet at which point lateral operations will be undertaken. This depth has been selected for the reason that at

this horizon all the operating mines have found some of their richest deposits. Due to the surface showings on the Hunton being exceptionally rich, although narrow, the work to be carried out during the next few months promises to be the center of more than ordinary interest.

There is said to be no truth in rumors about the Hunton-Kirkland joining the Orr Gold Mines in a scheme of consolidation.

Final details are being arranged in connection with transferring scrip in the Kirkland Lake Proprietary, 1919, for old shares in the Tough-Oakes mine Once this is completed, the new company will proceed with taking over the control and operation of the Tough-Oakes mine.

Steady Work at Boston Creek.

Cross-cutting at the 500 ft. level of the Miller Independence Mines is proceeding unremittingly, and the face of the cross-cut is now nearing the point where the downward continuation of the main vein is expected to be encountered. The cross-cut is now in more than 300 feet and is going ahead at the rate of 100 feet a month.

Some rich ore has recently been bagged on the Peerless Gold Mines, about twenty sacks of this material being ready for shipment. The ore is said to contain high silver values as well as gold.

Good progress is being made on the work of building a wagon road as well as a bridge over the Blanche river so as to provide improved transportation facilities for the Skead township gold area.

At Fort Matachewan.

It is learned that there is very little likelihood of the Matachewan Gold Mines resuming operations for some little time, and that work may be deferred until such time as electric energy is assured following the harnessing of a water-power on the Montreal River. This power development scheme is not making very rapid progress.

On the Thesaurus property situated in the township of Baden some little distance north of Fort Matachewan sinking is being done with hand-steel and the shaft is down 28 feet. The property is sometimes known as the "Jim" Nelson claims. The pay-streak, though not very wide, is said to be quite rich.

WHY ORE IS WHERE IT IS

The old saying—that gold is where you find it—implied that theory and knowledge were of no value in the search for ore, and that its presence could be made known only by actually finding it The idea is still maintained by many, particularly by the practical mining man. However, it is being continually demonstrated by the economic geologist, or mining geologist, that not only is ore where you find it, but in considerable part its discovery depends on where and under what conditions search is made for it. As our previous conception of percentage of copper or of iron necessary to constitute ores of those metals has changed, due to added knowledge of treatment of ores, so our conception of **why ore is where it is** has changed with increased geologic knowledge supplied by field and laboratory work. The old adage must now be discarded, and give rise to intelligently directed research, based on geologic principles, whether for increasing ore reserves in regions already being exploited or for mineral in new regions. The research work of our of our universities and of Government, and endowed laboratories, and the field work of our geological surveys and independent geologists, has produced a host of valuable data which gives greater probability of reward for intelligently directed search for ore or oil based on an understanding of geology. The economic geologist who avails himself of all phases of this knowledge is enabled to decipher more readily why a particular ore is where it is.

Ore is where it is, not purely by chance, but by the result of definite processes which operated under certain conditions within the crust of the earth. The economic geologist is like a detective, in that he must search for his clue and diagnose these processes which gave rise to a certain deposit. For example: is a certain ore deposit located in a particular place because of a pre-existing fissure, or a certain favorable rock formation, or its proximity to an igneous intrusion, or to a combination of all of them? Economic geology is not an exact science like mathematics, yet there are certain fundamental principles which underlie the formation of most ore deposits. No two ore deposits are alike in all respects, but with a knowledge of the principles and processes of ore deposition, one is in a better position to ferret out the problems of the particular ore body.

Such a knowledge of principles and processes is required to answer scientifically the question of **why ore is where it is.**

The answer involves, among other things, a knowledge of the different processes which result originally in the concentration of minerals or mineral products which may be valuable; of the source of the materials and the agents of transportation; of the shapes and distribution of pre-existing cavities and their control over ore bodies; of the shapes and characteristics of ore bodies formed by making their own cavities; the effect of the host rock; the action and results of secondary processes, and the tale that may be unfolded by the minerals that make up the deposit. The final careful answer to be the question tells most that need be known of the deposit. The answer, in turn,, often enables similar places where conditions exist, and where similar processes operated to be determined, and search for more ore to be directed accordingly. For example, should it be found that an ore body originated by solutions given off from a nearby intrusive, that fissures of a certain system acted as channelways for the solutions, and that where the fissues intersected certain beds of limestone, replacement ore bodies resulted. then, if the same congenial bed of limestone be formed, and fissues of the same age be recognised and projected to cut the bed, the intersection of the two may a locus for ore. Exploration may then be directed to that place with the reasonable expectation of the search resulting in the finding of more ore. This is one phase of the work of the trained economic geologist.

While the above example applies to the search for for more ore in districts already partly developed, the answers to **why ore is where it is,** gained from a number of places, may also be applied to undeveloped districts. It is a generally accepted fact that most ore deposits susceptible to relatively easy discovery have already been found. Most regions have now been at least superficially prospected. The incentive for prospecting on the part of the old-time prospector is not as great as it used to be. Much credit is due to him

for bringing to light a large number of ore deposits, and his passing is much lamented. This, coupled with the fact that more attention is directed to the exploitation of large iow-grade deposite, and in the acquisition of new properties, investing capital now gives more weight than heretofore to the expected possibilities of prospcts, requires for the discovery and development of more mineralised regions that there should be enlisted all the knowledge and experience gained by economic geologists. The old propspector was a self-trained man, and more often not trained at all, but the economic geologist has his own training gained from answer as to why ore is where it is. In addition, he has the advantage of the experience of the prospectors, and of other countless trained men who have contributed their knowledge to the science.

With the decreasing chances of discoveries by prospectors, and the consequent waning incentive for them to prospect, has not the economic geologist an opportunity to increase the world's mineral reserves by supplementing, or even supplanting, the work of the old-time prospector? His field may be not only to examine and report upon the prospect found by the prospector, but specifically to direct the prospector in his search for new mineral areas, and to guide and advise him about his discoveries.

The old saying "Where ore is, there it is," may then fade into historic interest in the light of the application of the geologist's answers to why ore is where it is.—South African Mining & Engineering Journal.

INTERNATIONAL NICKEL.

People Intimate With Company's Affairs Say Business and Earnings Are Much Better.

Sentiment among people conversant with affairs of International Nickel Co. has taken a decided turn for the better. The company is said to have definitely rounded the corner and its business is considerably better than for some time. This condition may be expected to be reflected to some extent in report for three months ended with June.

While surplus stocks of nickel, held abroad, and difficulties of transportation in this country materially reduced demand in fiscal year ended March 31, officials are said to be much encouraged by better business since that time.

It may be presumed that plant operations are at a higher rate than the 60 p.c. of capacity averaged during three months ended March 31. That 60 p.c. of capacity represented 80 p.c. of former capacity, as the Port Colborne plant was included in percentage for March quarter.

Not a little of the improvement is the result of new markets the company is constantly developing for its Monel Metal, an alloy made up of the same component parts as found in nickel ore. One of the uses for Monel Metal is in construction of racing yachts. A large amount of Monel Metal was used in construction of the Resolute, as well as in Vanitie. Another wide use is in golf clubs, where non-rusting qualities are important.

Nickel company's financial position was greatly strengthened in the last fiscal year and at March 31 it had a working capital account of nearly $9,500,000, against $9,779,645 March 31, 1918. Working capital March 31 last was larger than in any of the previous three years.

Possibility of resuming common dividends is believed somewhat remote, although the company is in a strictly liquid position, with earnings showing real improvement. One thing which might delay dividends is that additional plant facilities will be required to take care of expansion in Monel Metal. Such facilities, undoubtedly, would be financed from earnings.—"Boston News Bureau.

GRANBY CONSOLIDATED.

Securing Greater Efficiency—May Build A Concentrator.

Although it has spent in the neighborhood of 10,000,000 during the past few years in expanding its operations the Granby Consolidated Mining Smelting & Power Co. may eventually spend $1,000,000 additional in the construction of a concentrator.

The company has among its ore reserves at least 10,000,000 tons of silicious ores not amenable to direct smelting treatment. A 2000-ton plant would probably cost between $1,000,000 and $1,500,000 and would at once add substantially to the company's productive capacity. To handle the output of such a mill the present smelter could be increased in size if necessary.

Since the change in mine management was recently effected, greater efficiency has been accomplished. Considerably less coke and lime have been used to get the same results. The metallurgical end of the company's operations at Anyox has been thoroughly over hauled under the direction of E. P. Mathewson.

Granby has been producing about 500 tons of coal daily from its own property. A portion of this has been made into coke for the company's own use while the balance has been shipped to Vancouver for sale in the open coal market. Production could be increased to 1000 tons daily should market conditions warrant.

Boston News Bureau.

REORGANIZING CANADA COPPER CO.

$500,000 Assessment Underwritten.

The Canada Copper Corporation will be reorganized; a $500,000 assessment which has been underwritten.

Upon payment of an assessment of 50 cents per share stockholders will receive a share for share exchange of stock in a new company with same capitalization.

Should the stockholders not care to pay assessment they may exchange their holdings on basis of ten for three new shares, leaving the seven shares for the underwriters.

Heretofore, the Canada Co. and its predecessor the British Columbia Copper Co., have operated under American charters but the new concern will take up a Canadian charter, thereby effecting some saving by eliminating dual taxation.

The Canada Copper Corporation has practically completed a 2000-ton mill and production, after many delays, should be started before the end of the year. It has taken about three years to build the plant which can treat 2500 tons of ore daily.

Costs have greatly exceeded early estimates in constructing the 2000-ton plant. Instead of $2,500,000, covered by an issue of bonds, construction and equipment to date has cost over $3,000,000. The company claims reserves of 10,000,000 tons of developed ore.—"Boston News Bureau."

Mr. Geo. R. Rogers, manager of the Wasapika mine has returned to Toronto after a visit to the property.

INCREASING DEMAND FOR HIGH-GRADE ASBESTOS.

Canada Controls American Market.

The demand for asbestos spinning fibre has in late years grown usually strong, and this demand, coupled with the fact that the United States is largely dependent on Canada for high-grade asbestos, has enabled the asbestos syndicate of Canada, which controls most of the world's supply, to fix prices for the raw material that are so high as to make the manufacture of textile fabrics of asbestos profitable. Thus American manufacturers who do not own Canadian mines are at a great disadvantage. For these reasons much attention has been given to the search for spinning fibre in South Africa and in the United States to meet the increasing demand. The results are encouraging. Three varieties of asbestos are found in the Transvaal, and at some places the mineral occurs in abundance. The imports to the United States from South Africa are increasing.

Arizona has the Most Promising Deposits.

Arizona is the most extensive producer in the United States, although its output of spinning fibre is not large as compared with that of Canada. The growing interest taken in Arizona fibre by asbestos manufacturers in the United States is encouraging. The total quantity of asbestos sold in the United States in 1919 was 1,002 tons, of which 420 tons came from Arizona, where there are two promising areas, one in the Grand Canyon and the other about 40 miles northwest of Globe. The route to the deposits in the Grand Canyon has recently been changed, and a small output was made in 1919. Part of the output was sold to customers in America, and the remainder was sent to Japan. Nearly all the asbestos mined in Arizona, however, comes from the region northwest of Globe, where the Arizona Asbestos Association, on Ash Creek, and the American Ores & Asbestos Co., in the Sierra Ancha at the head of Pocket Creek, are the principal operators. A number of smaller producers and shippers considerably increased the total output in 1919.

Government Surveys for Asbestos.

Thus far asbestos has been mined only in the western part of the Arizona asbestos field, on Ash and Cherry creeks, and in the Sierra Ancha. The formations that contain asbestos lie nearly flat and extend eastward into the Fort Apache and San Carlos Indian reservations, where asbestos mining is not yet permitted, although steps have been taken by the Government to make these deposits available to meet the needs of the country. A party sent out by the United States Geological Survey, Department of the Interior, is now examining these deposits to determine their availability as a national resource. Two valuable deposits of asbestos on Indian lands are already known, one on Cibecue Creek, in the Fort Apache Reservation, and the other in Bear Canyon, in the San Carlos Reservation.

Georgia and California May Help.

Georgia ranks next to Arizona in quantity of asbestos produced, but the fibre is of very low grade. The grade of the fibre from California is better, and the mineral is more abundant there, so that the general outlook for production in the United States appears to be good.

Total Output in 1919 and 1920.

The total output for the United States in 1919 was about as follows: Arizona, 420 short tons, chiefly spinning fibre; California, Georgia, North Carolina, Maryland, and Wyoming, 582 short tons, most of it of low grade. Wyoming reports the sale of a small quantity that had been mined in 1918. The production of 1920 will be larger than that in 1919, and the most notable feature of the production is the fact that most of the fibre produced in Arizona is of spinning grade. Nearly 237 short tons was shipped from mines in Arizona alone during January, February, and March, 1920. If mining is continued at this rate throughout the year the output of Arizona in 1920 will be about 1,000 tons.

Imports.

The asbestos imported into the United States in 1919 is tabulated below. More than 99 per cent. of it comes from Canada and is entered free of duty to compete with our domestic fibre, greatly to the advantage of the Canadian producer.

Asbestos Imported Into the United States in 1919.

Country	Unmanufactured: Quantity (short tons)	Unmanufactured: Value	Unmanufactured: Average value per short ton at port of origin	Manufactured
British Indies	1	$80	$80.00	.....
British South Africa	900	132,465	147.18	.....
Canada	133,662	6,935,804	51.89	$17,188
England	156	53,057	340.11	211,957
Germany	.....	.....	.....	10
France	450	202,412	454.70	24,939
Hongkong	1	30	30.00	.....
Italy	.....	.....	.....	2,989
Japan	.....	11	.....	.....
Philippine Islands	.....	35	.....	.....
Portuguese Africa	100	43,791	437.91	.....
Scotland	.....	.....	.....	298
	135,270	7,369,685	.....	257,381

—U. S. Geological Survey.

NEW MAP OF PRAIRIE PROVINCES.

A new edition of a map of Manitoba, Saskatchewan and Alberta giving the number of quarter-sections available for homestead entry in each township with the boundaries and offices of government land agencies has been issued by the Natural Resources Intelligence Branch of the Department of the Interior. This new edition clearly indicates all railways, forest reserves, parks and Indian reserves, also the land which has been reserved for soldier settlement purposes. The size of the map is 24 in. x 36 in., and the scale 35 miles to one inch.

The importance of the new edition at the present time is apparent to prospective settlers, officials of banks, railway companies and land agencies, in fact everyone interested in the development of land in the Western provinces. A copy of this publication which is known as the "Small Land Map of Manitoba, Saskatchewan and Alberta," may be obtained free of charge by applying to the Superintendent of the Natural Resources Intelligence Branch of the Department of the Interior, at Ottawa.

THE SEARCH FOR PETROLEUM.

By Mr. E. H. CUNNINGHAM CRAIG.

(From the "Petroleum Times.")

Western Canada.

The vast regions which may be included under the title of Western Canada have been prospected for petroleum fairly extensively, and in several districts speculative drilling has been active at one time or another. But up to the present there has been no very pronounced success achieved.

That oil does occur in the region is not a matter of doubt, but the conditions under which it occurs have, perhaps, not been fully appreciated, and conditions that will concentrate it in sufficient quantity to give rise to prolific oil fields can hardly be said to have been proved yet. Difficulties of transport over enormous distances and wild country have no doubt kept back development, but these are being steadily, if slowly, overcome, and the time cannot be far distant when it will be possible to transport plant to any desired location without any excessive danger or delay.

Geologists and prospectors have traversed the country from the international boundary to the Arctic Circle, and there is a mass of information available for the student of petroleum to study and form his judgment upon.

There are several distinctly and entirely different propositions presented by different districts, and each has its adherents.

There are those who believe in the possibility of the foothill country of the Rocky Mountains, part of which was exploited during the short-lived and somewhat crazy Calgary oil-boom of 1914. Much of the drilling done at the time was quite justifiable on scientific grounds, much was mere "wild-cat" work, but the result in the end was that only one or two localities were tested adequately and only in one has a workable field been developed. It is not a large field, the drilling is deep and expensive, but the oil is of high grade and the small productions that are being obtained from half a dozen wells are sufficient to be remunerative.

Again there are those who favor the prairie lands, where the great gas-fields are situated on very broad and gentle anticlinical structures. In the Viking field where the flexure is slightly less broad a little oil accompanied by very strong gas has been struck.

It seems very doubtful, however, whether there has been sufficient concentration of oil to give lasting productions, though the gas supply may be ample for many years.

Then there are the exploiters of the tar-sand area of the Athabasca River, where the basal beds of the Cretaceous formation consist of very thick asphaltic oilsands that extend in an almost horizontal position over thousands of square miles. If a method of tapping these deposits in shallow and cheaply drilled wells can be devised, and if such ground be worked like a low-grade ore proposition, it is possible that a commercial success might be achieved. But small production of rather heavy oil will be the rule, and only work on a very large scale with special precautions can give any hope of successful development.

Finally there are those who look to the Devonian Formation for petroleum, and believe that the impregnation of the basal Cretaceous beds with oil is the result of seepage upwards from Devonian strata.

This theory, though subscribed to by several geologists, is the nucleus of much controversial writing, but field evidence may be said without exaggeration to be very heavily against it. The holders of this theory advocate drilling in anticlines in the Devonian formation in localities from which the Cretaceous asphaltic oilsands have not long been denuded, and where filtered residues of oil now make fairly conspicuous surface shows. That a certain amount of oil can be obtained under these conditions is obvious, but it has yet to be proved whether a commercial yield can be maintained over a period of years.

These are the four main classes of petroleum propositions that western and north-western Canada afford, leaving out more speculative ventures in British Columbia. Oil can be, and has been, struck under all those different geological environments, but as stated above, no great success has been made, up to the present, in any one of them. But there are still very many localities that have not been tested, there are many that have partially but not adequately been tested, and there are modified or slightly varied examples of those four fundamentally different environments that have not been fully studied.

For instance, it is said that by drilling many miles from the tar-sand outcrops, these strata will be found still fully impregnated with oil, but preserved from inspissation, and great productions under high gas pressure are predicted.

There is admittedly some evidence for this, e.g., the famous gas well at Pelican River, but the difficulty is to find any structure that will suffice to concentrate petroleum towards any one locality and so maintain a supply of oil to the wells. By careful and elaborate levelling it is stated that such structures have been detected, but the evidence is meagre and the structures so discovered are too gentle to have had any appreciable effect upon the underground migration of a heavy petroleum.

In the foothill country there are many localities with excellent structures and all essential conditions for an oilfield, so far as can be ascertained from surface evidence, where no drilling test has been made. Most of such localities would require deep drilling, and there is always the fear that the adverse condition discovered in the Calgary district, i.e., the lack of a porous reservoir rock of sufficient thickness, may militate against profitable production. Deep drilling necessarily requires prolific production to make it pay, but as oil becomes dearer this objection tends to become less formidable. There are areas west of Edmonton that appear to be worth careful and scientific exploration with the drill.

Then, as already suggested, a bold and comprehensive policy of handling the shallow tar-sand proposition merits attention. No small scale work will suffice here, for no prolific production in any one well is possible.

Detailed and painstaking work in the prairie area may result in the discovery of small oilfields, but it is more probably as gas-fields that these areas must look for commercial prosperity.

The believers in oil of Devonian age in this western and north western territory are perhaps taking the longest odds, but such enterprises are not to be condemned off-hand because the bulk of the evidence points to the oil belonging really to the Cretaceous Series. Light shows of secondary filtered oil can be made to pay if there be sufficient concentration, which depends naturally upon large and well-defined geological structures.

Considering the whole subject it may be said that the verdict at present must be "not proven." There is no doubt whatever about there being a vast volume of oil in the country: the only question is—can it be found sufficiently concentrated under favourable conditions for development. The conditions are known over very large areas, it is not a case of drilling mere "wild-cat" wells in the hope of discovering something phenomenal. Any company undertaking exploitation work must start with most of the essential facts known and a fairly accurate estimate of the depth to be drilled. Modified success or partial or even complete failure has been up to the present the result of all development work done. But a clear case can be made out to justify further attempts in several well defined districts. All the cards can be put upon the table at once. It must be stated at what horizons oil is to be expected, what depth has to be drilled and what area of concentration each well can be expected to drain.

Also, and this is really the most important point of all, what production of oil per well will constitute a success.

The investor or speculator in oil-shares must consider every point carefully and weigh every condition in the light of previous experience before he risks his money. No vague generalities should suffice to induce him to subscribe capital to any scheme, however enticingly put forward.

This perhaps may be said: in the foothills the chances of large productions are greatest, but the expenses of development work and the risks of failure are high.

Among the gentle structures of the prairies or the tar-sand areas the striking of gas or oil respectively are excellent, so long as wells are located on simple scientific principles but the yields may be small. In the Devonian strata drilling is more purely a gamble, but not without hope of substantial results. There is a very confident feeling in the West that big results will be obtained some day, and though booms are always to be deprecated, they are often useful in drawing more than local attention to development work.

But there is no excuse now-a-days for anyone entering upon a venture in oilfield development in western and north-western Canada with his eyes shut. The main facts are known, the possibilities may be estimated; it is only necessary to balance the calculated expenditure against the class of result that can be expected, and if a margin on the right side be indicated to go ahead boldly. The high grade proposition, big production per well and a fortune made in a day, is naturally the most attractive to anyone with a speculative instinct, but the low grade proposition, consisting of a large number of wells cheaply drilled and pumped, may in the end prove the more remunerative. The oil is wanted, and wanted badly; in the opinion of the writer it may be got, but there cannot and will not be any successful development by prospectors or companies that shut their eyes to the material facts.

Mr. G. C. Bateman, manager of the La Rose mine, has returned to Cobalt.

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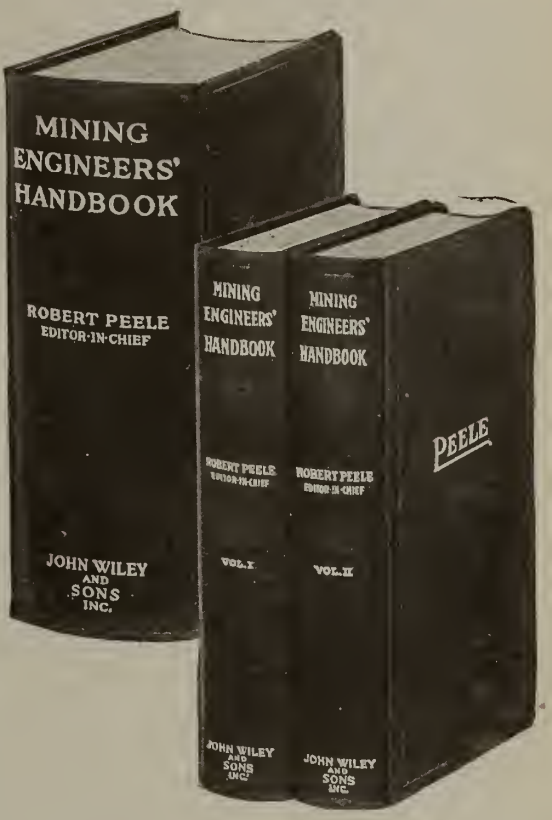

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THE COPPER INDUSTRY IN 1919.

Conditions and Prospects.

(From U. S. Geological Survey).

The principal features of the American copper industry during the year 1919 are shown in an advance statement on the production of copper in the United States by H. A. C. Jenison, of the United States Geological Survey, Department of the Interior.

The smelter output in 1919 was about 1,310,972,000 pounds, a decrease of 597,561,000 pounds from that of 1918. The production of refined primary and secondary copper from domestic and foreign ore and metal was 1,863,580,000 pounds, which was 612,497,000 pounds less than the production in 1918. Refined primary copper amounting to 326,043,000 pounds was produced from ore or other material imported from foreign countries, principally Chile, Peru, Mexico, and Canada.

The discrepancy between the smelter production and the refinery production is due to the fact that 562,000,000 pounds of blister copper and other material was in process of refining at smelters and refineries or in transit on January 1, 1919, and though it was smelted in 1918 it was not refined until 1919.

In 1919 the imports of copper in all forms amounted to 429,388,000 pounds, and the exports of copper in all forms amounted to 516,628,000 pounds, which was 231,062,000 pounds less than the exports in 1918 and 616,205,000 pounds less than those in 1917. The exports in 1919 were less than in any year since 1907.

On January 1, 1919, the stocks of refined copper were 180,000,000 pounds, and on January 1, 1920, they were 631,000,000 pounds, an increase during 1919 of about 451,000,00 pounds. The stocks on January 1, 1920, were several times greater than they have ever been before.

In addition to the stocks of refined copper in hand about 310,000,000 pounds of blister copper and material was in process of refining at smelters and refineries or in transit on January 1, 1920. This estimate does not include blister in foreign smelters destined for the United States for refining nor material in transit to the United States from such smelters.

The apparent domestic consumption in 1919 was about 876,564,000 pounds, which is 785,106,000 pounds less than that in 1918 and less than the domestic consumption in any year since 1914.

Causes of Decrease in Output.

Many causes contributed to decrease the smelter and refinery production, the domestic consumption, and the exports, and to increase the stocks, but the principal cause was a poor market. The industry was working at maximum capacity when the war demand for copper ceased, and it was then, of course, forced to continue production only at the rate required to supply the ordinary commercial and industrial demand. The war demand was stopped so suddenly as to disturb greatly the trade and industrial conditions, and the prospects for the immediate future appeared so uncertain that few industries were able to continue production without first decreasing it greatly and reorganizing, to some extent, their industrial mechanism.

Prices and Costs.

Under the peace-time conditions the demand for copper was small and the average price soon fell from 24.7 to about 15 cents a pound. This price was far below the actual cost of the production of a very large part of the previous year's output. All smelters and mines were forced to decrease production. Some were shut down entirely; others were operated at the minimum capacity that would keep the organization intact and the equipment in proper order. Much of the copper in stock could not be profitably held, and the placing of a large part of it on the market kept the price down, though it showed a tendency to rise when the readjustment set in.

The price during the year showed many fluctuations but averaged only 18.6 cents a pound, which was about 24 per cent less than the average price in any year since 1915, though the cost of labor and supplies had risen as much as 150 per cent during that time.

The labor troubles in other industries decreased the cost of supplies used by the copper industry, and materially increased the cost of production.

Decrease in Foreign Demand.

By the time the price of copper had risen high enough to permit the industry to meet these unfortunate conditions foreign exchange began to fall so rapidly that foreign buyers were unable or reluctant to purchase American copper, and finally the exchange between the United States and foreign countries dropped so low that they could no longer buy it. These conditions almost ruined the foreign market for American copper, and the demand and the price in the domestic market were less than they had been at any time for several years. On the whole, the year was an unsuccessful one, and in view of the conditions it is remarkable that the industry remained as stable as it did.

Prospects for 1920.

It is hard to forsee what improvement can be expected in 1920 but the quantity of copper sold in the early part of 1920 indicates that the year will be better than 1919. Any improvement, however, will be temporary and no stability or security can be found until existing troubles are settled and industry and trade become more stable. The prosperity of the copper industry is peculiarly dependent upon the establishment of stability in other industries, and before the industry can receive any great stimulus the condition of labor and of trade generally, not only in America but in Europe, must be greatly improved. When that time comes the industry will undoubtedly be as prosperous as ever.

METAL QUOTATIONS.

Fair prices for Ingot Metals in Montreal August 12th 1920.

	Cents per lb.
Copper, electro	24¼
Copper castings	23¾
Tin	55½
Lead	10
Zinc	10½
Aluminum	35
Antimony	9

PERSONAL.

Mr. E. V. Neelands, Mining Engineer, of Toronto left for Venezuela on August 9th and expects to return to Toronto about October 15th.

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FORESEES ELECTRO-CHEMICAL INDUSTRIES IN THE NORTH.

(By the Northern Ontario Correspondent of the Journal).

Among those who have given the matter considerable study, and from results accomplished under somewhat similar conditions in other countries, the belief is taking form that Northern Ontario may reasonably be counted upon to develop another important industry, which may rank favorably with the three chief industries of the present,—mining, farming and pulp-timber products.

It is in the water-powers, and the probable establishment of electro-chemical industries that careful observers claim to foresee new and important developments, and it is to the Des Quinze falls at the head of Lake Temiskaming, to Kettle Falls on the Abitibi River, as well as to the numerous great water-falls which occur on all the rivers tributary to James Bay that immediate attention may be turned.

It has been stated by the British Water-Power Commission that the world's annual consumption of nitrogen amounts to approximately 750,000 tons, having a value of at least $250,000,000. About four-fifths of the total has previously been produced from nitrate deposits, but with this source of supply nearing depletion, great importance attaches to nitrogen fixation from the air.

In Northern Ontario it has for some time been recognized that the rivers could be harnessed for this purpose, and that their economic value thus employed would be enormous. It has been pointed out that while no suggestion is made to copy the methods employed by the Germans before the recent war, it should nevertheless be kept in mind that Germany actually made great progress in the establishment of electro-chemical industries, including nitrogen fixation, and that these industries had their beginning from Government subsidies.

When last year's survey was made of a possible route for the extension of the Temiskaming and Northern Ontario Railway from Cochrane to tidewater at James Bay, considerable attention was given to the feasibility of utilizing Kettle Falls as a means of establishing an electro-chemical industry which might contribute to business for the proposed railway.

The diminution of the fertility of wheat and cotton-growing areas as well as general agricultural lands in many parts of the world creates a national necessity for establishing some system where artificial fertilizers may be obtained in large quantities, and it is believed that the favorable local aspect may attract the attention of the advisory bodies of the Imperial authorities, and that a solution of the nitrate problem may actually be found in the water-falls of Northern Ontario, an opinion based on existing official data.

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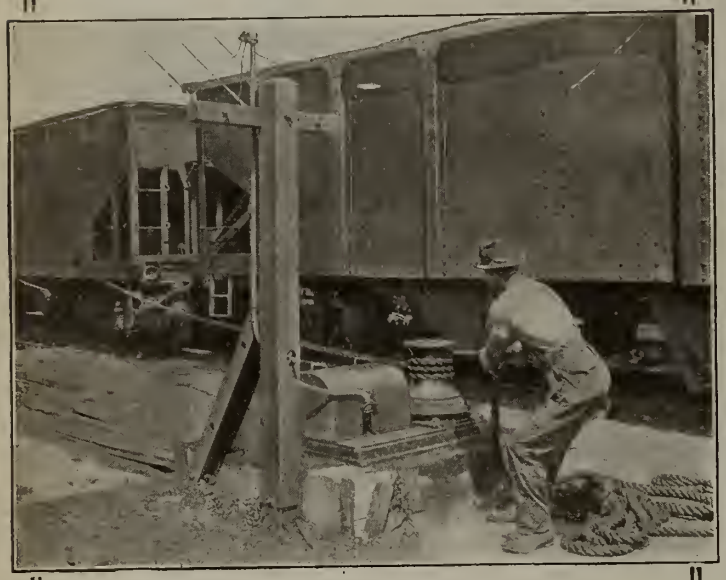

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COKE DISPOSAL.

The growth of the by-product coke industry independent of the iron and steel industry and the prospects for developing it primarily, as a source of gas without necessity for relying on the needs of blast furnaces, depend almost entirely on the question of coke disposal. The extension of the domestic coke market is of great importance in this connection, and much progress has recently been made in this direction. The situation bears close relation to the condition of anthracite coal supply which is yearly becoming poorer in quality and more inadequate in amount . Just as the availability of natural gas has accustomed millions of American people to the use of gas fuel for domestic purposes, so the wholesale use of anthracite coal as domestic fuel has paved the way to introduction and substitution of coke.—**Gas Age.**

Royal School of Mines Frecheville Research Fellowships

The Imperial College of Science and Technology, South Kensington, London, S.W. 7, with which the Royal School of Mines is incorporated, is offering two Research Fellowships of £300 a year each, tenable for one year and possibly renewable for a second year, to aid in carrying out any investigation or research connected with Mining, Mining Geology, Metallurgy, or Technology of Oil, which in the opinion of the Selection Committee is of sufficient use or promise.

Applicants, who may be Associates of the Royal School of Mines or others, and preferably men with some practical experience, if resident in Canada should apply in writing to the Secretary of the Canadian Mining Institute, Montreal, (from whom further particulars may be obtained), before 1st September, 1920, giving the nature of the proposed investigation, qualification for the work and references.

It is anticipated that the Committee will make the awards by the end of November, so that the Fellowships and work may begin on 1st January, 1921. Holders will be expected to devote their whole time to the work which may be conducted at the Imperial College or in special circumstances elsewhere at the discretion of the Committee.

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:-: EDITORIAL :-:

SOME FIRST-HAND DEFINITIONS OF THE THEORY OF THE O.B.U.

The newspapers have contained little about the notable debate which took place in Winnipeg on August 6th between exponents of the rival doctrines of the O. B. U. and the American Federation of Labor, but it occupied the attention of three thousand persons for three hours in hot weather, and elicited some definition of O. B. U. theories that will bear quotation.

Jos. Knight, who opened the debate for the O. B. U., and who was more remarkable for his venom than his logic, said: "The O. B. U. is not a national organiza-"tion. That is absurd. An organization of the work-"ing classes as a class cannot be national. . . . . "What has the O. B. U. done? It has permeated the "mind of the working classes of Canada in a man-"ner that they will not get over, and tomorrow the "O. B. U. will have the whole thing."

The representative of the American Federation of Labor, W. H. Hoop, defending the policies of the allied craft unions said this form of organization supplied "that merit which enables the worker to pool and "use his economic power within the limits of the con-"stitution, and carries with it the dictatorship of the "proletariat whenever they desire to express it at the "ballot box; whereas the O.B.U., throwing aside all "weapons other than the big stick of direct action, "treats society as an enemy, seeking to subdue various "sections by dictatorship."

John Houston, speaking for the O. B. U. quoted a conversation with a tramcar driver, who advised "All "you have to do to win that debate is to point the "attention of the audience to the fact that the bosses, "the politicians, the newspapers, and all the organiza-"tions and institutions of society are against the O. "B. U. If the working class cannot see that an or-"ganization which meets with all that hostility is in "their interests, then they cannot see anything at all." Mr. Houston's own point of view he stated to be a firm belief "that when a man takes part in the Labor move-"ment, and while doing so he enters into relations or "bargains or receives any favors from the bosses, he "is a traitor to the working class."

The speakers of course said much more, but the quotations selected sufficiently disclose the fatal gulf between those who desire to mend society as it is now constituted, and those who desire to end it. Mr. Knight and his confreres have correctly diagnosed the O. B. U. movement as the deadly enemy of "the institutions of society" and as anti-national. This gentleman, in his rebuttal speech, said further: "Oh "fellow-workers, the simplicity of the whole thing! "Here you are, the workers of Winnipeg. You or-"ganize in your own units. Express yourself through "your Council, and the workers of Winnipeg will have "control of their own affairs. There it is in simplicity "—the O. B. U."

"Their own affairs"—and, everybody else's. We grant the simplicity, but there's the rub.

Those who advocate the complete domination of the "working classes" also arrogate to themselves the definition of the term, accompanying their advocacy with a denial of the right of any other class to exist. When they also postulate that all those are traitors who enter into communication with those inhabitants of the world that are not included within the self-determined definition of workers, they disclose themselves as the relentless and irreconcileable enemies of society. Can society, the general community of mankind, which includes the workers **and** all others be blamed if it recognises its would-be assassin and defends itself?

The A. F. L. speaker said the O. B. U. was "out to smash the State," and that when "the nature of the real thing was seen by the State, there could be no compromise." Which seems to be a fair expression of the position and responsibility of the State towards "all the organizations and institutions of society" that the O. B. U. conceives to be the enemy of the worker.

INCREASED RAILWAY CHARGES.

The apologists for increased railway charges are making use of rather far-fetched instances to illustrate how lightly the increases of railway rates will be felt. Elaborate calculations are being made on the increased freight charges upon a tailored suit of woollen goods, and other finished articles whose value consists much more in labor than in material cost.

It is not in package freight and express shipments that increased railway rates will be most fundamental and widespread, but in the effect of increased rates upon heavy raw materials shipped in bulk, such as coal, iron-ore, petroleum, and bulk foodstuffs.

An increased freight charge upon coal will successively and cumulatively add to the cost of every manufactured article at every progressive stage of manufacture. The manufactured articles into which the cost of coal does not enter, and enter very largely, are completely negligible. In fixing freight rates, therefore, it is desirable that the least possible increase shall

be made in the carrying charges of raw materials, and in particular the transportation costs of coal.

No reasonable person will deny that the railways must have more revenue if they are to continue to fulfill their proper function. The mining industry, as the great producer of raw materials, stands to lose more than any other branch of industry if our transportation system break down through lack of financial strength, and all who understand the elementary requirements of prosperity in mining industries include efficient transportation facilities among them. The railway companies will not meet with any biased or thoughtless opposition from mining men to such rate increases as the Railway Commission may concede to be required to meet increased wages and increased costs of material, but there seems a possibility that the use of finished manufactured articles as typical instances of the effect of the expected increase of railway charges discloses a solicitude for manufactured goods in relation to freight charges that may imply a lack of realization of the far-reaching effects of freight increases on raw materials, and, in particular, on coal.

These remarks refer, of course, to those instances where it is necessary to transport coal by rail. Wherever it is possible coal should be transported by water. The railways admittedly do not like freighting coal, and regard it as a necessary nuisance, and—wherever a competitive or alternative water-route exists—the objection of the railways should not be disregarded. There are indeed railways in Canada whose running costs would be much lessened if they developed water transportation for locomotive coal to a larger carrying capacity than it has yet reached.

BRITISH LABOR AND POLISH FREEDOM.

Despite the biased and incomplete cabled reviews on which Canadian readers have to base their opinions of British politics, it has for sometime been clear that Britain would not declare war upon Soviet Russia. Britain has other fish to fry, she is dead-tired of war and war's consequences, and there is a widespread disinclination in Britain to interference in other people's political experiments.

Therefore the hysterical demand of the Laborites that there should be no war with Russia has fallen rather flat, and the country is generally amused at one section threatening revolution to obtain what is the very general desire of all the people.

The action of the Labor Party is not logical. They state first: "We are not concerned with the form of "the Russian Government. We have no concern about "the merits or demerits of Bolshevism." Later the Council of Action was instructed to remain in being until, among other things, "recognition of the Soviet Government" is secured. Recognition and approval of a constituted government are usually regarded as inseparable. It is one thing to protect against military interference in national affairs, and another thing to solemnly approve a foreign government.

These phases of the event should not however obscure the gravity of the step taken by organized labor, which, as it is characterised by H. J. Thomas himself, is "a desperate and dangerous method" and a "challenge to the whole constitution of the country."

The danger consists in acceptance by the Labor Party of a theory that was precisely enunciated by Robert Williams, who said to the assembled delegates: "I tell you solemnly and seriously that you are infinitely more representative than the House of Commons, and you may be summoned to sit permanently as a Committee of National Safety." Those outside the ranks of organized labor may challenge this statement as being untrue, and the issue will then be straitly drawn. The interpolation of the Russian situation will then be recognised as distinctly irrelevant and merely confusing the true issue.

The decision of organized labor to form a Council of Action, which is merely another term for a Revolutionary Committee, doubtless is a reflex of the Miners' Congress at Geneva, and is a sign of the growth of the international movement in labor politics, and the temporary discount of national sentiment that is a natural result of comparing of notes between representatives of European nationalities after the dreadful experiences of war.

If the labor groups in all civilized countries unite in denouncing war they will find few opponents of their course, and there is no doubt that a general strike of coal miners would most effectually paralyse all war effort. Labor has a long way to go yet, however, before it can guarantee national rights and national independence against agression by autocrats, either monarchial or ostensibly proletarian, or against the armed forces of uncivilized races and those nations that while they have accepted Western civilization have not accepted Western ethics. The British workman is secure in his nationality and in his island, but closer proximity to chaos and the kindergarten of child races that are at this time experimenting with forms of government in eastern Europe and western Asia would modify his enthusiasm in the singing of the "Internationale."

The taste of British laborites for Russian methods is as mysterious as the bygone enthusiasm of certain literary circles for Russian literature, and it is a singular turn of events that links Ludendorf with the British worker against Poland and Lloyd George. Considering the momentous nature of the laborites' decision to adopt direct action one could wish they had chosen a more definite issue, but, for the peace of Britain, it is perhaps fortunate the issue is clouded and not urgent.

ASSOCIATED GOLDFIELDS.

The proposal to give railroad facilities to the Larder Lake gold area is one that especially interests shareholders of Associated Goldfields. This company has issued a report on its property which would indicate that the company has resources for conducting mining operations profitably and on a large scale. A railroad covering the area would derive much business from an industry of the magnitude contemplated.

The Ontario Government owns the railroad from North Bay to Cochrane, the Temiskaming and Northern Ontario Railway, and a branch line from this railroad is asked for. The railway commissioners have indicated a willingness to consider the proposal provided a report on the property is made by Government engineers. Up to date there has been no announcement as to whether the company is willing to have the mine examined by the Mines Department. The usual examinations by inspectors of mines and geologists of the Bureau of Mines do not include sampling systematically of properties or the expressing of opinions as to their commercial possibilities. The examination called for would be of a different character from that of the customary ones.

In view of the expenditures involved in the construction and operation of branch lines the stand taken by the Government officials seems a reasonable one. It is to be hoped that the company will so regard it. —R.E.H.

ORIGIN OF THE SUDBURY NICKEL ORES.

The origin of the nickel-copper ores of the Surbnry district has been much discussed. Those who are interested in the subject will do well to read the opinion of a recent worker on the problem published in an article in the July bulletin of the Canadian Mining Institute. This writer states that geological work at the mines has disclosed facts that indicate the origin of the ore by its intrusion in molten condition along a plane of shearing in the footwall rocks adjacent to the norite, after the latter had solidified. The writer presents some evidence in support of his view, but does not discuss the subject fully.

The evidence offered is hardly sufficient to shake the faith of those who believe the localization of the orebodies to be primarily the result of differentiation in the norite magma. It is reasonable to suppose that the cooling of the molten mass would take a very long time and that during that period there would be much cracking of solidified portions and subsequent sealing of the cracks by dyke-like masses.—R.E.H.

Leland D. Adams of the Weedon Mining Company is visiting Canada. Mr. Adams, who resides in California, expresses himself as well satisfied with recent developments at the mine.

CORRESPONDENCE.

To the Editor of the Canadian Mining Journal.

Dear Sir:

In your issue of July 30th inst. you have an article on the Graphite in Canada. You have had a number of articles on this mineral during the last year or two. I do not think any of the writers of the articles are well posted about this mineral, especially in the Province of Ontario. I know that there is in Ontario, as yet virgin, mountains of sand and gravel, carrying silver flake graphite for the purposes you mention, that is for the making of crucibles and for pencils and for powder, just as pure as any found in Ceylon and I am sure as any found in the United States, and superior to the Black Donald of Renfrew, but up to the present no one seems to want them. Then you go on to say if concentration methods can be devised to take full advantage of the high graphite content of Canadian ores, the industry should prove permanent. Well sir, I own and control four patents, patented in Canada and in the United States. With any of them I can clean and separate Graphite, Gold, Silver, Lead, Zinc, Molybdenite, as easy and perfectly as blowing chaff out of wheat—I have a perfect process.

And I can clean and concentrate for cents per ton what by any other process costs as many dollars per ton. My process and my machine have no equal in the world, but Sir do you know that some of our mine owners, and mine managers, know so little about minerals, and the machinery required to clean and separate the minerals from the matrix that they think there is no machine will do it?

And they are using that rotten filthy dirty process —the Hun's process—oil flotation or still worse, cyanide, that is both dangerous and unhealthy. Any of your readers can see my Patents at any time, and they are in a class by themselves, as there is nothing yet patened in their class. Hoping you will find a place in your valuable paper for this.

I am very truly,

M. J. Paterson, Sr. E.M.

66 Churchill Avenue,
Toronto, August 9th, 1920.

BOOK REVIEW.

THE MINES HANDBOOK. The Mines Handbook and Copper Handbook for 1920, Vol. XIV, 6 by 8½ by 2½ inches. 1992 pages. Cloth Boards. Price $15.00. Published and compiled by Walter Harvey Weed, New York City.

The latest edition of this standard compilation covers the mining industry of the world for 1918, 1919 and the first quarter of 1920. It is announced that the Handbook will hereafter be published annually, delay in issuing the 1920 volume having been caused by labor troubles and paper shortage.

The Handbook contains statistical information regarding the production, consumption and United exports and imports in all commercial metals. The scope of the work is comprehensive, covering as it does the metal mining industry of the world, and the information, so far as we are in a position to check it from the references to Canadian and Newfoundland mining operations, is complete and accurate.

This Handbook is a necessity in the library of consulting mining engineers, metal brokers, dealers in mining equipment and supplies, and all who are interested in mining, more particularly in America.

The Concentration of Graphite Ores--Past and Present

By R. C. ROWE, Buckingham, Quebec.

I.—Introduction.

Some day, someone may write a complete history of the graphite industry of this country. The result will be interesting, and instructive, inasmuch as it will illustrate the remarkable and devious wanderings of the human mind in search of a certain definite result.

It is quite beyond the scope of this paper to attempt to explore the various backways and byeways of metallurgy that graphite has, in the past travelled. Only generalities can be dealt in.

Canadian graphite occurs principally in more or less flat flakes ranging in size from one-eighth of an inch in diameter to microscopical dimensions, disseminated throughout the rocks of its occurrence. Its specific gravity is in the vicinity of 2.2. That of its accompanying gangue is around 2.6.

Refined graphite enters into many phases of our everyday life; but its chief use is in the manufacture of crucibles. Only the largest flake is used for this purpose, and, as this material is the most valuable, the efficiency of a process for concentrating graphite is, to some extent, governed by the amount of crucible flake produced.

For example: Consider two mills each operating with a recovery of 85 per cent. One, however, produces 110 lbs. of crucible flake per ton of ore treated, while the other produces only 100 lbs., the remainder of the production, in each case, being made up of finer grades. The mill producing 110 lbs. of crucible flake would be considered the most efficient and, would probably remain a better paying proposition, even if its recovery dropped 5 or 10 per cent below that of the other. Thus it is obvious that a high recovery figure does not always mean a paying graphite proposition.

The small difference in the specific gravities of graphite and its accompanying gangue, makes it difficult to concentrate the mineral by any methods that have gravity as their underlying principle, and it will be readily understood that it also aggravates certain problems that are familiar to all mill men. In fact, the average millman, inexperienced in the mineral, upon tackling its concentration, finds himself in a veritable land of topsy turveydom where precepts and precedents often fail. He finds concentrates where he is used to finding tailings. He finds settling tanks that don't always settle. He finds values, to alarming amounts, in overflows, and other places where they have no earthly reason to be. He finds his elusive mineral floating in the air about him, and polluting the country side. In fact, after a while, he begins to thing that there is graphite everywhere in the wide world, except in the one place where it should be, namely, the bags at the end of his often intricate pulp flow.

These introductory remarks will show, to some extent, the obstacles that have had to be overcome by the old operators. Couple to the physical characteristics of the mineral, erratic market conditions, and less modern machinery, and, in the light of latter-day knowledge, one can see that the whole thing was more or less futile.

It is to be regretted, however, that those who have gone before, have left us little record of their endeavours, and apparently few, if any, records of results have been kept.

Thus it is that, doubtless, much of the futile ground covered once, has been covered repeatedly since, and the bitter lessons of failure have had to be relearnt again and again.

II.—The Past.

Briefly, all efforts in concentrating graphite, up to the introduction of the flotation process, may be considered commercial failures.

The first graphite mill in this country apparently started to operate about fifty years ago. I have talked with an aged individual who remembers that his first job in life was to carry whiskey for the mill crew of this particular venture. From local tradition, and Government records, we learn that there was a considerable amount of activity in graphite about this period.

The concentrating device used was the well known buddle, and, as this was a more or less standard machine, graphite, in its infancy, did not stray far from the well beaten paths of common practice.

The flow sheets in use may be broadly described as follows: The ore was broken in crushers and stamps, and roughly classified. The resulting products were then fed to buddles. Buddling resulted in three products: Concentrates, middlings, and tailings. Middlings were re-treated in buddles, concentrates were treated with buhr stones and screens.

The use of buhr stones and screens has survived, and still forms a part of graphite milling practice; but the use of the buddle has died completely. It is obvious that, with such a small difference in the specific gravities of values and gangue, the buddle could never be an efficient concentrating device for graphite; but in one case its use survived until a short time ago, when it was superceded by oil flotation. Only remarkable local conditions, however, rendered this possible.

The general use of the buddle persisted for some years before it was finally abandoned as a failure, and, after its abandonment, graphite for a time departed completely from accepted practice. Each operator appeared to follow his own particular line of experimentation, and the ramifications to which fancy lead are extraordinary.

It would be useless to attempt to describe all the machines and devices employed. Some worked on the gravity principle, among which might be listed, air jigs, air float machines, and various wet concentrators. Some operators delved into electrostatics. In one case a bulk oil process was tried. Mr. H. P. H. Brumell evolved a surface tension machine. This apparently was not successful, though the use of devices, employing surface tension, continued in use, largely in Alabama, right up to the advent of the flotation process.

One operator, in the Buckingham district, tried for two years to design, and perfect, a machine that depended upon the flat shape of the flake for concentration. In other words, he endeavoured to make every individual flake follow the particular laws of dynamics that govern aeronautics. The outcome of

numerous experiments is shown in Figure I, and it is given here as an illustration of this phase of the graphite industry.

The ore pulp, rendered fairly dilute, was fed at the point A, and, forming a thin film, ran down the incline B. During the journey the flakes of graphite were presumed to acquire, and maintain, a position parallel to the surface B, and, upon striking the water level C, they were supposed to volplane as it were across the space G to the overflow lip D, where they were discharged to the small screen E, and removed by any suitable means. The gangue particles, being granular, sank in the space G, and were discharged through the valve F. Water level was regulated by the tailings valve.

Theoretically, the principles involved were fairly sound, and in practice some of the flakes did volplane across the clear space, and were duly collected; but, again, some of them didn't, and the proportion that did was very, very much smaller than the proportion that didn't.

About this time a dry process of rolling and screening was receiving a good deal of attention, and its adoption in Canada became almost universal. Here

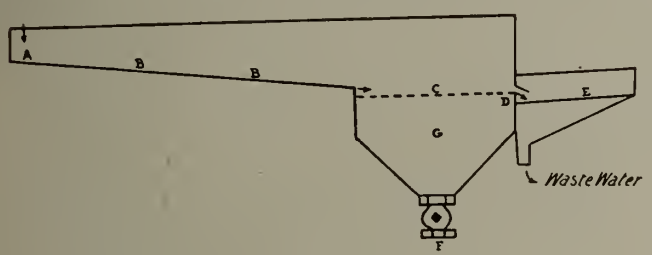

FIG. 1.

again the shape of the flake was taken advantage of, and here again the principles involved were fairly sound—up to a point.

The broad lines of the flow sheets usually adopted were somewhat as follows:—The ore was dried in either kilns or rotary driers, and was ground by the usual dry methods to minus 20 mesh. In this form it was fed to small high speed flour rolls. The theory simply was that, the flake, being flat and tough, would pass through the rolls uninjured, while the gangue being granular, with the exception of any mica present, would be pulverised to dust, and could thus be removed by screening. The rolled material was passed over a forty mesh screen. This yielded a fairly clean flake. The throughs were dusted over an eighty mesh, and then passed to another battery of rolls, after which the material was scalped over sixty mesh, the throughs being again de-dusted, and further treated with rolls and screens.

The principles upon which the process rested have long been recognized. The first graphite mill in Canada used buhr stones and screens for the final treatment of concentrates, and the latest uses rolls and screens for the same purpose; but there is a vast difference between treating a high grade concentrate, and a ten to twelve per cent ore. In the first case the destruction of valuable flake is small, and the wear and tear on rolls and screens is negligible, while in the latter the destruction of flake is enormous, and the cost of wear and tear becomes a most formidable item. In practice it was found that, with the roll and screen method, a large proportion of the graphite was broken up, and therefore passed out with the dust. The large quantities of floating dust in the air of the mills caused trouble with bearings and belts. Recoveries were low, operating efficiencies were low, costs for repairs and renewals were high, and so the process inevitably languished, and eventually died.

While the roll and screen process was dying out, a plant using wet crushing, grinding, classifying, and tabling machinery was designed and built. In this process the very slight difference between the specific gravities of graphite and its gangue caused many troubles; but the plant may be considered the most successful one working on disseminated ores up to the advent of the use of oil flotation on graphite ores.

The flow sheet was roughly as follows: The ore was broken in jaw crushers, and ground in a ball mill and tube mill. The resulting product was then sized in screens and hydraulic classifiers, and passed to a series of tables, which produced concentrates, middlings, and tailings. Middlings were re-ground and re-tabled. Concentrates were filtered, dried and then passed to a finishing plant consisting of rolls and screens.

The recovery of crucible flake was high, and the operating efficiency was high. The plant, consequently, has run fairly continuously for some years, and latterly flotation has been installed. The construction of this plant marked the return of graphite to the more or less beaten paths of milling practice, and during the war several other plants adopted the gravity process. All other plants, however, installed dry gravity tables, and the processes were dry throughout.

Reports of the results of these mills differ; but they all eventually closed down. It is the opinion of the writer that the enormous cost of repairs and renewals was largely responsible for this. High costs, and low operating efficiency appear to be factors accompanying every dry process.

The use of gravity methods for concentration, brought into discussion a point that had, apparently, escaped notice before, or if it had not escaped notice had, at least, not been raised, namely the intimate intercrystallization of graphite and its accompanying rocks. It was found, through careful examination of table middlings that, even at most minute sub-divisions, graphite and gangue were still to be found clinging to one another. This is a most important point in considering the application of the flotation process to graphite ores, and it will be treated in a subsequent portion of this paper.

The use of standard gravity tables, for the concentration of graphite, marks the last phase of the past. The use of the oil flotation process belongs to the present; but before passing from the past to the present it might be remarked that it is singular that the flotation process was never discovered by the early graphite operators. Fine graphite will often float without the aid of oils, and on every tailing pond big blobs of graphitic froth may be seen. It seems remarkable that, to none of the numerous operators came that flash of inspiration that would have bridged the gap between those floating blobs of mineralized froth and a new process.

Frank Elmore saw the imprint of an oily hand marked out by collected copper slime, and from this germ of thought one phase of the flotation process was born. Graphite operators, for years, actually saw the mineral laden bubbles that were, eventually, to

revolutionize metallurgy, and they, even though searching for a process to solve their troubles, failed to grasp the significance of what they saw. So are epochs born—and so are they lost.

III.—The Present.

The flotation process is now being generally adopted for the concentration of graphite ores. Its adoption has, however, been somewhat slow, and graphite is probably one of the last of the amenable minerals to which the process has been applied.

It was probably the remarkable results obtained by flotation upon molybdenite that first drew wide attention, in this country, to the possibility of applying the process to graphite. Concentrates running ninety per cent MoS_2 were obtained by flotation, and, as graphite much resembles molybdenite in appearance, a widespread idea became prevalent that graphite concentrates running ninety per cent graphitic carbon could be obtained by oil flotation in every day milling practice.

If such were the case, the milling of graphite would be a very simple operation. This idea still persists in some quarters, and the writer ventures to assert at this point that a graphite concentrate averaging ninety per cent carbon, obtained by flotation alone, in ordinary milling operations, is a myth. Such a concentrate has been obtained in the laboratory, and it will, undoubtedly, be obtained again; but anyone hoping to produce such a result in milling practice is pursuing an ignis fatuus.

In a very broad sense, it may be stated that the flotation process presents a solution of the vexing problem of economically concentrating graphite. The operator contemplating the installation of the process has one solid rock to cling to: Froth flotation produces a clean tailing. Given the correct ore pulp conditions, he may rest assured on this point; but from here on nothing is stable.

Mechanical or pneumatic machines give practically the same results. The former giving a shade better tailing, while the latter generally shows a slightly better concentrate.

Mr. Chas. Spearman remarked in a recent article upon graphite published in The Canadian Mining Journal, that the problem was more one of grinding than of concentrating. I, for one, agree with him upon this point. As pointed out previously, Canadian graphite, as a general rule appears to be very intimately associated with its accompanying rocks, and no system of wet grinding appears to free the particles of graphite completely from the accompanying gangue. It must be borne in mind, when considering this point, that sliming must be avoided. Preservation of flake is one of the graphite mill man's chief objects.

Under existing methods the product of any grinding plant may be roughly classified as follows:—

a. Free flakes of graphite.

b. Flakes of graphite with small pieces of attached gangue.

c. Particles of gangue with small pieces of attached graphite.

d. Free gangue.

This classification is more noticeable in undecomposed ores Decomposition appears to free the flake in a manner impossible to duplicate mechanically. Tests run on such ores often give remarkable results that cannot be duplicated upon undecomposed ores, and, for this reason, it is desirable that all tests, in connection with flow sheet design, should be run on ore taken from below the zone of decomposition.

According to flotation practice, classes "a" and "b" and part of "c," of the above classification, will float. This is entirely desirable from a recovery point of view; but it tends to produce a dirty concentrate.

Thus, it will be gathered that the purity of a graphite flotation concentrate is in direct proportion to the degree of liberation of flake accomplished by grinding, and that the degree of concentration attainable by flotation is governed by factors which are, in themselves, quite apart from the process under discussion.

The ideal machine for preparing graphite pulp for flotation would be one that woud pulverize all gangue and yet leave the flakes of graphite intact. Such a machine does not exist, and probably never will. The only remaining alternative is to pick the machine that will accomplish the grinding with a minimum destruction of flake. Here a diversity of opinion is met with. Some engineers prefer ball mills, some rolls. Among those preferring ball mills there is a further split; one faction favouring peripheral discharge mills, while the others can only think of centre discharges. It is therefore impossible to lay down any rule in connection with this most important point. The ultimate scheme to be adopted by any operator can only be determined by tests, and local conditions; but in any case grinding and classification should receive very careful consideration, and nothing should be left to theory, every step being tested out, if possible, by mill scale tests.

Rougher, or primary concentrates, will generally run from thirty to forty-five per cent carbon. Three methods of raising these present themselves:

(1) Successive floatings, returning tailings for retreatment.

(2) Stage grinding and floating.

(3) Tabling.

The first consists of a series of cleaners, and is undoubtedly the simplest; but it is doubtful whether it will, under any circumstances, result in a really high grade concentrate.

In the second method the entire primary concentrate is reground in a pebble mill, and refloated, the concentrate obtained by refloating being again ground, and further floated. This may be carried on indefinitely, as the successive regrindings and refloatings are all operated in closed circuit. A high grade concentrate is the inevitable result; but the destruction of valuable flake must be tremendous. The destruction of flake occurring during tube mill grinding is a much debated point. Many claim that the loss is negligible; but the writer has found that, in a thirteen foot mill, fourteen per cent of the flake was ground to minus 150 mesh. This with a dilute pulp, and a special large discharge.

The third alternative—tabling—appears to be best suited to general requirements. Theoretically, the free flake, having a different specific gravity to flake carrying attached gangue, would be taken off, and thus saved from the chances of tube mill grinding, while the tailing containing unfree flake would be returned for regrinding and refloating. But practice does not altogether bear out theory. It is difficult to quite break the primary froth, and an oil streak, which passes straight down with the head water on the table, is the result. This oil streak looks rather fine; but it entraps a proportion of unfree flake and gangue and a lowering of the table concentrate is the

direct result. Careful selection of flotation oils may do much to alleviate this condition; but, in any case the old troubles, due to slight differences in specific gravities, are present.

By any of the above methods a concentrate ranging from sixty-five to eighty-five per cent graphitic carbon may be obtained. A fair average is 75 per cent.

After dewatering, and drying, the usual finishing methods may be followed. The plant employed usually consists of a series of buhr stones and screens. In some cases rolls are substituted for the buhr stones.

Apart from the general lines touched upon in the foregoing, many difficulties crop up. Froth collects, and builds up, in all sorts of odd and unexpected places, and it is particularly difficult to dispose of overflows without losing graphite.

It will be observed, from the foregoing, that no golden rules have been laid down. One can only generalize, and that all too broadly. It cannot be too strongly emphasized that every graphite ore is a problem. Two ores, that appear exactly alike, will yield vastly different results with the same treatment. For this reason, every contemplated step in a flow sheet should be thoroughly tested, and nothing should be left to theory, and nothing to chance.

To continue our generalizations: — Treatment I. should yield good results on a soft friable ore.

With undecomposed gneissic ores treatments 2 and 3 should yield good results. Either might be advantageously used, or a combination of both.

Treatments 1 and 3 undoubtedly yield a higher proportion of No. 1 flake, while No. 2 probably results in a higher grade combined concentrate.

As stated elsewhere in this paper, it may be found justifiable to sacrifice a small percentage of recovery, if the sacrifice involves an increase in the amount of crucible flake produced per ton of ore treated. In this connection it may be remarked that, the finer the grinding, the higher is the flotation recovery. The amount of grinding best suited to commercial and metallurgical requirements can only be determined by careful observation over periods, though careful testing will indicate the limits within which the ideal must lie.

In conclusion it may be remarked that the trend of thought, regarding graphite and the flotation process, is distinctly optimistic; but it must be pointed out that the graphite industry on this continent has, in the past, suffered through an acceptance of certain optimistic lines of theory. Mills have been built on theory alone, and it was not until the mill failed that the weakness of the theory was shown. The application of the flotation process to graphite is a tricky thing, and a too easy acceptance of theory may easily end in failure.

The advisability of testing has been emphasized in this paper, and, in conclusion, it may well be emphasized once more. Prove every step, if possible by mill scale tests. Look upon theories with suspicion. Remember that a few hundred dollars spent in tests may save many thousands—and failure.

The U. S. Geological Survey reports 2,430,000 tons of gypsum mined in the United States in 1919, an increase of 373,000 tons over the production of 1918, reflecting the resumption of building construction.

SALT MINING AT MALAGASH, NOVA SCOTIA.

About twenty tons of salt daily are being produced here. The deposit of potash-bearing mineral which was reported occurs near the surface, and while its analysis is promising, it is not considered as representative of the continuation of the deposit when it reaches a depth where atmospheric and surface influences are not felt. Sinking is being carried on in the salt vein itself, and the possibility of finding more valuable material is regarded as quite probable.

THE IRON ORE MINES AT WABANA, NEWFOUNDLAND.

The Scotia Mine is producing 1100 tons daily, of which 98 per cent is machine-loaded ore. There are now eight mechanical loaders in the submarine territory, namely, four Thew shovels, two Myers-Whaley loaders, and two Armstrong loaders. The use of mechanical loaders is being found of much advantage in advance work, the rate of progress of headings and leading places being much helped thereby.

The sale of ore for outside shipment has not yet resumed pre-war volume. It is reported that the Dominion Steel Corporation is about to ship ore to Middlesboro, England. This Company has not hitherto sold much ore to outside parties, but the Scotia Company was in previous years a heavy outside shipper. There is little doubt that with the reduction of freight rates likely to take place the shipment of ore to Europe, and to the United States, will assume important proportions once more.

COAL SHORTAGE AND PRODUCTION.

A Glace Bay Viewpoint.

Papers in Montreal and other parts of the upper provinces are urging upon the Dominion government the importance of increased production at the Cape Breton collieries in view of the shortage of coal which threatens to assume famine proportions before the winter is well under way.

It would be interesting to know how the government would proceed about getting more coal out of the mines in Cape Breton. The various managements have been trying to do that for the last couple of years and have not yet succeeded in making any appreciable headway. By the Dominion coal company, the principal producer, a steady average of 10,000 or 11,000 tons a day is being maintained and with the utmost exertions it seems to be impossible to get above that figure, taking it month by month. Once a week or so it rises to over 12,000 but this hardly ever happens two days in succession. Before the war production at these collieries often rose to over 20,000 tons a day. . . .

If the government could provide the management with several thousand skilled mine workers it would be doing something practical to help out the coal situation as it would enable the management among other things to open new mines or speed up production at those in process of development. But if Montreal is depending on increased production in Cape Breton, as things look now it will go without fuel this winter.—Glace Bay "Gazette."

Coal Export Embargo will Injure Nova Scotia Coal Trade

Inverness County Especially Threatened.

By The Editor

The circumstances under which the S.S. "Lord Dufferin" loaded with coal at Port Hastings, Cape Breton Island, has been allowed to proceed to Holland illustrates exactly the possibilities for injury to the Nova Scotia coal trade that accompany the export embargo now in force. The cargo in question was loaded by the Inverness Railway & Collieries Company, a reorganization of the Inverness Coal & Railway Company with some added properties. This reorganization was planned and has been carried out to take advantage of the favorable export market now existing, and the willingness of foreign purchasers to send ships for loading. Just previously to the re-organization there seemed every likelihood that the Inverness Colliery would be compelled to close down, and, as everybody in that district knows, if it once closed down, it would not be re-opened. There is one other coal mining operation in Inverness County, also the result of the existence of an export market. Neither operation is large enough to permit of the ownership of large steamers, and the rail shipment from the Inverness collieries places them at a great disadvantage as compared with f.o.b. cash business.

During the war the profits of the Inverness Coal & Railway Company were most rigidly held down by the Fuel Controller. The property is a most difficult one to work, the face of the deeps being some 6,000 feet out to sea, and the haul from the workings to the surface is one of the most difficult in Nova Scotia. The survival of the property in an operating condition has been possible only through most rigid economy and the existence of a good demand for coal in recent years. Under these circumstances the re-organization of the property, the coming in of new capital, the acquisition of adjoining properties, and the excellent export market offering has caused much rejoicing in Inverness County, where during recent years, the inhabitants have seen mine after mine disappear from the operating list, and have seen once prosperous mining towns full of empty houses with boarded-up windows.

The assistance which can be given to the Canadian domestic coal supply by the production of Inverness County is entirely negligible, and the entire output of the county in recent years has not exceeded 200,000 tons annually.

Apparently the authorities have seen the injustice of enforcing the embargo in the case of the Inverness collieries, and it is to be hoped that not only will it be removed so far as these mines are concerned, but that the Government will encourage the intensive mining of coal in Inverness County for export purposes. It is not for the good of Canada, nor will it appreciably assist in relieving the existing bituminous coal shortage in Canada, that an industry that has declined for many years should be throttled at the first signs of revival. Neither will the people of Inverness see the justice of a policy that threatens to impoverish them in the day of opportunity to relieve the needs of a market that in other times has not afforded the local industry any help.

If the Government at this time prevents the Inverness collieries from undertaking profitable business that will enable it to lay aside reserves against the evil times that are coming, then it should assume financial responsibility for the future of the properties, and should undertake to dispose of the output of the collieries at a price that will yield them a fair profit for an indefinite period ahead.

During the coming Winter and particularly during the Spring season, when the drift-ice will prevent water shipments of coal, the collieries will either have to bank out coal or remain partially idle. If the collieries, as was suggested by the Fuel Controller, can be given long-term advance contracts for railway coal by the Government, with a guarantee that the coal will be taken away in the shipping season, then it would be possible for the mines to work all winter without interruption, thereby largely increasing the annual output of coal.

Any Government that undertakes to control an industry must accept concomitant responsibility for that industry. It is pertinent to recall that the issue of the "Canadian Mining Journal" of this date in 1919 quoted the plea made by Mr. D. D. Mackenzie, M.P., for the larger allotment of the coal purchases of the Canadian National Railways to Nova Scotia coal mines, which was withheld because United States coal was cheaper. Mr. Mackenzie wrote to Mr. Hanna, in part, as follows :

"I must with all respect, yet with all insistency, " impress upon you the necessity of coming to the " assistance of these men by purchasing the article " which they produce, whether or not it may be more " expensive than the same article imported from a " foreign country. "

It is this policy of ignoring domestic coal mines in favour of the United States when coal is cheap and plentiful, and of restricting the profits and expansion of these mines when coal is dear and scarce that has brought the Nova Scotian collieries to their present state of low production tonnage, high production cost and a generally unstabilized condition.

It is quite certain that if the Inverness Collieries had been required to depend upon the Canadian National Railways or upon the Montreal market for a market and disposal of their coal output there would have been neither new capital or re-organization of old properties, but, just so soon as under the stimulus of good demand at remunerative prices, the interest of investors is quickened it is discovered that domestic requirements must take precedence of all other demands.

Any and every course that will stimulate coal production in Canada is commendable. It seems an elementary proposition that the way to relieve a coal shortage is to produce more coal, but it is nevertheless a proposition that has never been grasped by the successive governments of Canada. Any and every course that restricts coal production is to be condemned, and restriction of production, both present and future, will result from the export embargo. At the same time the domestic situation will not be greatly helped.

NEW YORK ADVICES ON ASBESTOS MARKET.

Since our last letter regarding the Asbestos situation, prices have advanced for all grades, some grades only slightly and others to a greater extent. This is only natural when one stops to consider the enormous demand which is evidenced by the fact that there are to-day 7,750,000 passenger cars and trucks on the roads, and the fact that automobile manufacturers expect a production of 2,000,000 cars and trucks for this year.

In addition to this, the enormous building construction going on all over the world is almost double what it has ever been before at any time. This is due to the fact that practically all building construction both here and in Europe was stopped during the war. Besides the extraordinary building construction that is going on in this country, England, France and Italy, there is additional reparation and construction work going on in the devastated districts of France, Italy and Belgium.

The steamship trade is also consuming large quantities. Not alone for the new tonnage which is being produced, but also owing to renewals of practically all the steamers that were operated during the war. Owing to the scarcity of steamer space from 1914 until the Armistice was signed nearly all steamers were kept in service continuously and renewals and repairs were put off until recently.

Considering that the output at the Mines has decreased instead of increased it is readily understand that the Asbestos market is going to hold firm with the probability of prices still going higher for a considerable period.

TORONTO COAL PRICES.

Toronto, August, 18.—Prevailing coal quotations are as follows :

Mine run $14 25 to $14.50 f.o.b. Toronto; smokeless coal $14.50 to $15.00; hard coal $8.00 to $11.50 gross tons at mines. American funds. The demand is not stiff but practically no coal is coming in, the shipments being diverted to the Great Lakes for consumption in the North West.

METAL QUOTATIONS.

Fair prices for Ingot Metals in Montreal August 19th 1920. (For shipment from stock, and in less than car-load lots.)

	Cents per lb.
Copper, electro	24¼
Copper castings	23¾
Tin	55½
Lead	10
Zinc	10½
Aluminum	35
Antimony	9

A NEW USE FOR MAGNESITE.

It is reported by the Engineering and Mining Journal of New York that Mr. H. F. Wierum has been experimenting with ground magnesite as a substitute for lime in making egg shells. He finds that hens using magnesite produce a very superior grade of shell, having superior insulating and wearing facilities. Those who found magnesite useful in the shell industry during the war will be pleased to find that it is also useful in the original shell industry. It is another example of how the old established industries have been helped by the hunt for substitutes.

Our Northern Ontario Letter

THE SILVER MINES.

In the silver mining fields of Nothern Ontario, as a result of success achieved in the South Lorrain, Gowganda and Elk Lake districts, the output of the metal may be maintained for a much longer period than had the industry depended entirely upon the Cobalt mines alone.

At Cobalt, too, the new developments on such properties as the Bailey Silver Mines, the Colonial, Prince Davis and Lumsden offers promise of adding to the number of producing mines.

According to official advice to the "Mining Journal" an ore shoot just encountered at the 350-ft. level of the Bailey Silver Mines shows a width of from four to five inches and contains high silver value, some of the ore containing from 2,000 to 4,000 ounces to the ton. The high grade is being bagged, while the lower grade material is being made available for treatment in the company's own mill. The work of transporting medium-grade ore to the mill will commence just as soon as the short railway siding is completed. This should not be later than about the middle of September.

Perhaps the most interesting official advice received during the week is that dealing with the success being met with on the Keeley Silver Mines, in South Lorrain. Although this property remained idle for a number of years, and was not re-opened until a few months ago, it is understood the ore in sight is estimated to contain close to $1,000,000 in silver. Not only has the ore encountered been found to contain high values, but the ore-shoots are comparatively wide. One main ore-shoot is stated to be from four to five feet in width, and contains average silver values ranging from 30 to 100 ounces to the ton. In the meantime, the work of constructing a new mill is making satisfactory progres and the company experts to be treating ore at the rate of 80 tons daily some time during the closing quarter of the current year.

During the month of July the Nipissing mine produced silver at the rate of close to $6,000 every twenty-four hours. In his regular monthly report to the president and directors, Hugh Park, manager, states that during the period, the Nipissing produced $182. 111, and shipped residue and bullion from Nipissing and custom ores of an estimated net value of $129,315. Mr. Park states there were no unusual underground developments, but that the usual success was achieved in opening up new narrow veins.

A new order issued by Hon. Beniah Bowman, Minister of Lands and Forests, grants general working permission on all mining claims staked on the Gillies Limit. The Limit was thrown open on July 20th, with the understanding that the holders of claims would have to make application for and receive permission to do assessment work before undertaking any development work, but the new order directs that on and after July 20th it will not be necessary to make such application. Incidentally this will tend to shorten the time within which the first instalment of work falls due.

Up to the present only two mining disputes have resulted from staking of claims which occurred in July on the Gillies Limit. This is in sharp contrast to 1912 at the time a small part of the territory was

thrown open when as many as half a dozen disputes arose in connection with one claim.

Some small nuggets of native silver have been found in a narrow vein on the Garvey claims in the Gowganda district, in the vicinity of Smoothwater Lake. The find is characteristic of many others made in this field.

A large number of mining men will attend a general meeting of the members of the Ontario Mining Association to be held this week at Sudbury. The meeting commenced August 17th and will last for three days. Mine managers and presidents of mining companies representing perhaps ninety per cent of the mines of the Province will attend the meeting. In view of this being the first general meeting since the new organisation became fully established, it promises to be of outstanding importance. From this rate forward, the activities and the influence of the Association appears destined to be extensive. Not only will it serve as a means of comparing mining achievements, but the organisation aims to cooperate with the Ontario Government in such a way as to make available much valuable data, and stands ready to offer suggestions which may be considered beneficial to the industry.

THE GOLD MINES.

What is considered to be one of the most hopeful signs in connection with the gold mining industry of Northern Ontario is the report this week that the Hollinger Consolidated has secured fifty English miners. It is believe that if a slack period in mining has actually set in in England, and if the Hollinger has secured fifty men, it is not unreasonable to suppose that many more may be obtained in the same manner. Should such prove to be the case, it will remove the only obstacle standing between the gold mines of this conntry and maximum production.

The gold mines in the aggregate have a greater quantity of ore in sight than ever in the past, and their milling facilities will permit them to treat more than 6,000 tons every twenty-four hours. These two factors would come into full play in the event of an adequate number of men being secured. For this reason, therefore, too much importance cannot be attached to the reports that men are being obtained from the British Isles.

An announcement of importance to the shareholders of the McIntyre-Porcupine has just been made. and conveys the information that the company has decided to enter into another venture, this time in a coal mine in Alberta. It is stated by president J. P. Bickell that one property has been purchased and an option has been secured on another, and that the Temiskaming Mining Company may also be asked to take part of it. The Blue Diamond property at Brule, Alta, has been purchased, and a fifteen year option is held on the Canadian Coalfields property. Just how the report will be received by the shareholders of the McIntyre-Porcupine and the Temiskaming Mining Company remains to be seen and will be governed largely by the report presented prior to voting on the question.

The Miller Independence Mines of Boston Creek announce a stock offering of 46,000 shares, and restricts the right to participate in it to the present stockholders. This company received permission from the Department of Securities of the state of Ohio, about one year ago to sell not more than 100,000 treasury shares at $3.80 per share. Of this amount 54,000 shares were sold at that figure. The present offer is calculated to again strengthen the treasury and at the same time offer an opportunity for the present stockholders to reduce the average paid for shares.

Work at the mine is proceeding in a satisfactory way and the face of the main cross-cut at the 500-ft. level is believed to be within about 70 feet of the downward continuation of the main orebody. In the meantime, work has been resumed in the inclined shaft at a point closer to surface with the object of blocking out the high-grade ore shown at that horizon.

KIRKLAND LAKES ANNUAL MEETING.

That a fine body of ore had been recently discovered on the 400-foot level was an announcement made by President Frank L. Culver, at the annual meeting of the Kirkland Lake Gold Mining Company, Limited, held in Toronto on Tuesday of this week. The development has not proceeded sufficiently as yet to indicate the extent of the ore body, but it is believed to carry values ranging from $200 to $300 a ton. In the President's survey of the operations it was pointed out that the principal development consisted in the sinking of the main shaft to the 900-foot level. In this respect Kirkland Lake is the pioneer in the way of depth operation in the Kirkland Lake Camp. The results obtained are most encouraging as the porphry formation is found to exist at the 900-foot depth. Mr. Culver made it clear that the company had never carried on what is described as selective mining, and stated that such a policy would always be avoided. It was also stated that the proposed amalgamation between Kirkland Lake, the Orr and Teck-Hughes Mines would receive consideration at the hands of Kirkland Lake only on the basis of actual values. All of the old board of directors were re-elected.

CARTWRIGHT GOLDFIELDS.

Surface exploration of the property of Cartwright Goldfields, Limited, which lies north east of Matheson, Ontario, is bringing good results. Last week another vein carrying free gold was discovered. It lies near one of the veins that is now being stripped. Work on the latter vein was begun a few weeks ago and good values have been found in the samples taken as the work progresses.

The Cartwright property is close to Painkiller Lake. It is easily reached by wagon road from Matheson on the L. and N. O. Railway.—R.E.H.

THE PREMIUM ON GOLD.

At a meeting of the Commercial Club in Salt Lake City on July 23, Mr. H. N. Laurie of the American Mining Congress outlined the proposal which would provide for a premium of $10 per ounce on newly mined gold. This proposal is being placed before U. S. Congress by Representative McFadden.

At present Canadian gold producers are benefitted by a premium on gold arising from the fact that gold can be sold in Canada on the same basis as U. S. currency. This means that gold in Canada is worth considerably more than the $20.67 per ounce at which it is quoted.

Putting Canadian Iron Ore on the Map

By J. J. O'Connor

If Canada is to keep place with her competitors for world trade, if her great fleet of merchant ships are to be kept employed in carrying our own products to world markets, if she is to pay her debts out of her own resources, she must develope her enormous deposits of iron ore, in order to occupy that industrial independence that will enable her to compete successfully for the foreign trade that is so vitally necessary to her future.

A glance at the past shows that all that is needed to make Canada a leader in mineral production, is well directed, and sustained effort on the part of Government and people, in the exploitation of her vast store of mineral wealth. In 1886 Canada's mineral production amounted to $2.23 per capita, in 1917 it had reached $23.12 per capita. If iron ore production had made the same advance as all other minerals, if imported iron ore had been displaced by domestic ores, and if the enormous importations of iron and steel products—now in the neighbourhood of $175,000,000 annually—had been displaced to a great extent, by our own manufactured articles, as they very well might have been, our mineral production would show a vastly increased sum per capita.

That this industrial independence may be brought about, is but reasonable to suppose, in the light of what is being done in other iron fields, by our neighbours in Minnesota, where millions of tons of iron ore are being beneficiated annually, and millions of dollars are being expended in the installation of plants for the magnetic separation and concentration of low grade iron ores, similar to our own.

The province of Ontario is wholly dependent on United States ores, with the exception of the extremely small percentage of domestic ores now being charged to the furnaces of this province.

The Ontario Government is directly interested in the industrial development of its own estate. The Federal Government is equally interested in the upbuilding of an iron and steel industry in Canada, adequate to its needs, therefore, they should co-operate in demonstrating the commercial feasibility of converting our low grade ores into a desirable product for furnace use.

The Bureau of Mines, Toronto, and the Mines Branch, Ottawa, should make a joint, and thorough investigation of what the Mesabi Iron Company have done in their experimental plant, at Duluth, and what they are now doing at Babbitt, Minn., as a result of the experiments carried on at Duluth, where they produced thousands of tons of ore that met the highest furnace requirements.

Skillings' Mining Review, an outstanding authority on Minnesota iron ore, in a recent issue, says, in part: "The work of pouring concrete for the foundations for the first mill unit of the ore treating plant of the Mesabi Iron Company, at Babbitt, Minn., will be begun early next week, and the work of erecting the steel for the superstructure will be begun about August 15th. Four hundred men are employed by the company at Babbitt, and the immediate vicinity, in the extensive preparations necessary to whip this new and important iron mining enterprise into shape for production. The company will enter the shipping list with its product at the opening of navigation next spring. This initial unit has an estimated capacity for treating 3,000 tons of ore per day, but it will occasion no surprise if the over-run is considerable. The size of the new mill will be total length 1350 feet, and width 130 feet. The plant consists of five sections laid out to give continuous process. But to return to the mill that is being erected out there in the wilderness of the Eastern Mesabi. The Minneapolis Steel Machinery Co. has the contract for the steel. While people are vastly interested in the fact that the Mesabi Iron Company is spending about three million dollars on the Eastern Mesabi, the real basis of this interest lies in the fact, that the expenditure is being made to establish on a broad commercial basis, an advanced principle in magnetic separation. Magnetic separation is the principle on which this costly development is being founded, and this Company has produced separators that are expected to do their work more efficiently than any heretofore built. The modus operadi is as follows : Mine, crush, grind to powder and separate the ore from the rock, and form the concentrate into clinker by the sintering process, for blast furnace use. The final clinker will be a very high grade iron ore, free from moisture, free from all deleterious elements, such as sulphur or titanium, and dust. There are billions of tons of low grade magnetic ore, or taconite, on the Eastern Mesabi. The Mesabi Iron Company alone controls, or owns outright, many hundreds of millions of tons itself, in the 20 square miles it has taken over. It would seem that the Mesabi Iron Company had fully worked out its problems in metallurgy, when one considers the success of the first cargo of the product of the low grade magnetic ores, which was produced in the experimental plant at Duluth. As far as can be seen all problems of the future were met in the production of the first cargo. Assuming that to be the case, the Company seems destined to become one of the chief factors in the future of the iron ore industry of Lake Superior. It has brought into being an enormous mass of iron bearing material that gives every promise of lengthening for a very great many years, the life of the iron, mining industry of Minnesota. W. G. Swart, general manager, in charge at Babbitt, Dwight E. Woodbridge, of Duluth is in charge of the company lands."

With this experience before us, and the success it has met with, it would seem idle to not take advantage of the opportunity of investigating this great enterprise, and determining its adaptability to our own ores. Both Governments have the necessary machinery at hand, for making such an investigation. Added to this, is the highly satisfactory results in magnetic separation, obtained by Prof. Stansfield, of McGill University, recently. It is to be hoped that this matter may not be longer deferred, and that immediate action may be taken. The Tarriff Commission would do well to look into the question of the vast tonnage of iron ore, and iron and steel products imported annually, and its effect on the commerce of the country.

Pottery products in the United States during 1919 are reported to have reached a value in excess of any previous year. The value of manufactures in 1919 is estimated at $76,140,000 comparing with $63,911,793 in 1918. The increase over 1918 is of course largely made up of higher values as measured by cost, but no figures are available regarding quantities.

British Columbia Letter

Stewart, B. C.

R. K. Neil, part owner of the Premier Mine, Salmon River, Portland Canal District, in discussing operation on that property, stated that cyanide plant, with a capacity of 00 tons a day, is being installed and would be ready for use early next year.

There are some 100 claims staked in the Marmot River section of Portland Canal and on many development work is in prograess George Clothier, government mining engineer, recently made a tour of inspection through the district with a view to ascertaining the extent of the necessary road and trail improvements. The B. C. Exploration Company is heavily interested in this section and Dr. W. L. Uglow, geologist fr the Company, has completed an examination and is preparing a report, together with maps, describing his investigations and giving his conclusions. P. D. I. Honeyman, for the same Company, has a small crew of men at work on the Salmon River Lode Mining Co's property, situated near the Big Missouri Group.

Among the properties under development in the Bear River Valley, Portland Canal, are the Bayview, situated just back of Stewart, from which a trial shipment is to be made soon; the Lakeview, which is being worked by Al. Harris on behalf of P. Welch and associates; the Fitzgerald Group, which is to be explored by diamond drill by the Algunican Development Co.; and the Nabob and Redtop Groups.

Alice Arm, B. C.

The Dolly Varden Mine is shipping an average of 150 tons of ore a day and preparations are being made for the extension of the railway to the Wolf Group of the Claims situated a short distance north of the mine. The Toric, Tiger, Musk, Silver Horde, Climax and other prospects are being opened up, Surface stripping is taking place on the La Rose Group with satisfactory results and good showings are reported on the Wild Cat, North Star and Royal Groups.

Hazelton, B. C.

John D. Galloway, resident engineer at Hazelton, B C., has left on a tour of inspection of various mining properties in the Cariboo District. He is engaged incidentally, in the collection of an exhibit of the minerals of northern sections of the Province which is to form a part of a large British Columbia mineral display in England.

There is considerable placer mining work in progress in the Dease Lake, McDame's Creek, Thebert Creek, and Telegraph Creek districts of Northern British Columbia this season. On Thebert Creek George Adams, a well known hydraulic operator of the Atlin Camp, has been at work since early in the year. A. St. Clair Brindle, a mining engineer, has returned after accompanying a party representing the Princess May Mining Co., of Vancouver, to McDames Creek. They took in an hydraulic outfit.

Quesnel, B. C.

Once again R. T. Ward, of the Bullion Placer Leases, Cariboo, has been heard of in connection with litigation. Having won his long drawn out suit with John Hopp it was thought that the operation of the long disused property would follow without delay. Some or Mr. Ward's associates, however, challenged his right to retain control or the management of the project. For a time it looked as though there might be another sustained fight through the courts. However it now appears that a settlement, said to be generally satisfactory, has been reached and that the famous property soon will be put on an operating basis.

Prince George:

Good reports have been received concerning the showings obtained on a property situated near Prince George and known as the Hole-in-the-Wall. Samples have been brought in containing values in gold, silver and copper and it is said that the two outcrops from which these were taken have been uncovered by stripping. The property is to be inspected by a competent engineer.

Nelson, B. C.

Considerable development is taking place on mining properties situated on Lightning Peak and the Provincial Government is having a road surveyed from Deep Creek to the Peak. It is likely that a trail will be constructed and prospectors and operators interested are confident that it will not belong before the mineral resources of the section are sufficiently well proven to justify the building of a wagon road.

The possibilities of the development of gold mining on a considerably larger scale than at present in British Columbia was the subject of an address by Dr. Edwin T. Hodge, formerly professor of geology in the University in British Columbia, delivered recently at Nelson. To a number of interested mining men he explained that there was a belt in this Province similar to that of California extending from Bridge River in the north southwards across the Fraser River into the Skagit basin in the State of Washington. It is cut by numerous dykes and in places quartz veins have been prospected and shown to contain gold, Only in a few places have been mined to any extent. One of these places is in the Coronation and Pioneer Mines on Bridge River and another in the International Group on the boundary line. Dr. Hodge, however was of the opinion that the richest showings were in the central portion and in this connection he mentioned the Emancipation Mine, which was bounded recently and is to be developed. The British Columbia Belt was described as similar to the Motherlode Belt of California and "whether considered in a generalized way or considered from the standpoint of the minute and detailed study of the individual deposits there are a good many reasons to believe that within the Province a series of gold mines will be developed which will rival those of California.

Among the properties under development on Lemon Creek, Slocan, is the Barnett, where a force is engaged in stripping the veing and driving a tunnel. There are two of these, that on which work is in progress, being in a distance of 80 feet and the other 70 feet. Both are in ore which carries values in gold and silver, chiefly the former.

The Silversmith Mine, formerly the Slocan Star, promises to be one of the heaviest producers of the

Kootenays. The annual report, just issued, shows that the gross receipts from the sale of ore for the year ending May 31st were $205,996.68, the margin over operating expenses being $14,358.83. It is pointed out that this latter showing may not appear to be adequate but its comparative meagreness is explained by the necessity'' to spend large sums for timber, raising and opening up various stopes in order that the ore could be economically mined,'' Perhaps the most significant statement is that ''it is estimated that sufficient stoping ground has been developed to last seven years at the present rate of production.

Kaslo, B. C.

On his return from a tour of the Kaslo District, R. done preparatory to a thorough examination of the pro- conditions are improving. George H. Aylard and Associates have taken a bond on the old Wellington Mine and the tunnels are being cleaned out and other work done preparatory to a through examination of the property. On the South Fork of Kaslo Creek the Silver Bear is being opened up by a small crew of men. Not only is development being carried out underground but a considerable amount of surface work is being done. Some ore is being taken out at intervals and at present a car load is sacked and ready for shipment. The Index, Revenue and Liberty Hill Groups also are receiving attention. The Cork-Province at present is idle but it is understood that the owners expect to be able to complete financial arrangements shortly for the resumption of operations.

R. A. Grimes, manager of the McAllister Mine, Three Forks, is responsible for the statement that the labor trouble which has been interfering with mining activity in the Slocan and other parts of the Kootenay is being overcome. Illustrating the improved conditions he points out that a considerable force is engaged on the Noble Five; that the same is true of the Queen Bess; that the Rambler-Cariboo again is the scene of real work; and that the Rosebery-Surprise is operating. He has been able also to increase his crew on the McAllister and the threatened walk-out at the Blue Bell, Riondel, is said to have been averted. There is as a result, Mr. Grimes asserts, a feeling of renewed confidence and optimism among the operators.

Trail, B.C.

Ore receipts at the Trail Smelter of the Consolidated Mining & Smelting Co. for the final 10 days of the month of July were the greatest for any similar period this year. They totalled 12,862 tons, bringing the aggregate for the year to date up to 181,157 tons.

Nelson, B.C.

The Provincial Prospectors' Protective Association continues to gather strength. Local organizations representing the Grand Forks and Smithers Districts have made applications to the central body for copies of the constitution, and there is every reason to believe that they will become affiliated. It has been decided that the Provincial Attorney General shall be asked what action will be taken to protect prospectors' cabins and caches from the depredations of thieves. It appears that members of the Association have been put to expense and annoyance in many instances by finding their headquarters in the hills rifled on returning from their periodical trips.

The Perrier Gold Mines, Ltd., of Nelson, recently incorporated with a capitalization of $250,000, announces that the development of the Perrier, situated on Cottonwood Creek, will be proceeded with. The property has been opened up to the extent of two shafts, one being 120 feet deep with a northerly drift 200 feet in length from the bottom. There are two feet of good milling ore in the shaft and a similar width in the face of the drift. The smaller shaft, 40 feet deep, has been sunk in four feet of milling ore. The latter is said to be similar to the product of the Athabasca and the Granite-Poorman, from 60 to 70 per cent of the gold being free milling. While there is a considerable body of ore blocked out, no stoping has been done as yet, the ore shipped having been taken out in the course of development. The present equipment includes a 150-ton milling plant, a compressor, a friction hoist and an hydraulic pump, this being operated by water power brought through a 2,500-foot eight-inch wooden pipe.

Stewart, B.C.

Word from the Salmon River Section, Portland Canal, indicates that a fresh body of ore has been uncovered at the Premier Mine. The strike has been made in No. 2 Tunnel at a depth of about 600 feet and assures the active operation of the mine for an indefinite period. It is believed that this development is responsible for the recently announced decision to install a cyanide plant on the property. There now are more than 150 men employed in and about the mine, and good headway is being made with the concentrator foundations and the pipe line.

One of the two diamond drills on the Big Missouri has been closed down, that at work on the E. Pluribus Claim being continued. This is the claim on which high-grade ore is being opened up.

The Northern Light and Spider Groups on Salmon River and the Fitzgerald Group on the Bear River are being thoroughly explored by the Algunican Development Co., whose operations are the most extensive of any other one concern interested in the district, with the exception of the Premier Mining Co.

Vancouver, B.C.

John Hopp, well-known as an hydraulic placer operator in the Cariboo, states that, while British Columbians interested in this phase of mining appreciate the Provincial Government's action in relieving them partially from taxation and the payment of royalty, they still are seriously handicapped. With camp supplies, fuel and wages doubled in cost, the gold mining companies are hard hit at being compelled to market their product at an arbitrary figure. ''We miners,'' he said, ''only wish that gold would be left free to have its price fixed by the law of supply and demand. The arbitary price of $20.27 an ounce for fine gold hits us very hard. Only the best conducted plants can afford to operate, and many placer men are just holding on and not operating.'' Dealing with the season's conditions he stated that the water has been late this year, and that to make it worse there is a very rapid run-off which probably would limit the season to 90 days. Usually he gets his plant in operation by May 12, but this year work did not begin until June 1.

Victoria, B.C.

The Geological Survey of Canada has issued its an-

nual summary report of the geological survey work in British Columbia, and the Yukon during 1919. It contains an account of the explorations of W. E. Cockfield in the Ogilvie Range, Yukon, who also writes of the Mayo District in the same area. J. J. O'Neill deals with the Salmon River District, B.C.

Apropos of the new monograph on Graphite by H. S. Spence of the Dominion Mines Branch, it may be noted that in British Columbia graphite has been discovered at Alkow Harbor and on Dean Channel in the Bella Coola District. In the Fort Steele District it has been found on Matthew Creek, Marysville. A vein about two feet wide and running 25 per cent graphite was uncovered there about four years ago. In neither body nor values, however, is the vein a commercial proposition. Some years ago two carloads were shipped from Harrison Lake, but nothing further has been developed there. These are the only reputed discoveries. In the Bella Coola District the mineral occurs in minute flakes associated with pinites in a matrix of heulandite. In runs 23 per cent. in graphite. The Marysville deposit occurs on a contact of diorite and mica schist in a disseminated matrix of earthy silicates.

Moyie, B. C.

It again is reported that the St. Eugene Mine is to be put on a shipping basis by the Consolidated Mining & Smelting Co. The heavy tonnage from the Sullivan at Kimberley to the Trail Smelter is said to necessitate wet ore from the St. Eugene to act as a flux. The St. Eugene has produced over 5,000,000 ounces of silver and 229,000,000 lbs. of lead, valued at more than $10,000,000. When the St. Eugene closed down in 1910 it was reported that the ore deposits had played out but it is said that there are big bodies of ore still in reserve. A small crew of men is at work.

Trail, B. C.

Ore receipts at the Trail Smelter of the Consolidated Mining & Smelting Co. of Canada for the week ending July 21st were 7,061 tons, bringing the total receipts for the year up to 168,295 tons. For the first time for some years the Velvet Mine of Rossland appears among the list of properties shipping ore to the smelter. The Silver Bear, of Kaslo Creek, also is one of the shippers.

Grand Forks, B. C.

The Copper Farm Group, situated about five miles below Princetown on the Great Northern Railway, is being developed by the Princetown Mining & Developing Co. and is expected to become a regular shipper. There are three full claims on which the ledge has been opened by three tunnels. The vein has been traced for about 4500 feet on the surface and the operators assert that they have a large body of concentrating ore averaging 4 per cent. in copper and one ounce in silver. A three drill compresser has been installed and is now operating by means of steam power and another is to be installed shortly.

Vancouver, B. C.

J. W. D. Moodie, for many years general manager of the Britannia Mines, has resigned. He has been succeeded by B. B. Nieding, a well known mining man of the Pacific Northwest.

T. C. Botterill, formerly assistant superintendent of the Surf Inlet Mine, has accepted the superintendency of the Emancipation Mine, operated by the Liberator Mining Company.

THE COAL MINES.

The Canadian Collieries (D) Ltd., has adopted a forward policy in connection with the development of its coal holdings on Vancouver Island. J. M. Savage, General Manager, and Thomas Graham, General Superintendent, have decided that the Extension field shall be opened up to a greater extent than at present. There is coal at Extension and coal at the head of Oyster Harbor and there is every reason to believe that there is coal under the Haslam flats lying between these points. Several boreholes have been put down in this territory and all have shown coal or coal indications. A workable seam, however, has yet to be found and the Company will make another effort to this end, it being the intention that new boreholes shall be commenced without delay. The Company's new mine at South Wellington now is a regular producer and it also possesses a coal field at Sable River, near Union Bay, which will have attention soon. Messrs. Savage and Graham declare that the factors that have prevented the Company's aggregate output mounting very materially are lack of labor and uncertain market conditions. At present, however, there is no doubt about the market. The demand for the fuel produced by the collieries of Vancouver Island is brisk, in confirmation of which may be instanced the recent shipments to Sweden and other foreign parts and the prospect of further development of this overseas trade. Therefore it is the intention to proceed with development and to produce to the maximum capacity of the field having regard to the labor available.

With reference to the recent indications that a strong European market is about to be established for British Columbia coal it is interesting to note that the "S. S. Robin Goodfellow," of the Robin Line Steamship Co., a subsidiary of the Skinner and Eddy Corporation, of Seattle Wn., after loading at the bunkers of a Vancouver Island Coal Company will leave for a South American port.

Following the reaching of a settlement of wage and other questions between the Mine Operators and Employees in Eastern British Columbia and Alberta Coal Fields it was thought that a period of industrial peace was assured. Broadly speaking there is no reason for believing that this assumption will not be justified. There already has been, however, one slight rift in the lute. It occurred at Fernie, B. C. All the men with two exceptions had signed up with the U.M.W. of A., as it was through this organization that the agreement had been made with the Operators. When the two refered to it is stated that the U.M.W. of A. refused to accept them as members. Whether this is correct or no there is no doubt of what ensued. The miners refused to go to work the next day as a protest and a deputation waited on the management of the Crow's Nest Pass Coal Co. to make known the grievance. The next day, however, they went back to work pending an adjustment of this difference. The mines at Michel are in full operation, which statement applies to most of the mines of District 18 (U.M.W. of A.) which takes in a part of Eastern B.C. and the whole of the Province of Alberta.

The Coalmont Collieries, in the Nicola-Princeton Coal Field, mainland of British Columbia, soon will be well equipped with the plant necessary to permit a greater output and regular shipments to the waiting Vancouver and other adjacent domestic markets. The stations for the tramway that will bring the coal from the pitmouth to Coalmont are erected with the exception of the terminals. The little town at Coalmont will house the families of the miners and the married men will be able to spend their week-ends at home, bunks and meals being provided in addition for all hands near the pitmouth. At present some 150 tons a day are being produced, transport being furnished by motor truck over the hill road.

In a recent address to the members of the Vancouver (B.C.) Board of Trade W. R. Wilson, president and general manager of the Crow's Nest Pass Coal Co., Fernie, B.C., emphasized the desirability of the businessman having a clear knowledge of the fundamental basis of the chief manufacturing industries of the Country and in this connection referred to the conditions under which the iron and steel industry was operated in Canada and the United States. He spoke of the lamentable duplication of transportation and the high costs that were added to the finished product as a result of these charges. He said:—

"The iron ores that are smelted in Pittsburg are chiefly produced in the State of Wisconsin and are brought to Pittsburg by these stages of transportation: First, by rail to the lakes from the mines; second, across the lakes by steamer to the different points on the east side of the lakes; then, again, distributed by rail to different smelter points. Then, after these three stages of traffic manipulation, the ores are smelted in various forms of crude iron and steel are shipped from Pittsburg to various points in Ontario and Manitoba for further manufacturing processes.

"Folowing this manipulation of transportation of iron ores and iron those engaged in the iron trade production in Ontario and Manitoba, through the lack of fuel in these Provinces, again go to Pennslyvania or Virginia to purchase the coal and coke fuels they use in the finishing processes of reducing the crude iron to marketable form.

"In these duplicated processes of transportation of the crude metals and transportation of fuels the manufactures of Ontario and Manitoba possibly absorb about $12 excess per ton in all the finished products they make, which can only be regarded as a serious economic handicap to those engaged in these particular industries in provinces which do not possess suitable fuel deposits for these purposes.

"Then the people of the West, who have so far failed to take advantage of their own natural resources are called upon to purchase the products of iron and steel that are manufactured in the East, not only at excessive cost of production, as just illustrated, but to pay for repeated mileage costs of transportation, which have become involved in a system of production that is founded on either an oversight or a misconception of the sound basic principles of industry.

"In the Fernie District we have coal deposits that are, at least equal to the best coals on the continent. The coal bedding, in some instances, is accompanied with exigencies that I have never seen in any other coal fields on this continent, which peculiar characteristics may be briefly referred to as follows:

"When these mountains were lifted from the original lines of formation, which upheaval approximately lifted the structural bedding in some parts of the areas of the district from 500 to 3,000 feet higher than they were originally, considerable crushing and contortional twisting in the structural mass occurred, which violent forms of crushing developed dynamic heat of various degrees of intensity. These forces volatized the coal beds to a certain extent, also volatizing the beds of shale that interevene between the different beds of coal. These violent crushing mass pressures, acting upon the sandstone, shale and coal measures of the district may be estimated at 2500 to over 3000 feet in thickness, also developed indefinite and artificial rent lines in the whole structural mass.

"In some portions of the fields, rent lines appear to have been formed, thereby making it possible for the intense gas pressures to escape as the process of volatization went on. In other portions this form of relief fracture does not appear to have occurred, hence in certain districts of the field intense pent-up pressures of the gas appear to have been formed in the small voids and cracks and cavities that have been created during the general upheaval.

"In some instances these small pent-up pockets of gas may be estimated to have assumed a pent-up force of about 210,000 pounds per square foot, or about 1458 pounds per square inch. These difficulties, while of a very unusual nature in coal mining, are carefully approached and through the medium of excessive care may be safely dealt with."

Coal mining operations will be commenced at the new coal field near Lampman, Saskatchewan, Canada, within the next sixty days. This field is being developed by the Farmers Coal Mining Co. Ltd., a company owned and operated by the farmers of the district. The shaft already has been sunk to a depth of 170 feet and the coal bed lies at a depth of 210 feet. This coal has been shown from analytical tests to have a calorific value of more than 12000 British thermal units, and is of high grade. When fully developed the mine will have a capacity of 1,000 tons a day. This will take some time, however, as it will be necessary to do a large amount of work in channelling and tunnelling away from the shaft before maximum capacity can be reached. In the meantime the work is being hurried and coal will be brought to the surface within the next two months.

Coal production returns for the month of July, as far as are available, indicate that the collieries of British Columbia apparently are satisfactorily meeting recent heavier demands of the trade. The figures follow :

Nicola-Princeton Field.

	Tons
Middlesboro Collieries Co., Middlesboro	6,918
Fleming Coal Company, Merritt	2,626
Coalmont Collieries Co., Coalmont	1,984

Vancouver Island Field.

Canadian Western Fuel Co., Nanaimo	55,399
Canadian Collieries Ltd., Comox	41,089
Canadian Collieries Ltd., So. Wellington	8,904
Canadian Collieries Ltd., Extension	15,342
Pacific Coast Coal Mines, So. Wellington	7,680
Nanoose-Wellington Coal Co., Wellington	3,079
Granby Cons. M. S. & P. Co., Cassidy	9,019

JOHN STEWART MacARTHUR.

A TRIBUTE BY DR. W. A. CALDICOTT.

(In The Journal of The Chemical, Metallurgical and Mining Society of South Africa.)

The members of our society will learn with much regret that J. S. MacArthur, whose name is familiar throughout the mining world as the inventor of the cyanide process, has recently died in consequence of complications following upon a chill.

John Stewart MacArthur was the son of a Scotch clergyman, and began work early in life as an apprentice in the laboratory of the Tharsis Sulphur and Copper Company of Glasgow. Later he entered the service of the Cassel Gold Extracting Company as chemist (1871-86, eventually becoming its technical manager (1886-93), and subsequently managing director until 1897. It was during his service with this company that he, with Dr. Forest and others, undertook during his leisure hours the series of systematic researches for a hydro-metallurgical process of lixiviating gold ores, which resulted in the first practical application of a dilute alkaline cyanide solution as a gold solvent, and of zinc shavings, at first plain and later lead-coated, as a precipitant of the dissolved gold.

Apart from patent specifications, the first published authoritative account of the MacArthur-Forrest process of gold extraction is contained in an article published by J. S. MacArthur in the "Journal of the Society of Chemical Industry" on 31st March, 1890, After describing the practical application of the process, the paper concludes with the following words :— "I confidently predict that cyanide of potassium, hitherto used only to polish amalgamated plates, will take front rank as chief agent in gold extraction." The events of the last thirty years have amply fulfilled this prediction; and further, most silver ores in Mexico, which is the chief source of silver, have for years been treated by means of the cyanide process. The many million ounces of gold and silver yearly extracted by means of the cyanide process have, apart from their direct influence upon the mining industry, produced wide and far-reaching effects upon the whole monetary and economic systems of the civilised world.

The cyanide process was demonstrated in South Africa upon a variety of gold ores, concentrates and tailings in 1890 at the battery of the Salisbury G. M. Co. Later this pioneer work of the Cassel G. E. Co. was taken over by the African Gold Recovery Syndicate, which eventually became the African Gold Recovery Company. Following these novel and successful demonstrations, the use of the process rapidly extended in the Transvaal and the whole mining world, as its superiority over competitive methods became realised. To the gold mines it meant the conversion of embarrassing tailings into dividends, and the payability of mines otherwise unprofitable. Some of MacArthur's reminiscences of this period were given in the December, 1908, issue of our journal.

Subsequently, in 1896, the Transvaal patents were the subject of an historical lawsuit, which resulted in their cancellation on the ground of prior scientific knowledge, although no gold had ever been previously extracted on a commercial basis from ores by means of cyanide solution. A recent tribute to MacArthur's work in this direction is contained in Dr. H. H. Green's presidential address before the last meeting of the South African Association for the Advancement of Science in the following words:—"Thus the development of the whole mining industry of the Witwatersrand, and the very coming into existence of the city of Johannesburg, was conditioned by a laboratory observation made originally by a pure chemist, and developed by a mineralogical chemist—who, it may be added, did not get enough out of his patent to enable him to abandon his practice. The cyanide process for the extraction of gold from low-grade ores and tailings makes just that difference between profitable and unprofitable production of gold in South Africa, and without it the industries of the Witwatersrand would never have reached their present development."

Following on the last of his visits to the Rand, MacArthur engaged for many years in ordinary professional work on gold and copper as a consulting metallurgist. His practice involved repeated visits to Portugal and the United States, as well as numerous investigations and researches. In January, 1913, he published a paper in our journal on winz wafer precipitation, and during the war until his death he devoted himself to the extraction of radium at Balloch, on Loch Lomond, for military watches and compasses.

To his sturdy independent Scottish characteristics and chemical knowledge MacArthur added a remarkable insight and tenacity of purpose and a kindly consideration for those with whom he was associated. The world is the poorer through his death in the loss of a good chemist, a famous inventor, and an honorable, upright man.

In addition to having been for many years an honorary member of our society, MacArthur was awarded in 1902 the gold medal of the Institution of Mining and Metallurgy, and the well-known text book, "Rand Metallurgical Practice," was dedicated to him by the authors in the following terms :—

To
JOHN STEWART MACARTHUR.
Whose pioneer researches and introduction in 1890 of the Cyanide Process as an essential feature of Rand metallurgical practice have rendered possible the successful treatment on scientific principles of low-grade banket ore, and have been a prime factor in establishing the Witwatersrand Goldfields as the premier gold producer of the world.

GOWGANDA.

The revival of interest in the Gowganda silver area, due in part to the development of the Castle property by the Trethewey Company is still dampened by the lack of suitable transportation facilities. The proposed light railway would help the district considerably, but there seems no prospect of it being built this summer.

The reported new discovery at the Miller Lake-O'Brien, the premier mine of the district, doubtless originated with the shipping to Toronto of a large specimen of very rich ore.

The high price obtainable for silver should encourage those interested in Gowganda properties. They have however had many difficulties to contend with.

It is rumored on the street that an English company has acquired a large interest in the Trethewey on the strength of developments at the Castle property.—R.E.H.

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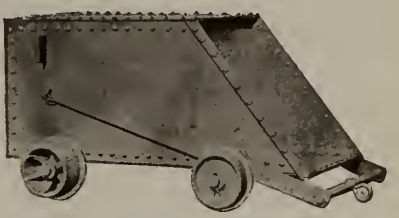

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THE SECOND INDUSTRIAL CONFERENCE.

Views of the Canadian Institute of Mining and Metallurgy.

In all probability, the Minister of Labor will call a second Industrial Conference, to meet at Ottawa during the autumn. Few will gainsay that it is, in theory, an excellent plan to bring together periodically in gatherings of this kind representatives of industrial employers, of employees, and of the general public. In practice, however, the usefulness of such a conference must depend very largely on the degree to which the various delegates can really speak authoritatively for the class they are supposed to represent. The labor delegates, representing organized and unionized labor, can be depended upon to act as a single unit. They are agreed upon what labor wants, and by their life's training and practical experience in such matters, they are both prepared and qualified to state their views or demands of labor upon any question which may arise. On the other hand, at last year's conference it was evident that the employers' representatives were in a position to speak only for themselves, or at most for the one particular industry in which they were engaged, and it must be admitted that, in general, they did not display a sufficiently intimate knowledge of the wider aspects of the various labor problems that came up for discussion. The delegates representing the general public, also, could do no more than express their opinions as individuals, and in no sense did they fairly represent the class for whom they appeared—a class that surely is as vitally interested in the establishment of harmonious industrial relations as are either the employers or the employees. A conference so constituted cannot possibly go very far towards solving permanently the problems underlying industrial unrest. It might be compared with a match in which a team of amateurs, who have never previously played together, is pitted against a well trained professional team. No matter how able and resourceful the former may be individually, their lack of understanding and combination places them at a great disadvantage, and the game must suffer. So with the conference, and unfortunately there is, on very important points, sufficient antagonism between employers and employees to render the parallel all the closer. Since there must be two sides, let them be evenly matched and determind to play the game. As was stated in the *Bulletin* in commenting on last year's conference, "if industry it to benefit to the fullest possible extent from such meetings as the recent Conference, it is essential that representatives of employers as well as employees should be in a position to speak authoritatively for the interests for whom they appear.

NOTES ON MINING OF MICA, GRAPHITE AND MAGNESITE IN QUEBEC.

(From Bulletin of C. I. M. & M.)

The demand for Canadian mica continues to be good; the prices are quite satisfactory, and in consequence the mines of the Lièvre-Gatineau region are very active. The Blackburn mica mine, at McGregor lake, one of the very few underground mica workings in the country, has now reached a depth of 250 feet on a slope of 60 deg. The Wallingford mines, at Perkins, are getting out some remarkably large sheet-mica, a great proportion of which is shipped to England. Canadian mica is of the variety phlogopite, possessing elasticity and dielectric properties unattained in the other varieties. The province of Quebec produced last year over 80 per cent of the Canadian output of this mineral.

The graphite industry is showing signs of resuming activity. After a year of inactivity, the Quebec Graphite Company, Ltd., has re-opened its mines and completely remodelled its mill, which is now working with the Callow process as the basis of its concentration practice. Oil flotation methods appear to be the process to which the Buckingham ores are most amenable. The Quebec Graphite Company has also gone into the manufacture of graphite products, such as flake lubricants, graphite pastes, pipe-joint compounds and foundry facings, and they intend to extend this list to include graphite greases, stove polish, electrodes and paints.

All the magnesite quarries are in operation in the Grenville district. The Scottish-Canadian Magnesite Company, which has installed a very complete and modern plant for the production of dead-burned magnesite, is now turning out a product that finds a ready market in the United States, in Canada and in Europe. The North American Magnesite Company has also built a very complete mill at Calumet, but, unfortunately, the starting has been delayed by the non-delivery of some of the machinery. In the meantime, the quarry has been active and the rock shipped, as in the past, to the Longue Pointe cement plant, where it is dead-burned in the rotary cement-kilns. The International Magnesite Company, operating in Harrington township, is producing calcined magnesia, used in the manufacture of flooring cement. The consideration, by the Senate of the United States, of the Magnesite Bill, which passed Congress in October last, imposing a duty of ¾c per lb. on dead-burned magnesite entering the United States, has been postponed until next December.

TALCUM FIGHTS FIRE.

Talcum powder, a leading ingredient of vanity cases, was recently used in putting out a fire which otherwise would have burned down a coal tar products plant in Cincinnati, Ohio. The blaze which had caught a huge tank of napthalene was smothered by dumping upon it fifty-pound sacks of the well-known complexion aid.

In a yard near the burning plant where tanks containing 300,000 gallons of oil, but as the fire was checked they were not touched by the flames, according to an account in the current number of the Journal of Industrial and Engineering Chemistry. This is the first time that a cosmetic has been applied with puffs to the bright face of danger.

A large deposit of metallic arsenic is reported on Alder Island, one of the smaller islands of the Queen Charlotte group. Several claims have been staked covering the entire island, and samples taken indiscriminately give returns from 18 per cent. to 24 per cent. arsenic, while the locator states it is possible to obtain specimens of the almost pure mineral. This is the first deposit of the kind on record in British Columbia, although for years arsenic has been produced as a by-product from the arsenopyrite ores of the Hedley Gold Mining Company.—From the Journal of Industrial and Engineering Chemistry.

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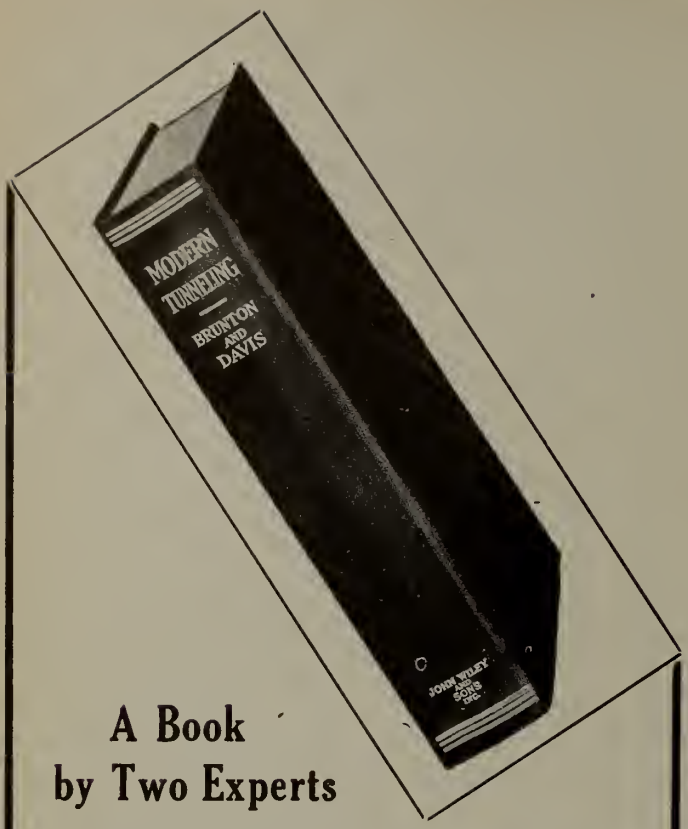

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C.M.J. 8-20-20.

The Independent Labor Party in Britain believes in talking to the man at the wheel. They also have a fondness for rocking the boat. Premier Lloyd George's hatred of a causeless or unnecessary war led him in the past to brave the yelling of the mob, and as skipper of the Ship of State he put her past some nasty rocks between 1914 and 1918. If the old boat wobbles today it will not be because the skipper has lost his skill, but because there is a mutiny in the fo's'cle.

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:-: EDITORIAL :-:

THE ASBESTOS INDUSTRY.

An account of the endeavors made in the United States in recent months to find asbestos deposits of good quality (which we copied—with due acknowledgment—from the Bulletin of the U.S. Geological Survey) has been twisted in Ontario newspapers to the attempted detriment of Canadian asbestos companies. The asbestos companies are stated to be "even worse than the International Nickel Company" that *bête noire* of a section of Ontario politics, which we take to represent the ultimate depth of perfidy. The inside story of nickel is soon to be exposed, so we are told. We are under the impression it had already been told, and quite voluminously. The suggestion is made that the inside story of asbestos would be equally redolent of iniquity. The International Nickel Company will we believe welcome the fullest enquiry into its affairs. The "inside story" of asbestos will be found written in the Annual Reports of the Quebec Department of Mines, but, fortunately for Quebec, that province is not so given to corporation baiting as some other provinces in Canada.

The fact that asbestos is not as yet spun and manufactured into finished articles on a larger scale in Canada is not perhaps entirely a matter for congratulation, but it represents a phase through which most primary industries have to pass. This phase will not be shortened by ill-advised railings against the conduct of an industry that has passed through some very evil times and has only recently obtained a position of financial stability.

The recent large and rapid increases in the selling price of various grades of Canadian asbestos are stated in the 1919 Report of the Quebec Department of Mines "to be due to an extension and development of the known uses rather than to new applications and utilizations." In many cases, asbestos is but a single component in a manufactured article that consists of a combination of materials, as, for example, in the case of steam packings of various patented makes, where asbestos, graphite, metallic wire, rubber, and possibly a lubricant enter into the fabrication of one article.

The criticism to which we take exception speaks of the "refining" of asbestos, but no analogy can be properly instituted between the extraction of metals from their ores, and the working up of the thousand and one specialized articles of which asbestos is a component .The most accurate analogy in Canadian life may be drawn between asbestos and pulp-wood, and when the time is ripe, Canadian enterprise can be trusted to supplement the production of crude asbestos by its further utilization in manufactures in Canada, as is being done in the case of pulp-wood and paper.

The existence of an avid market for asbestos in the United States cannot be considered as a reproach to Canada, as has been intimated. The Quebec Mine Report mentions that two mining industries in that province, namely the production of chromite and magnesite, are threatened in their future prosperity by possible closing of the United State's market consequent upon the mooted imposition of a protective import tariff. The export of these two minerals has not been objected to, and in Quebec it is regarded as desirable. The export of asbestos differs only in degree, but not in principle.

It is not desirable that the export of any Canadian minerals to any friendly nation shall be discouraged, because such a policy involves a restriction of mineral production in Canada. Canada needs the largest possible export of mineral products, combined with maximum use of domestic mined minerals within our own borders. The last-named desideratum is not, however, one that will be obtained by government regulation of exports—as is suggested—but by private manufacturing enterprise.

To mine the minerals we possess to the fullest extent would be—as in the classic cases of coal and iron—the best possible way to diminish unnecessary imports; and to mine and export to the fullest extent the minerals that we uniquely possess would be the best way to reduce our adverse trade balance. The mining industry in Canada does not require control, but it does require aid and comfort from our governing bodies, and a readjustment of that jaundiced view which assumes that because an industry is big and efficient it is therefore evil.

CORPORATION BAITING.

Those of our readers who see that excellent weekly, "Chemical and Metallurgical Engineering" may have noted a rather interesting piece of detective work which led to the arrest of clever thieves who had stolen platinum from the Old Hickory Powder Plant at Jacksonville, Tennessee. The chemical analysis of the stolen material was a determining factor in the detection of the thief, and a feature of interest to readers in Canada was the statement made by one of the accused men that the sponge platinum in their possession

had been obtained "by placer mining on an unregistered claim in a region about one hundred miles north of Parry Sound, Ontario." The authorities ascertained by enquiry from the Department of Mines that the total annual production of platinum in Canada did not exceed 25 ounces, and that no placer mining of platinum was carried on in Ontario.

This quite interesting account of chemistry applied to the detection of crime has been reproduced in the "Literary Digest" as being of general interest, but the Toronto "World" finds the account "very suspicious" and, rather ungrammatically, states editorially "You'd almost think the long and exact account of "the trapping of the thieves was printed in that paper "for some special reason." This "special reason" the "World" surmises is because the International and Mond Nickel Companies wish to convey to the Canadian public the impression that the "whole annual output of platinum does not exceed 25 troy ounces."

We remember on a previous occasion that an article advocating the electrification of the Canadian National Railways which appeared in this journal, which suggested the use of the slack coal from a colliery with an annual output of 180,000 tons, was discovered by the "World" to be inspired by the "coal barons of Nova Scotia." At that time we thought it was impossible that Torontonian perspicacity could go further, but apparently there are no limits to the penetrating vision of those who have chosen corporation baiting as a vocation.

A full and complete account of the platinum production of Canada will be found in the Report of Mineral Production for 1919 issued by the Mineral Resources Division of the Mines Branch at Ottawa. The Toronto newspaper states that the Ontario and Ottawa Mines Departments "have been forced by the long compaign "of the 'World' to at last begin to express their suspicion that a very valuable amount of platinum has "been taken out of the nickel ore from the Sudbury "Mines". We would not consider the definite statements of the two Mines Departments as "expressing a suspicion". Ottawa states that the International Nickel Corporation reports for 1919 a recovery, in Canada of 25 ounces of platinum and 62 ounces of palladium, with also a small quantity of fine gold and silver. It also is stated in the Ottawa report that recoveries in New Jersey during 1918, as reported by the Annual Reports of the United States included 649.7 ozs. of platinum, 786.6 ozs. of palladium and 472.5 ozs. of rhodium. While it is not possible to state exactly how much of this recovery of platinum group metals originates in Sudbury mattes, it is believed, states the Ottawa report, "the Sudbury mattes have been the source of the greater part of the platinum group metals recovered."

We can conceive of no reason why the International Nickel Company desires to convey to the public any other impression than is given by the published reports of the provincial and federal Mines Departments, and if, as the "World" states, the Mond Nickel Company in a recent London prospectus referred to the possible recovery of platinum group metals, it is merely a proof that there is no desire on the part of the Mond Company to conceal a thing that is common knowledge.

To use Lloyd George's most recent epigram, the "World" is flinging a sledge hammer at an open door. Its criticisms are not important, being based on erroneous surmises, but the attitude of this newspaper is important to the extent that it reflects unjustified criticism of large investments of United States capital in Canadian mining venures. The greater the number of United States investments in our mining fields the greater will be their development. The larger the number of refining and manufacturing plants that United States interests can be induced by fair means to operate in Canada, the better will Canadians be pleased, and we take it to be a proper and laudible policy to bring this about by legitimate means—to which our friends in the United States as shrewd business men will be the last to sincerely object. Nevertheless, there are most pressing reasons to deprecate the use of jaundiced inuendo, and the perversion of national loyalties to effect commercial ends. There is no more dangerous citizen abroad today than he who deliberately stirs up strife between Canada and the United States, and this in effect, if not in intention, is what the "World" is doing.

LENIN'S IDEA OF A STABLE GOVERNMENT.

> The most intelligent and richest bourgeoisie are those of England and America. The English are the most experienced and the best administrators. They afford us the best examples of personal dictatorship in its highest form, the most stable kind of a government which has consolidated power in the hands of a single class. . . . I believe that if you will keep in mind this English example you will comprehend this question of personal control better than from any number of abstract resolutions and preconceived theories. . . . I hope the gentlemen present, who are experienced Water Transport Workers and therefore know what good management is, will appreciate that we must first of all be good business men, and must dispense with our industrial Soviets and run things without them. Every branch of administrative work calls for special training and qualifications.

The foregoing is not an extract from a capitalistic organ, nor the opinion of a bourgeois professor of political economy. It is an extract from a speech made by Nikolaie Lenin before the Third All-Russian Congress of Water Transport Workers. From all accounts Lenin is in a position to compare at first hand the results of administrative work by men without special training and qualifications, and his opinion is for that reason a weighty one. It coincides fairly exactly with the opinions expressed by Mrs. Phillip Snowden and Bertrand Russell on their return to England after a visit to Russia.

OUR "CURIOUS PLEA FOR PATERNALISM."

The Sydney "Post" takes exception to our suggestion that a federal loan should be made to the Nova Scotian coal companies to assist in the development of new collieries, and believes that any millions the Government has to spend can be laid out "in a million better ways than that suggested by the 'Mining Journal."

The objection of the "Post" is apparently based on an assumption that our "curious plea for paternalism" is advanced in the interest of the coal operators, whereas the basis of the argument is that deficient production of the bituminous coal in Canada is a national menace requiring definite aid and a definite policy on the part of the Government to remove. No criticism is made of the existing government of Canada that is not applicable to all previous governments, for none of them have ever grasped the fundamental importance of coal production to Canada. It may serve as an illustration of the very general inability of the public —and its reflection, the government in power at any given time—to understand the true national position of coal production, when a newspaper circulating in a community that depends for its daily bread on coal production, deprecates a suggestion that the government should assist coal production by loans to be devoted to the extension of output.

We suggested that the expansion of the production of the Nova Scotia collieries to a point commensurate with the potentialities of the coal deposit, and adequate to meet the domestic needs of Canada, involved a capital expenditure entirely beyond the ability of the coal companies to handle, and we believe this statement will be found to stand unimpugned, once it is admitted that coal production is a national necessity. Any possible difference of opinion lies in the admission or non-admission of the paramount need for a domestic source of coal production in Canada.

Coal production on a much enlarged scale is a principle condition of the persistence of the Canadian nation. It is more important than agriculture or any other form of industry, because without coal production neither agriculture or any form of manufacturing industry could exist. The Province of Ontario alone requires 12 million tons of bituminous coal annually, or more than twice the production of Nova Scotia. Every form of industry in Canada has in the past few years been throttled and prevented from attaining its possible development by coal shortage or fear of coal shortage.

The Canadian Government itself, as owner of the National Railways and as owner of a fleet of merchant steamships, is very intimately interested in the availability of coal. The Provincial Government of Nova Scotia depends on coal royalties for its revenues almost entirely. The export trade of Canada depends entirely on the availability of coal for its existence. The adverse balance of trade with the United States against Canada is largely made up of imports of coal and steel, and things made with the aid of coal. Is it then quite correct to say that there are a million better ways in which the Government could spend money than in loans to increase the production in Canada of the most important raw material known to civilization?

It is intimated that our suggestion will appeal to none "but the interested operators". That is to be doubted. It may well be entirely unwelcome and objectionable from certain standpoints of the operator.

In making the suggestion, the "Journal" did not have in mind either operators, operatives or politics. There is no body of men more interested in the preservation of Canada's capacity for bituminous coal production than the Canadian Federal Government for the time being, because the continued existence of that government and the persistence of Canada as a separate and independent political entity in North America hinges on whether we will or will not take steps to stop this decline in domestic coal production, and thereby assure this country of some modicum of industrial independence.

The coal problem in Canada is a permanent one, and we shall not approach a solution until it is studied from a national standpoint by a permanent body appointed for that purpose. The "Canadian Mining Journal" holds no brief for the coal operator, but being a periodical devoted to the progress of mining and metallurgy in Canada, it conceives that it is carrying out a proper function in calling attention to the unsolved condition of the problem of coal supply, on which all mining and all metallurgy depends.

THE COAL EXPORT EMBARGO.

Our contemporary "Coal Age" suggests that the embargo on export coal is unfair to the coal producer unless a proportionate embargo is placed upon the export of manufactured products which consume coal in the making. The point is well made. "Coal Age" suggests that the coal industry in the United States would be willing to participate in a curtailment of coal export "in like degree with the manufacturers of any other commodity that consumes coal in its making and that requires transportation in the process of getting it out of the country. Any other programme for increasing the supply of coal for home consumption by decreasing exports is as unfair to the home coal industry as it is to the foreign consumer."

It would be interesting to see a list of the things that do not consume coal in the making and do not require coal for transportation to seaboard. It would be indeed a list of things that "aint". The tendency is for large manufacturers to acquire their own coal areas, to be operated for their own manufacturing uses, and a large part of the coal producing capacity

of all countries is in this way passing under the control of interests that are not primarily engaged in the supply of house and ordinarily marketed coal. Coal mining as the base of a manufacturing industry occupies a proper place, and the manufacturer who acquires coal mines is wise in his day. Coal mining, prosecuted singly as means of commercial profit, has not, however, been remarkably successful. It will not be surprising, in the future years, to see the "coal operator" as he is now known, disappear, to be replaced by men who are not willing to act the part of a common laborer for industry in the digging of coal, but will follow coal into all the ultimate profit-making uses that ramify throughout the entire fabric of the modern world.

THE INTEREST OF THE COAL PRODUCER IN COAL DISTRIBUTION.

Evidence was recently given before the Board of Commerce sitting in Victoria, British Columbia, that a coal dealer was accustomed to pay $7.50 for a long ton of coal at the pithead, which he retailed in Victoria at $12 per short ton, the equivalent of $13.44 per long ton. After allowing for cost of handling the coal and delivering it into the customers' cellar, this dealer concluded that his average profit had been $2.50 per ton.

From the records of the Fuel Administrations of the United States and Canada we believe that the figure named by the Vancouver dealer does not represent fairly even the profit made by coal dealers upon sales of domestic coal in small lots to private customers. Transactions in car-load lots, and contracts for large quantities of coal for manufacturing purposes and large buildings are conducted on a smaller spread. The extent of the profit of the dealer upon domestic business is, however, one to cause the coal producer to think.

Those who have had experience of the operating costs of coal production know that very large expenditures, both of money and of mental and physical energy, are required to effect an economy of a few cents in the unit cost of coal production. They also know that a profit of $2.50 per ton is a possibility that does not enter into the most roseate dreams of a coal mine operator. If the financial risks and the scale of the coal mine operator's undertaking is compared with that of the coal dealer the disproportion will be found to be striking, and the proportionately smaller reward of the coal operator equally striking.

These considerations give point to a suggestion, previously urged on several occasions in the "Journal", that the coal mine operator, wherever it is found possible, should control not only the comparatively thankless and unremunerative operation of coal production, but should control further the handling and distribution of the coal to the point of ultimate destination in the customers' cellars or storage bunkers.

Unless the coal mine operator is prepared to do this, he is likely to continue to bear unjustly the odium of a "spread" in coal selling prices with which he has nothing to do, but for all of which he will be blamed by the uninformed public, certain of no pertinent facts except the ever-rising price of coal.

The basic nature of coal in fixing prices of all commodities is little understood, and is least understood by those who control the mining and sale of coal, otherwise their carelessness of what happens to the price of coal after it leaves the pitmouth is not understandable. We doubt whether any condition would be more potent in reducing commodity prices in Canada than a plentiful supply of coal at moderate prices and the coal producer is the person most interested in seeing that the price paid by the ultimate consumer is as low as it can be made.

Up to the point of leaving the colliery yard every possible device of economy is made use of to lower the unit cost of coal production. Production costs are dissected minutely and discussed in cents and fractions of cents, but as soon as the colliery premises are left behind—or just as soon as the handling and transportation of the coal ceases to be controlled by the producer — inefficiency, with its corresponding cost, commences and continues to the point of ultimate destination.

It is advisable, in the interest of the producer of coal and the consumer alike, that wherever possible the producer should control every revenue-producing stage of coal handling and transportation from the coal face to the consumer's cellar.

The coal producer, who spends half a million dollars to take five cents a ton off coal haulage costs, cannot, if he appreciates his own interests, view with disinterestedness the carriage of coal along city streets in winter weather in half-ton lots.

We are pleased to note the whole-hearted manner in which the Canadian collieries (Dunsmuir) Limited go about arranging a picnic for the employees. Free transportation for five thousand people to the seashore, fifteen thousand ice-cream cones, chocolates, oranges and sports for the children, are some of the items noted in a Vancouver Island paper. The presence of all the officials, from the President down, and a general spirit of good feeling is in marked contrast to times happily gone by. The fashion is one that it is to be hoped may spread.

The death is announced from Ottawa of Dr. William James Wilson, for many years the paeleobotanist of the Geological Survey at the age of 69 years. It is hoped to make more extended reference to Dr. Wilson's scientific attainments in a later issue.

Mining Operations in Quebec During 1919

In the first issue of the "Journal" in 1920 we were able through the courtesy of the Superintendent of Mines, Mr. Theo. Denis to give a summary of mining operations in Quebec during 1919, with approximate figures. At that time it was thought that the total value of the mineral production of the Province, as was the case in all other provinces of Canada, would be appreciably less than the figures for 1918, whereas the exact figures now available show that in 1919 the curve of aggregate annual values of the mineral production for Quebec continued its uninterrupted rising course and reached the highest figure yet recorded. The 1919 value was $2,105,908 or 11.3 per cent. in excess of the value of 1918, and the unremitting progress of Quebec as a mineral producer is shown by the following table, taken from the Report of the Superintendent of Mines, now to hand for 1919, viz.,

Table of Value of Annual Mineral Production of Quebec from 1900 to 1919.

Year	Value
1900	$ 2,546,076
1901	2,997,731
1902	2,985,463
1903	2,772,762
1904	3,023,568
1905	3,750,300
1906	5,019,932
1907	5,391,368
1908	5,458,998
1909	5,552,062
1910	7,323,281
1911	8,679,786
1912	11,187,110
1913	13,119,811
1914	11,732,783
1915	11,465,873
1916	13,287,024
1917	16,189,179
1918	18,707,762
1919	20,813,670

The industry employs 8,930 workers, with wages totalling $7,341,619. Asbestos is by far the most important single branch of mining in Quebec, seeing that it employs 45 per cent. of the workers and disburses 54 per cent. of the wages of the total industry. The quarrying and preparation of building materials and cement is an increasingly valuable feature in Quebec, employing 37 per cent. of the workers and disbursing 32 per cent. of the wages. The manufacture of cement contributes 21 per cent. of the total mineral production value of 1919, comparing with only 16 per cent. in 1918.

The Superintendent of Mines properly congratulates the Province of Quebec on so favorable a showing in the disturbed period which has followed the Armistice, and is the more worthy of note in Quebec because that province contributed notably to the output of minerals such as pyrites, molybdenite, magnesite and chromite that were in unusual demand during the war period and ceased to be in demand when the war ended.

The striking freedom of Quebec from social disquiet is attributed by Mr. Denis to the confidence of the people of the province in "the judgment and the advice of the 'directing' classes" and their indifference to "the insinuative, and often plausible, urgings of theorists who have panaceas to bring about the advent of utopian conditions, and of the Millenium."

It is pointed out that the increase in mineral production value is to be attributed to higher unit prices rather than to increases in tonnage for the same items. For example, the main product of the Provinces, asbestos, shows an increase in value in 1919 of 279 per cent., but a tonnage increase of only 33 per cent. Cement shows an increase of 33.6 per cent., but a decrease in quantity of 20.5 per cent. Brick value is increased 7.8 per cent., but quantity production is decreased by 31.3 per cent.

The Report includes a description of the gold-bearing area on Lake de Montigny in the Abitibi Region[1], and on the molybdenite deposits of La Corne Township, in the same region by Adhemar Mailhiot of the University of Montreal, and accounts of investigations made by Mr. Denis on the alleged discovery of a new goldfield in the unsurveyed portion of Gaboury Township, to the south of Lake des Quinze and on an occurrence of serpentine near Lake Mackenzie in the same township.

Attention is called to the large unknown area of Quebec and the dearth of trained geologists, and the use of the areoplane to aid prospecting is suggested.

Again, and not unnecessarily, the Quebec Mines Report warns against fraudulent mining-stock offerings. It would be well if Quebec newspapers would give as much publicity to Mr. Denis's warning as they do to the advertising of dubious mine stocks.

Asbestos.

The following statistics regarding the mining of asbestos are condensed from the Report:

	1919 Tons	1918 Tons
Rock mined and hoisted during year	3,061,690	2,445,745
Asbestos produced	154,378	159,225
Pounds asbestos per ton rock	101 lbs.	117 lbs.
Value per pound	$3.88	$4.08
Total value	$10,995,300	$9,053,945

There is in Canada only one manufactury of asbestos products, namely that of the Asbestos Manufacturing Co., at Lachine, where there are produced asbestos slates, shingles, sheathing, mill-board, paper and pipe coverings. Eighty-nine per cent. of the Canadian shipments of asbestos go to the United States, seven per cent. to England and the remaining three per cent. to other countries.

Operations are reported by sixteen companies in the Black Lake, Thetford, Coleraine, Danville, Robertson and East Broughton Districts. An interesting development is the progression of open-pit mining to the "glory-hole" method in the operations of the Asbestos Corporation of Canada, and the use of shafts for haulage of rock and in some instances of men,

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[1]See "The Upper Harricana River Gold Area," issue of 14th Oct. 1919 page 765. A. Mailhiot.

[2]See "Molybdenite Deposits of La Corne Township, Abitibi, P.Q." issue 18th February 1920, page 135. A. Mailhiot.

thereby doing away with ladders, and eliminating interference with operations by weather conditions.

Chromite.

Production of chromite fell to 8,184 tons valued at $223,331 compared with 23,000 tons valued at $770,955 in 1918, and the future of the industry depends largely on whether the United States imposes an import duty on chrome.

Copper and Sulphur Ores.

Production in 1919 was 53,965 tons valued at $447,623 comparing with 125,446 tons valued at $1,319,690 in 1918. Copper contents of ore shipped amounted to 5,751,188 pounds, a substantial portion of which is to be credited to the re-opened Huntingdon Mine[3].

Activities of all the mines were affected during the early part of 1919 by the lack of demand for pyrites and the low price of copper.

Molybdenite.

Only one production of molybdenite is reported for 1919, namely 83,002 lbs. of molybdenite from the Moss Mine of the Dominion Molybdenite Co. Operations ceased at this mine on March 10th 1919 owing to market conditions. The deposit is not exhausted, and the mill equipment is described as remarkably efficient. Should the demand arise, the Quebec deposits will be able to produce moderate quantities of molybdenite for an indefinite period. Prof. Mailhiot's report on the La Corne deposit is published in this section of the Report.

Zinc and Lead.

Shipments were confined to the Port Neuf District, and totalled 5,318 tons valued at $103,138, a decrease of 2,320 tons of ore and of $71,956 value compared with 1918.

The Federal Zinc and Lead Co., which is developing the promising deposits of zinc and lead ores in the region of the Cascapedia River[4], devoted most of its energy to road-building during the year.

Gold and Silver.

The production in 1919, as formerly, came from the treatment of the copper-sulphur ores of the Eastern Townships and the zinc-lead ores of Portneuf Co. Gold so recovered totalled 1,446 ozs. and silver 127,223 ozs.

A description of the development work in the Lac de Montigny District is given in Prof. Mailhiot's report, but no gold production is recorded in the 1919 figures from this newly discovered occurrence.

Magnesite.

Magnesite to the extent of 9,940 tons was produced in Quebec in 1919, being a considerable decrease from the figures of 1918. Important shipments of dead-burned magnesite were made during 1919 to most of the steel mills in the Eastern United States and in Canada, the Report mentioning the following concerns who have used Quebec magnesite with satisfaction, namely, Bethlehem Steel Co., Carnegie Steel Co., Jones and Laughlin, Atlas Crucible Co., Halcomb Steel Co., Ludlum Steel Co., and all the Canadian steel plants. Like chromite, the future of the Quebec magnesite industry depends on whether or not a prohibitive protective tariff is imposed on importations from Canada into the United States.

[3]See issue of August 6th 1919, page 582. "The Huntingdon Mine". R. E. Hore.

[4]See issue of 6th February, 1920, page 102. "Zinc and Lead Deposits of Gaspesia. J. C. Beidelman.

Graphite.

There was no commercial production of graphite in Quebec during 1919. The industry is in a waiting condition, and much depends on the possibilities of improvements in concentration practice, which have been very fully dealt with in recent number of this journal[5].

Mica.

Mica production is valued at $224,988 an increase of eleven per cent. on 1918 value. As so much depends on the grade of the mica placed on the market quantity comparisons are not especially valuable. The 1919 production is estimated at 3,853,265 pounds. Eighty-two per cent. of Canadian mica is credited to Quebec.

Miscellaneous Mineral Products.

Production of iron oxide and ochre is valued at $111,645, a reduction of 30 per cent. in quantity, but of equivalent value to the figures of 1918.

Silica and vein quartz production is valued at $50,161, a decrease from 1918 figures being due to the lessened demand for silica used in the manufacture of ferro-silicon.

Peat, for the first time, is recorded in the Mines Report of the Province. The producers are the "Tourbieres des Laurentides" with head office at Grand Mere, who work the Garneau Junction Bog, peat being delivered for domestic uses at Grand Mere by auto-truck, a haul of four miles. The peat is cut and stacked for drying in the old-fashioned way. The Bog is said to be 500 acres in extent with a depth of peat varying from 5 to 11 feet.

Wages and Accident Statistics.

The average wage of workers in the mineral industry has increased from $593 annually in 1915 to $968 and $1,025 respectively in 1918 and 1919.

Fatal accident rate in 1919 was, for all branches of the industry, 1.67 per thousand workmen. Very complete statistical information on the incidence of accidents is given.

The Report of the Superintendent of Mines for Quebec is a carefully compiled volume. Wherever information of a scientific or commercial nature seems desirable it is included in a form likely to be helpful to mining men. The Province is to be congratulated on its unique position in 1919, as being the only province in Canada to report an increase over 1918, and on the comprehensive and accurate nature of the Annual Report.

[5]See issue August 20th 1920, article by R. C. Rowe, page 676. Also issue August 6th, 1920, page 636, and articles by Chas. Spearman, issues 12th Feb., 6th Aug., 1919, and 16th Jan., 18th June 1920.

Oil Found by Imperial Oil Company North of Great Slave Lake.

Oil has been struck by the Imperial Oil Company, Limited, at a point just within the Arctic Circle, north of the Great Slave Lake, and close to the Mackenzie River. The flow of oil is small, and possibly cannot be made use of economically, but it is regarded as significant that oil has been found there. The flow is ten barrels a day. At Czar, Alberta, the Company's drill is down 2,000 feet.

THE BLACK DIAMOND MINE FATALITY WITH BREATHING APPARATUS.

Report by the British Columbia Chief Inspector of Mines.

Coal Mine Operators and Coal Miners will be interested in a report, which has been issued in bulletin form by the Provincial Department of Mines, on the accident to members of Mine Rescue Teams which occurred at the Black Diamond Mine of the Pacific Coast Coal Co., State of Washington, on Saturday, July 10th, 1920.

Hon. Wm. Sloan, Minister of Mines, on being informed of the serious character of the accident, three men losing their lives and others having narrow escapes, instructed James McGregor, Chief Inspector of Mines, to investigate.

Mr. McGregor's report, together with some supplementary official comments, are included in the afore mentioned Bulletin. The former details the circumstances very fully and the latter make a number of pointed references to the happening that are particularly instructive and interesting reading.

These follow :

"This accident in no way discredits the efficiency and safety of the apparatus when handled properly.

"The plain facts of the case are that this team (that is the Black Diamond Mine Rescue Team, which last year won the championship in competition with teams from the entire Pacific Northwest and two of whose members were lost on this occasion) attempted a feat in ordinary practice that any sane man would have given very serious consideration before permitting even in a case of emergency.

"The place to be travelled was dangerous being full of carbonmonoxide gas, (CO_2). There was no need to take the risk in ordinary practice work.

"The roadway to be travelled by the team was the worst possible for men wearing mine rescue apparatus, being of heavy grade and very rough.

"To go in with such a supply of oxygen (the tanks were shown to have been only partially charged), knowing the conditions, was suicidal.

"The slope to be travelled by the team is 1400 feet in length and pitches 35 degrees and with the rails being lifted was in very dangerous and rough condition for walking. A person in good physical condition without mine rescue apparatus would have his work cut out to make this return trip in 30 minutes. yet the men attempted to make it with one of their number only having 45 minutes supply of oxygen, two having 50 minutes supply, one 60 and one 90 minutes supply.

"It is notable that the one with the 45 minute supply was one of the survivors, the machine he was wearing being a Gibbs. This can be attributed to the automatic feed, which would function according to the wearer's demands. Both men lost were wearing the Draeger type of apparatus, 1916 model, which are not equipped with the automatic feed arrangement. the machines giving a constant supply of oxygen and not functioning according to the wearer's demands. After the accident the machines were all found to be in good condition and if they had been properly charged before going in the mine there would have been no accident.

"The rough conditions encountered on the slope can be imagined when it took five teams of four men each to get out the bodies of the victims."

PORT ARTHUR NOTES.

By J. J. O'CONNOR

Territory near Thunder and Black Bay to be prospected for Oil.

In 1911-12, Mr. J. A. Beam, of New Bethlehem, Pa., visited this district and made a thorough examination of the formation and physical features of the territory adjacent to Thunder and Black Bays, with a view to its oil and gas possibilities. His long experience, as a gas and oil operator in other fields, forced him to the conclusion that there was more than an even chance of finding both oil and gas in paying quantities in this territory.

As a result of his investigations, the Nepigon Prospecting Company, a close corporation, has been formed with J. A. Beam, of New Bethlehem, Pa., as operator in a large way of oil, gas, coal and railways in Pennsylvania, as President, Jobe Burton, of Pittsburg, Pa., manufacturer, as vice-president, and A. E. Annis, of Orangeville, Ont., contractor, as Superintendent of operations.

The company have secured through A. E. Annis, leases covering 30,000 acres of land, in Dorion, McTavish, McGregor, Pearson and Sibley townships, including the Woods Location, (Silver Islet) excepting the Silver Islet Mine. The leases are the usual form in use in the oil fields of Lambton County, Ontario, and other oil fields. The owner of the fee is to receive one-eighth of the oil, and $100 per well, after the first year. If no drilling be done, the owner of the fee is to receive ten cents per acre after the second year, and if no drilling be done at the end of five years, the company forfeits all rights under its lease.

It is the present intention to have the drilling done by contract, if suitable arrangements can be made. If not, the company will bring in its own drills from Pennsylvania, under experienced drill operators. The first hole will be put down on the Woods Location. It is expected that no results will be obtained under 1700 feet, and possibly at a much greater depth. However, it is intended to pursue the drilling until the formation has been thoroughly tested. The drills will be in operation by October 1st, next, and continue through the winter. The old road from Silver Islet to Sawyer's Bay, will be cleared out, and motor trucks used in taking in supplies from Sawyer's Bay, during the winter, so as to avoid going round Thunder Cape, at seasons when the passage by ice is difficult and dangerous, in the early Winter and Spring. The Head Office of the company will be at Port Arthur.

Grace Mine on Eagle Lake to Resume Work.

The Grace Mining Company, George J. Blake, 300 Broadway, Buffalo, N. Y., President, with Head Office at Toronto, Ont, and 300 Broadway, Buffalo, N. Y. is resuming active mining operations after nearly a decade of inactivity.

The Grace mine is situated 21 miles south of Eagle River station, on the Canadian Pacific Railway, on the shore of Eagle Lake. The present development consists of a complete camp equipment, and a ten-stamp mill. The main shaft is down 150 feet, with considerable drifting and cross-cutting, on a strong highly-mineralized quartz veins, yielding an average of over $23 per ton in free-milling gold ore. Arrangements are completed for continuous operations during the coming Winter, with a full staff of miners.

The organization is composed entirely of American

capitalists, who are expected to visit the property when the engineer in charge gets the work of mining underway.

Captain Walpole Roland, with a crew of men, two car-loads of machinery, a gasoline launch, a scow and a general outfit of supplies arrived at Vermillion Bay, Eagle Lake, on August 12th, and on the following day proceeded by launch to the mine, where the preliminary work of unwatering will begin, directly pumps can be installed. On the completion of unwatering active mining will be proceeded with.

NOTES FROM THE NOVA SCOTIA COLLIERIES.

Springhill Mines.

Several days idleness has resulted from a dispute between the management and the boiler firemen, which has been adjusted. Disputes in connection with the development work at the No. 7 Slope and in connection with underground rates at No. 2 Slope have also been adjusted by increasing the rates.

A new slope, to be known as No. 8 Slope, has been commenced by the Dominion Coal Company.

Increase of Benefits in Relief Association.

The several branches of the Dominion Coal Workers' Relief Association have agreed to increase the weekly subscription from 25 cents to 30 cents. The relief payment will be raised from $6.00 to $9.00 per week. The Dominion Coal Company, which pays on a fifty-fifty basis with the employees, is also increasing its payment. This society deals entirely with cases of sickness and death not arising out of employment.

The Royal Commission on Wages.

The Commission, which has been taking evidence in the Minto District, is expected to hold final sessions in Sydney, before filling its decision.

Dominion Coal Bankhead Escapes Fire.

By prompt measures the Reserve Bankhead of the Dominion Coal Company, which serves Nos. 5 and 10 collieries, was saved from destruction by fire on the 26th August. A previous bankhead at Reserve Collieries was destroyed by fire in October 1906.

The Hiawatha Coal Co.

This new coal company is opening up a mine on the General Montgomery Moore areas at False Bay Beach, in the Morien Basin of the Sydney Field. The take of the company is stated to cover two square miles of the Tracey Seam, estimated to contain ten million tons of coal. At the shore crop, the seam shows a thickness of 4 ft. 8 ins., but inland it is believed to increase in thickness. Some dredging will have to be done to obtain a berth for loading vessels to open up a passage from the sea to False Bay Lake. Coal may be shipped during the remainder of the year, but it is not expected that operations will be large until next Spring.

ASBESTOS NOTES.

An English invention is a pulley made of asbestos and cement, designed to run at very high speeds. It is said to be satisfactory in operation, with good balance, and costing much less than aluminum pulleys.

"Asbestos" states that reports come from Luzon, Philippine Islands of a property yielding considerable quantities of Nos. 1, 2 and 3 qualities of asbestos, with some fibres three feet in length. "Asbestos" is investigating these reports and more definite information may be forthcoming.

ASBESTOS TRADE CONDITIONS IN EUROPE

"Asbestos" for July contains a resume of the asbestos situation in Europe by Mr. B. Marcuse, President of the Asbestos and Mineral Corporation who has recently visited Europe.

Mr. Marcuse reports that there are a great many plants making shingles, textiles, sheet packings and mill boards and that, while all these plants have been seriously hampered by inoperation during the war, and by the terrific drop in exchange since the war, they are gradually and surely resuming operation. It will, however, in Mr. Marcuse's opinion, be quite some time before their production will be sufficient to care for home consumption. Hence it is unlikely that much of the foreign made product will appear in the world market for some time to come.

It is interesting to note that in France, as well as in Germany, the manufacturers are associated in a syndicate or Groupment, which to a large extent buys and allocates raw material, exchanges trade information, and presents a united front to outside competition. In Germany this Groupment is directly under Government control, and has charge of all imports and exports. Practically no exports are now permitted, since Germany was quite barren of all Asbestos during the war and has not yet caught up with home demands.

During the war the United States was exporting to Europe quite large quantities of Asbestos goods but, now that the European plants are again producing, that market will automatically be closed to United States shippers. Since the foreign plants cannot do much more than care for home requirements, it is evident that the one big foreign outlet is South America. Tremendous development is going forward in South America, and at least one United States manufacturer has been fully alive to the possibilities there, for he has maintained several direct representatives in South America for the past few years, and records of exports furnished by the U. S. Customs Office indicate that the market is a good one.

Asbestos Products—Prices Current July 1920.

(From "Asbestos.")

Average market prices paid by consumers for average quantity, quality and freight haul from producer, were about as follows:

Asbestos Air Cell Covering, 4 Ply	35% to 40% off
" Air Cell Paper in Rolls	$10.00 to $12.00
" Cement	$1.75 to $3.00 cwt.
" Cloths, 10s Commercial	$1.50 to $2.00 lb.
" Listings and Tapes	$1.75 to $1.90 lb.
" Millboard	$12.00 to $18.00 cwt.
" Packing, Steam, High Pressure	$1.25 to $2.00 lb.
" Packing Sheet	$1.00 to $1.50 lb.
" Wick and Rope	.65 to $1.00 lb.
" Paper, Commercial	$12.00 to $18.00 cwt.
" Paper ,and Millboard Special	$17.00 to $35.00 cwt.
" Yarns, 10s Commercial	$1.35 to $1.90 lb.
" Yarn and Cloth, Special	$2.00 to $6.00 lb.
Magnesia Carbonate, Powdered	15c. to 20c. lb.
85% Magnesia and Boiler Covering	5% to 15% off.

SALT FOUND AT FORT McMURRAY.

Announcement is made from Edmonton that salt of good quality has been discovered at a depth of 523 feet at Fort McMurray.

OBITUARY.

J. C. Gwillim.

Mr. J. C. Gwillim, for several years professor of mining engineering at Queen's University died in Kingston on Thursday August 19. Funeral services will be held in Kingston on Saturday. The body will then be shipped to Winnipeg for burial.

Professor Gwillim was well known in mining circles throughout Canada. He was not only an able engineer but a successful teacher of mining engineering. He was one of the most popular professors at the School of Mining and the many graduates of that Institution will learn with regret of his demise. He leaves with them memories of a man worth knowing.

For some time Professor Gwillim had been suffering from the serious illness that resulted in his death. He spent several months in British Columbia in an endeavor to win back his health, but recently was compelled to resign his position on the staff of the University.

Dr. ELLIS DEAD.

Dr. William H. Ellis died on Monday, August 23, at Lake Joseph, Muskoka. He was for some years, Dean of the Faculty of Applied Science at the University of Toronto, succeeding the late Dean Galbraith in 1914. Previously he was professor of chemistry in the same Institution, having been identified with the School of Science since 1878. Before that he had been instructor in chemistry in the College of Technology, Ontario's first technical college.

School of Science men all knew and liked Prof. Elis. He had a great part in building up the Institution that now ranks with the best engineering colleges. He served well and long.

Dr. Ellis was born in Derbyshire. He graduated from the University of Toronto in 1867. He died in his 75th year.—R. E. H.

PERSONALS.

Mr. Dwight L. Woodbridge has returned from a trip to the Belcher Islands, Hudson Bay. Mr. Woodbridge was examining iron ore deposits there for American interests.

Mr. Murray Kennedy has been appointed manager of the Trethewey silver mine at Gowganda. Mr. Stewart Thorne who was manager at the Trethewey mine at Cobalt when he left for overseas has been in charge of the Gowganda property for some months, but has resigned owing to poor health.

Sir Charles Wright and Capt. Leighton Davies are in Toronto inspecting the Toronto plant of Baldwin Ltd. This company will soon be producing iron and steel sheets and tinplate at the Ashbridge bay property taken over from British Forgings.

METAL QUOTATIONS.

Fair prices for Ingot Metals in Montreal August 26th 1920. (For shipment from stock, and in less than car-load lots:

Copper, electro	24¼
Copper castings	23¾
Tin	53
Lead	9
Zinc	10½
Aluminium	35
Antimony	8¾

THE FINANCIAL RESULTS OF GOLD MINING IN NORTHERN ONTARIO.

The following brief anaylsis of the result of gold mining operations in Northern Ontario, dating from the time the first dividend was paid, up to the middle of the current year, gives a fair idea of the results achieved to date.

One feature not dealt with in detail at this time is the ore reserves at the various mines. In this connection, the broad statement may be made that ore actually in sight at the proven mines amounts to close to 70 million dollars, while that indicated in the mines both prospective and proven amounts to close to 100 million.

Following are figures showing production from year to year, as well as the amount of dividends paid during each twelve-month period:—

Gold Production from Porcupine.

Year	Value produced $
1910	35,539
1911	15,437
1912	1,730,628
1913	4,294,113
1914	5,190,794
1915	7,480,901
1916	9,397,536
1917	8,229,744
1918	7,833,966
1919	9,941,803
1920 (est. first half)	5,500,000
Total	$59,650,461

Kirkland Lake Production.

Year	Value produced $
1913	26,232
1914	74,590
1915	555,539
1916	702,761
1917	404,356
1918	636,667
1919	486,809
1920 (est. first half)	570,000*
Total	$3,456,955

Note:* The output for the first half of 1920 from the mines of the Kirkland lake district has exceeded the whole of 1919, during which year a labor strike caused the mines to close down for over four months.

Dividends from Kirkland Lake Camp.

Year	Value produced $
1915	65,187
1916	260,750
1917	(nil)
1918	100,000
1919	100,000
1920 (first half)	50,000
Total	$575,937

Dividends from Porcupine Field.

Year	Value produced $
1912	270,000
1913	1,182,000
1914	1,410,000
1915	2,360,000
1916	4,166,000
1917	1,699,542
1918	1,771,000
1919	2,083,028
1920 (first half)	1,299,028
Total	$16,240,598

Summary of Gold Production.

Porcupine	$59,650,461
Kirkland Lake	3,456,955
Grand Total	$63,107,416

Summary of Dividends.

Porcupine	$16,240,598
Kirkland Lake	575,937
Grand Total	$16,816,535

It should be noted that while only $16,816,535 has been paid out of a total gold production of $63,107,416, the producing mines have all built up large treasury surpluses, as well as spent a large amount of current earnings on building up ore reserves which assures larger dividends than ever before, and means that as the mines become older the total dividends paid will represent a larger percentage of the total production than has been the case up to the present.

DAVIDSON CONSOLIDATED GOLD MINES, LTD.

For several months the directors of Davidson Consolidated Gold Mines Ltd., have been negotiating with English interests to make the mine a big producer of gold. The directors have now announced to shareholders that a satisfactory conclusion to these negotiations has been arrived at. The shareholders are now asked for their approval of the deal and co-operation in making it possible.

According to the letter just sent to shareholders arrangements have been made for the sale of 1,500,000 treasury shares at 75 cents per share; the proceeds of this sale in principal to the applied towards the carrying out of an extensive plan of development, which has been decided upon by arrangement between the English interests and the Davidson directors. A condition of the offer is that the English interests shall receive an option on 2,000,000 shares—1,000,000 at $1 and 1,000,000 at $1.25, the option to remain in force for nine months after the first 500 ton unit of the mill is completed, but in no event to exceed a period of two years. In order to carry out this arrangement it will be necessary for each shareholder to contribute 50 per cent. of his holdings towards the option.

The development planned includes the sinking of a 3 compartment working shaft to a depth of at least 1,000 feet, the construction of a mill with a daily capacity of 1,000 tons, the first unit of which (500 tons) shall be undertaken in the immediate future.

President G. C. Crean in his letter points out that the report on the property made by Messrs. Bert and Loring for the company is fully confirmed by the examination and report of Colonel Fielding of London, who was sent out by the English interests to examine the property.—R.E.H.

TORONTO NOTES.

The mica mine at Blue Mountain, near the head of Stoney Lake, Peterboro County, Ontario, which was unsuccessfully operated about a quarter of a century ago, has been purchased through the Supreme Court of Ontario, from the Bradford estate, which was being settled in that court by two American engineers, C. L. Nicholson of New York and Norman Miller of Michigan. It is expected that the mine will be in operation by the middle of September with an output of about 100 pounds a day. The machinery and equipment are now on the way to the mine and labor has been arranged for. The output is contracted for until after Christmas and three firms are trying to contract for the mine's total output. The most serious difficulty that will confront the new operators will be that of transportation. The mine is located about four miles from the head of Stoney Lake, which is about twenty miles from the terminal of the Grand Trunk at Lakefield. The mica will have to be hauled over poor roads to the head of the lake and there towed down Stoney and Clear Lakes to the railway at Lakefield. During the winter sleighs will be used to haul the mica over the lake to the railway. It is stated that the former operators of the mine failed to make it a paying proposition because they spent too much money on road construction. The new enterprise, however, is confident of success and claims that the mine is rich.

According to the quarterly report issued by the Bailey Silver Mines, Limited, the gross earnings of the Bailey Custom Mill at Cobalt for the first quarter were in excess of $50,477, and the net profit from milling operations were $22,951. It is stated that the mine has a large tonnage of ore actually developed and with the completion of the railway siding at the mine will commence immediate shipment of its developed ore to the mill, which should then show a net profit in excess of $1,000 daily.

THE FINISHED WORK OF THE BOLSHEVIKI.

The folowing opinions on the results of the applied doctrine of the Bolshevists are extracted from an article contributed to a Parisian newspaper by H. B. Sliozberg, a lawyer of Petrograd, who was so fortunate as to escape from that devoted city.

"The Bolsheviki wanted to destroy the bourgeoisie; instead of that they have merely strengthened and increased it."

"They attempted to introduce agriculture on a communistic basis; instead of that they have developed in the peasantry a still stronger desire to own land."

"The Bolsheviki attempted to subject the industrial life of the country to the government, but instead of that they merely destroyed and disorganized it."

"The Bolsheviki attempted to spread enlightenment in the masses, but instead of that they have paralyzed science and art."

GABRIELLE MINES PROPERTIES UNFAVORABLY REPORTED UPON.

Although a discouraging report has been received from J. B. Tyrrell, mining engineer, of the value and quality of the quartz from the Gabrielle Mines, Ltd., directors of that company are determined to carry on the work next year. Lieut.-Col. A. C. Gray, president, announced that a report had been made to him by Mr. Tyrrell, one of the most competent mining engineers in Canada, showing that assays showed little promise of returns from the property, but that the officers, directors and shareholders were so confident of the value of the mine that they propose to go on with the operations next year if it is at all possible.

The Gabrielle properties consist of the Gabrielle, the Gabrielle Fraction and the Cartwright claims. The Gabrielle was the first mine discovered in the Rice Lake district, the discovery being made in March, 1911, by Maj. E. A. Pelletier, now vice-president of the company. The first assay in 1911 showed a yield of $130 a ton. Up to the present time there has been constructed 120 feet of shafting and 130 feet of drifting. A survey was made in 1919 by Mr. Tyrrell and in his report he said: "I believe you are justified in making arrangements to sink one or both of the shafts to depths of 100 feet at least and in drifting on the veins from these shafts. The property appeals to me as sufficiently attractive to warrant risking a reasonable amount of money in the hope of developing it into a paying mine."

His report to the directors concludes with the following : " There are four gold bearing veins known on the property. Two of them designated Nos. 2 and 4 respectively, are too small to deserve serious consideration. No. 1 vein is close to the shore of Rice Lake. Gold may be found in it in many places, but a careful sampling showed that the surface, the vein in the drift, and the dump taken from the drift all yielded assays varying from $4.80 to $4.87 in gold to the ton. No. 3 vein, near the north side of the Gabrielle claim, is the strongest and most continuous of any on the property but on the best exposed portions of its surface, for a length of 100 feet, it showed an average value of $3.88 in gold to the ton, while in the drift, at a depth of 64 feet below the surface, and for a length of 75 feet, it showed a value of $3.35 in gold to the ton. A dump beside the shaft, which had been taken from the shaft and drift, was sampled and yielded $4.80 to the ton. The results of the assays here quoted sho wvein-matter of much too low grade to be mined at a profit, and as there is no reason to believe that the veins contain more gold in some other places that have not yet been uncovered or explored, or that other and richer veins may be discovered, I recommend that all mining work on the property be discontinued. "

"The country does not deserve the blow that this report will give it," said Col. Gray. "We are just as enthusiastic as we were before over the mine and indeed over the whole Rice Lake district. "

He said that although the directors were upset by the report they are making arrangements to go on with the work next year. Pending further negotiations to carry on the work the mine will be closed at the end of this season. Old prospectors who have been over the ground carefully, he said, had faith in the claims. Some of them pointed out that four or five of the largest mines in the world were once condemned to be closed by competent engineers, but the "bull-headedness" of their owners kept them going. Major Pelletier has a claim adjoining the Gabrielle site, and he has announced that he intends to spend $5,000 there this winter in developing it.

Col. Gray states that a meeting of the shareholders will be called on September 14. At that time another report will be presented by Capt. C. A. Millican and by Col. Gray.

Since the claim was opened there have been 1,500 tons of rock removed and half a ton of this has been used for sampling. The average value of the samples has been about $60 a ton, it was said. Timber on the property is valued at $150,000. The claims are held under crown grants.—"Winnipeg Free Press."

SAFETY METHODS IN BUILDING CONSTRUCTION REDUCE ACCIDENTS.

An innovation in making provision for the safety of workmen engaged in building and construction work has been introduced in the erection of large extensions to the plant of the American Rolling Mill Company at Middletown, Ohio.

At 2 P. M. each Tuesday a committee composed of foremen, mechanics and laborers inspects the entire job from sewers to roof with the one purpose of seeing that proper methods are taken to safeguard the employees against accident. This committee makes a detailed report of each inspection to a representative safety committee, which considers and puts into effect the recommendations of the inspection committee.

The plan was introduced and is being carried out by Dwight P. Robinson & Company, Inc., a large engineering and construction organization which has been making careful investigations of various plants for protecting its employees.

The success of this program is being closely watched by various safety societies which are now encouraging day laborers as well as trained men to speed up their work. Experts in all types of building construction are agreed that the first marked reduction in building cost will come through increased production. The best features of this new safety plan are being copied by many large construction companies in the United States and Canada. The public is interested in the plan because indirectly it will lower rentals by reducing construction costs. This applies equally well to industrial constructions, large building projects and homes.

THE TORONTO EXHIBITION.

Canada has no institution which better reflects the national spirit than its National Exhibition, which stands a monument to the civic progressiveness of Toronto, a triumph of loyal, vigorous citizenship and one of the Queen City's greatest contributions to the educational service of the nation, and to her industrial efficiency and agricultural advancement. The paramount reason for the majority of Fairs and Exhibitions is primarily the exploitation of the immediate locale. Not so the Canadian National, with its annual attendance of 1,000,000 people, drawn from all parts of the continent. It is the arena for the display of the strength and enterprise of the whole nation and the testing ground for much that other nations have to offer, a giant kindergarten, where the hundreds of thousands go for relaxation and enjoyment and are taught, enlightened and elevated in thought without being conscious of the many influences at work. A year of travel in Canada can here be condensed into a few days' sight-seeing.

A NOTABLE GROUP.

Photograph taken at the office of the Dominion Steel Corporation in Sydney during the recent visit of the Directors to the Collieries and Steel Plant.

Top Row—H. E. Rice, General Superintendent; Col. Chas. W. McLean, Montreal; H. B. Smith, Director; E. P. Merrill, General Manager; Messrs. Christian and Johnson of the Montreal "Gazette."

Second Row—Roy M. Wolvin, President; Hon. C. P. Beaubien, Director; Sir William D. Reid, Director.

Second Row (seated)—J. Kempton, Secretary to President; J. F. M. Stewart, Director.

Bottom Row (seated)—Stanley E. Elkin, M.P., Director; Hon. J. P. B. Casgrain, Montreal.

Porcupine Keora Mining Company's Shaft, Powerhouse and Fuel-pile. Results of extensive drilling on the properties of this Company are reported in a recent circular to the shareholders.

British Columbia Letter

THE METAL MINES

Hazelton, B.C.

In his report for 1919, John D. Galloway, resident mining engineer, referring to the Rocher de Boule Mine stated that it was a formerly big copper producer but had remained inoperative all year. There was considerable milling ore available but no shipping ore pending further development. It now appears that the Mine is not likely to figure this year among the shippers it having been announced by J. D. Williams, who recently returned from the property, that there was no prospect of immediate resumption of work, as the copper market was not very active and the labor situation uncertain.

The Delta Copper Co's property, Rocher de Boule Mountain, is to be subjected to some exploration by means of the diamond drill. There has been some tunnelling in progress, but this has been found too slow and a drill will be put on the ground as soon as possible. If the results are satisfactory a permanent working tunnel will be driven.

The encouragement of the production of gold is a problem which is giving the Provincial Mines Department considerable concern. The amendments to the Placer Mining Act passed at the last Session of the Legislature by reducting rentals and other expenses attached to leases and by permitting the payment of arrears annually in comparatively small amounts it was thought would make it easy for those sincerely desirous of operating their holdings and at the same time squeeze out those who have been holding merely for speculation. Attention now is being turned to a more direct, and perhaps a more practical form of aid, J. D. Galloway, resident engineer with headquarters at Hazelton, having been authorized to continue Keystone drilling operations on the placer areas at Harpers Camp. This week was started last year, but, for various reasons, could not be finished. An expert crew of men has been engaged by Mr. Galloway and operations have been underway for some weeks. It is hoped that it will be possible to report satisfactory results at the end of the season. Mr. Galloway, in his 1918 report, gives detailed attention to placer mining conditions on the Horsefly River. First explaining that the important productive ground near Harpers Camp was an area lying in and about a bend of the Horsefly River, consisting in all of not more than 10 acres, and that the estimates of the amount of gold taken out of this area vary from $500,000 to $1,250,000 he proceeds to deal with the theory of the rich old channel, which the drilling now underway is expected to establish or disprove. It is pointed out that the character of the gold taken from the ground known as Ward's Horsefly was uniformly "fine, flat and well-worn" making it clear that it had travelled some distance and probably had its origin at some unknown point far up the Horsefly. The Horsefly River, both above and below Ward's Horsefly, has been fairly thoroughly prospected and a little gold has been taken out in places but no place has been found comparable in richness to the Ward ground. "The conclusion" Mr. Galloway continues "has therefore been reached by many that the gold in Ward's Horsefly did not get there by following the present channel and an old channel of the river is postulated to account for this remarkably rich spot." There has been considerable prospecting for this presumed channel, but the work has not been well organized nor sufficiently exhaustive to satisfy those who have examined the ground that it does or does not exist. Mr. Galloway then tells of operations down the Horsefly River at a point known as "Hobson's Horsefly", where the deposit of gravel worked was a short distance from the river and represented a former channel. In this connection he says: "The project was unsuccessful owing to the outside gravel changing to a cemented gravel, which is virtually a conglomerate. Hydraulicking therefore was of no avail and a small stamp-mill was erected to grind the cemented gravel. It was obvious that unless the ground was extremely rich placer-ground it was not pay to operate in this way. The mill was operated only a very short time when the work was stopped."

Stewart, B. C.

The Provincial Government, through the Mines Department, is making considerable expenditures in road and trail work in the Salmon and Bear River sections of the Portland Canal Mining Divisions this summer. The extension of the road to the Premier Mine in order to furnish a ready means for the transportation of supplies from the Coast to the many claims under development in that region, and later to provide a means for the shipment of ore to tidewater, is making good progress. It was started as soon as weather condition permitted and is being hurried because of the shortness of the season. Hon. William Sloan, Minister of Mines, is expected to visit the Camp in the course of a few weeks and it is possible that he will take the opportunity to inspect this work as well as to give his personal attention to some of the operations and requirements of the Bear River area. Lucien Danoel, a mining engineer and a professor of the University of Liège, visited the district recently accompanied by Théo. Collart, Belgian Consul at Vancouver. He paid special attention to the several properties in which the Algunican Mining & Development Co., a Belgian syndicate, is interested. On the Spider, one of these prospects, a tunnel has been driven 360 feet with good ore all the way and it is planned to ship ore next winter over the snow. The visitors commented favorably on the activity of the Provincial Government in opening up the country and on the great work being done by the United States authorities in the construction of a sixty-foot road from Hyder to the border.

Trail, B. C.

Four men were more or less seriously hurt recently while at work in the Copper Refinery of the Consolidated Mining & Smelting Co. All were burned about the face and one, Gordon O'Connor, may not recover his sight. Molton copper splashed between the moulds and into running water used for catching the drip. The copper was shot 40 feet into the air.

Ore receipts at the Trail Smelter of the Consolidated Mining & Smelting Co. for the week July 21 to 31 aggregated 12,862 tons and for the week August 1 to 7, 10,221 tons.

Nelson, B. C.

The Emma Mine of the Consolidated Mining & Smelting Co. will resume operations immediately with a force of 50 men. This property formerly shipped about six cars of ore a week, but work ceased last year when production was discontinued at the Rossland Mines. Now that the latter have been placed on a shipping basis the ore of the Emma is required as it makes a god flux for the product of Rossland. It is understood that its outpnt will be about the same as before the close down. The ore is low-grade gold, silver and copper.

Vancouver, B. C.

Conditions at Keno Hill, Mayo District, Yukon Territory, where rich discoveries of silver are reported, are described by George F. Johnson, a mining man recently returned from the North. He says :

"Preliminary prospecting has uncovered evidence of as many as nine separate leads of silver-galena shipping-ore. The present known depth and length of these are such that shipping ore now in sight will require many years of considerable activity to mine.

"Taken from one of the "leads" on the plateau of Keno Hill is what the miners call the "War Baby Silver-Galena Nugget." It is one oblong piece of solid silver-galena, similar in shape to a large potato, weight estimated by experts to be 1200 pounds. From the same vein or ledge from which this piece came are four other nuggets or slabs. These are nearly solid silver-galena and by comparison the weight of the smallest is easily 800 pounds.

"On either side of these slabs, and also below and above the "ore vein" is in evidence, with manganese capping, carbonates and footwall, all of such character as to induce the prediction that further development may prove the district to possess the largest and richest silver deposits in the world.

"Owing to the surface character of some of the "leads" it has been possible to develop with comparatively little effort to a point where ore can be shipped. In places one man can "pick down" or mine a quarter of a ton of shipping ore per working day. Estimating this ore to be worth $200 per ton it is clear that some individual claim owners will be able to mine profitably."

It is stated by Mr. Johnson that the holdings of the Yukon Silver-Lead Mining Co. were located and partially developed before the discovery of the Keno Hill properties. The former are situated on Mount Haldane or Lookout Mountain and are in direct line with Keno Hill and the Silver King, from one pocket of which silver is said to have been taken valued at $500,000. Much development has been done on Lookout Mountain, tunnels and shafts having been driven aggregating 1200 feet. It is stated that the vein has been followed for 400 feet perpendicularly, disclosing good shipping ore. Development on such properties as the Silver King, Mount Rambler and others in the section, as well as in the Twelve Mile area, should prove the extent of the area of the silver-galena bodies in the Yukon.

Considerable work is being done by the Canadian Geological Survey in British Columbia this year. Charles Camsell, until recently in charge of the western survey station and now Deputy Minister of Mines for the Dominion, states that there are twelve parties in the field. The topographical branch of the Survey is making two fine maps of the Vancouver area and other parties are at Salmon Arm in the Coquihalla District, at Bridge River on iron deposits, in the Lardeau and in the Eutsuk Lake areas, and on the west coast of Vancouver Island. There is another party at the mouth of the Fraser River studying the sedimentary deposits of the river.

Mr. Camsell announces, too, that important work is being done in the Province of Alberta, D.B. Dowling is continuing his oil investigation. Another party is examining the Peace River Coal Fields and another is mapping out the extension of the Crow's Nest Pass Coal Fields to the north. A further party is in the McKenzie River country working out the structure of possible oil bearing rocks.

Oil drilling rigs are actually installed and working in two areas, one in the Great Slave Lake region and another near the Arctic Circle, the latter being the scene of the most northerly oil drilling in the world. There is much oil drilling going on around Peace River Crossing and much gas and some oil has been found. The latter is heavy oil and is a pumping proposition.

The gold receipts at the Dominion of Canada assay office, Vancouver B.C., from January 1st to July 31st, 1920, are valued at $1,073,451.17. From April 1st to July 31st, 1920, they aggregated $819,216.72, or about $200,000 per month for the four months of the fiscal year 1920-21.

THE COLLIERIES

When the Board of Commerce of Canada held sessions recently in Victoria, B.C., evidence was submitted by what is known as the United Co-operative Society that there was a combination among the local Retail Coal Merchants as a result of which the former's demand for delivery of coal by the Collieries was refused. It also was charged that the retailers were charging unwarranted prices for the fuel. In reply the dealers denied that there was a combination, assorted that their influence with the Coal Operators was not sufficient to enable them to dictate to whom coal should be delivered, and that the prices asked for coal were reasonable. One firm admitted a profit of 90 cents a ton which was not considered excessive and others claimed their profits were not as great. It also was declared that coal was cheaper on the Pacific Coast than anywhere else in the world. Coal costs the consumer in Victoria, and it is approximately the same in Vancouver and elsewhere in British Columbia, from $7.50 a ton for slack to $14.50 for lump for domestic use.

It is announced by Dominion Government authorities, Ottawa, that although the embargo which came into effect on August 1st almost completely prevents the export of coal from the Eastern Canadian Provinces, it applies only to the Atlantic Coast. The Pacific Coast Collieries may still export coal. The Canadian Collieries (D) Ltd., and the Canadian Western Fuel Co., Vancouver Island, and possibly the Crow's Nest Pass Coal Co., Eastern British Columbia, are in a position to export considerable quantities. As the prices in this province are lower than in most parts of the world, and as the market and prices in European and other overseas parts, are satisfactory it is likely that this trade will grow. Already, as has been reported same shipments have been forwarded to Sweden and

elsewhere and, as there are many orders on hand and others are constantly coming, a material development of the business is promised.

The output of coal in Western Canada continues to be satisfactory. There was produced in the Province of Alberta during the first six months of 1918, 2,897,950 tons of coal while for the corresponding period of 1920 the output was 3,043,940 tons. The increase demand, however, has kept pace with the greater production as Alberta coal now is being used almost entirely as far East as the head of the Great Lakes. This, of course, is relieving very substantially the pressure on the supplies of Eastern Canada.

The negotiation of an important mining transaction, involving control of some of the greatest coal fields of the Province of Alberta, has been reported. As a result these properties are to pass into the hands of the McIntyre and Temiskaming Mining Companies of the Porcupine and Cobalt District, Ontario, respectively.

The Ontario companies are purchasing the Blue Diamond Coal Mines Ltd., of Brule, Alberta, a concern with an acreage of some six square miles and producing 500 tons of steam and domestic coal a day, and have optioned the Canadian Coal Fields Ltd., whose holdings cover a large tract of coal lands lying along the Hay river some thirty miles from the Blue Diamond. The Blue Diamond is capitalized at $1,500,000 and the Canadian Coal Fields Ltd., at $10,000,000. The option on the latter is understood to be for 15 years. The seller of the Blue Diamond is Messrs. McKenzie, Mann & Co., which concern also is a large holder in the optioned property. The purchaser of the property is the McIntyre Company, whose intention it is to share the deal with the Temiskaming Company on a fifty-fifty basis at the purchase price.

Engineers already are planning for considerable further development of the Blue Diamond Mines, it being the intention to install the mine plant and equipment necessary to permit an increase of production of from 600 to 2000 tons a day.

The production of coal in British Columbia for the month of July, 1920, follows :

Vancouver Island Field.

	Tons
Canadian Western Fuel Company, Nanaimo, B.C.	55,399
Canadian Collieries (D) Ltd, Comox	41,089
Canadian Collieries (D) Ltd, South Wellington	8,904
Canadian Collieries (D) Ltd., Extension	15,342
Pacific Coast Coal Mines Ltd, South Wellington	7,680
Nanoose-Wellington Collieries, Nanoose Bay	3,079
Granby Consolidated M. S. & P. Co., Cassidys	9,019
Total	140,512

Nicola-Princeton Field.

Middlesboro Collieries, Middlesboro	6,918
Fleming Coal Co., Merritt	2,626
Coalmont Collieries Ltd., Coalmont	1,984
Princeton Coal & Land Co., Princeton	2,114
Total	13,642

Crow's Nest Pass Field.

Crow's Nest Pass Coal Co., Coal Creek	38,073
Crow's Nest Pass Coal Co., Michel	22,172
Corbin Coal & Coke Co., Corbin	15,763
Total	76,008

COMBATING RISING COSTS BY REDUCING OPERATING EXPENSES.

Coal strikes, coal shortages and increasing prices have taught coal dealers and large consumers the wisdom of stocking and storing large amounts of coal. In that manner big reserves of fuel can be held against times of lessened production, blockaded traffic and increasing prices.

Such a plan is very advantageous but it encounters difficulties presented by the problems of handling the coal within the yards or storage space. Labor is scarce and wages high. These factors, coupled with the increasing prices of coal, make it very difficult to keep down rising costs.

However. it is the only way out. Coal prices cannot be reduced—they will go up instead of down. Nor

Disc Feeders of Loaders.

can cheaper labor be secured—it is difficult to get at any price. The only way left to combat coal costs is to reduce operating expenses.

This question of lower operating costs also applies to business having large quantities of bulk material to handle which can no longer afford to use obsolete and expensive hand methods—a fact proven by the tremendous growth in the past few years of labor-saving machinery of all kinds.

For different operations, specific machines have been developed which perform that one operation at great savings in time, labor and money. Each type of machine has its particular place and function, but it is unusual when one machine can be used for a multitude of different tasks.

Old Type Barber-Greene Self-Feeding Bucket Loader with Traction Wheels.

The Barber-Greene Company of Aurora, Ill., have however, with their Self-Feeding Bucket Loader proved the exception to this general rule for the B.G. machines can do many jobs with equal ease and equal economy.

Being comparatively small and moving from place to place under their own power, they can move around a factory, yard, sand or gravel pit, road or paving job just as a gang of shovellers would change from job to job as needed. The difference is that only ONE man is required to operate the Loader, and this one man can move about 75 cubic yards per hour.

The distinguishing feature of the B.-G. Self-Feeding Bucket Loader is the Rotating Double-Disk Feeder (patented) at the base of the elevator. The feeder does the work of one or two men and gives the machine a range that is otherwise impossible. It enables the machine to dig to a width of six feet rather than to the bucket width, and the operator consequently has little difficulty in keeping the loader continuously up to the capacity.

The digging or feeding device consists of a pair or horizontal discs, set almost flat on the ground, but with a slight pitch toward the pile. The rotation of the two discs carries the material to the centre where it is picked up by the buckets digging from the smooth surface of the discs. The wide digging face of this loader enables it to handle a large quantity of material with very little movement and it also enables the machine to advance without obstruction into the pile.

The construction of the machine in general enables it to use the Disc Feeder to best advantage. The Discs deliver a large capacity to the Bucket Elevator and this in turn is of a size consistent with this capacity. It is designed for handling heavy materials and for very severe service. The frame construction and the crawlers embody strength; the chains and buckets are selected for wearing qualities; and the drive is designed to enable the operator to keep the machine at productive work for the maximum amount of time. A differential provides for turning sharp corners. A slow reverse feeding-speed is provided to enable the loader to be readily spotted on the job.

MODEL 20, the "last word" in Loader design and construction—the result of 18 months' study and ex-

Old Type B. G. Bucket Loader handling Coal from Stock Pile and delivering to B. G. Portable Belt Conveyor.

perimentation. It is simply a new and better model built along the same general lines as the hundreds of older B-G. Self-Feeding Bucket Loaders in daily operation all over the world.

The Barber-Greene Co., extend service to customers through their Branches and Agents, Mussens Limited, being their Canadian representatives.

WHY FRANCE WANTS COAL.

Maximilian Hardin, in a recent number of *Zukunft*, enforces upon his German readers a few wholesome truths regarding the coal deliveries demanded of Germany under the Treaty:

The **Bulletin de l'Association internationale des chemins de fer** has just published the following report: 'The new president of the Society of French Civil Engineers, Mr. Eduard Gruner, in his inangural address, discussed the destruction and reconstruction of the coal districts in the North and Pas-de-Calais. Citing the records left by the German engineers themselves, he showed that Germany's work of destruction in these regions was thoroughly planned and carried out with all resources of expert engineering science. In August of 1915 they had ascertained scientifically the height of the ground water line in every shaft then working, and beginning with the advance shafts in Courrières and Lievin they started their work of destruction. The engineers in charge of this crime have themselves explained that they dropped into each shaft a small beam to the end of which was attached a mass of high explosive. The quantity varied from 80 to 200 kilos according to the estimation of the amount required in each particular instance to destroy the casing and cement work of the mine. The underground passages and excavations were filled with water. Around the pillars they assembled all conceivable material: barrels, gratings, cable, basketry, human corpses, bodies of animals, and whatever they could lay their hands upon to foul the water and prevent the mines from being pumped out. In the midst of this débris, they sank shells and boxes of dynamite, hoping thus to prevent salvaging the mines by causing constant explosions. First of all they dealt with the property of the Lens Mining Company. They did not spare one of the twenty shafts. This explains why a district which used to produce more than 4,000,000 tons of coal annually could be flooded to the very top of the shafts.

Equally methodical was the destruction of the works above ground. Every building, machine, piston rod, crankshaft, shaft, with its bearings and brackets, was cut up and broken into pieces completely with dynamite. It would have been considered a very serious oversight to leave a boiler intact. All the steam boilers, winches, and other pit head apparatus, were completely destroyed with explosives. Of 12,000 laborers' houses in Lens and thousands of small houses in the neighboring villages and country, not a single one was left intact. In October, 1918, the irresistible general advance of the Allied Army swept through these regions. Thereupon every shaft of the Mining Companies of the North, from Escarpelle to the gates of Douai and the collieries of Anzin on the Belgian border, was destroyed. In regions where a cannon was never heard, thirty or forty kilometers from combatant troops, by the 12th of October there was not a steam engine, a winch, or a pump, or a ventilating fan left. Everything was completely ruined. A few figures will show the extent of this destruction. For years to come 220 mines will be useless. The water is from 60 to 80 meters deep in them. Double or three times this quantity will have to be pumped out before the first breaches in the mine walls will be uncovered. A production of 20,000,000 tons of coal, which was increasing annually by far more than a million tons, and by 1920 would have reached at least 26,000,000 tons, has been stopped completely and cannot be resumed before 1920, at the earliest. This destruction was never justified on the ground of military necessity.—"Living Age."

A RE-ALIGNMENT OF TRANSPORTATION ROUTES.

A re-alignment of transportation routes in North America is assuming definite shape, some of the causes being undeveloped, and as yet not clear, and other causes more apparent.

The more general use of the Panama Canal is following upon the great port improvements on the Pacific Coast, Seattle having taken the lead and reaped the initial benefits of its expenditures, with Vancouver not far behind. More and more does it seem likely that the trade of the Orient will flow towards the Pacific ports, and that Vancouver will increase in importance and volume of shipping interchange. The growing strength of Japan, and the commercial impetus and increase in population which is likely to follow her occupation and administration of Eastern Siberia, Manchuria, Sakhalin, Corea, and the long heralded renaissance of China, which seems likely to take place under Japanese tutelage forecast much coming enlargement of the commerce of the Northern Pacific. The political changes which these future developments may give rise to are momentous and may force some re-adjustment of the attitude of North America towards Japanese and Chinese ambitions, but they point indubitably towards greater importance of the Pacific ports and the railway lines that serve them. The presence in China of great deposits of anthracite, bituminous coal, iron and alloy metals, is one of the significant facts indicating world destinies.

The great bituminous coal reserve of Canada lies bordering the crest and to a great extent on the Albertan side of the Rockies. This deposit is so large and unique in Canada that it must at some future date become the dominating centre of Canadian industry, and the focus from which transportation lines will radiate. Inspection of the map will show that the western coalfield is relatively near to the Pacific Coast, and that in days to come Vancouver will become a great coal-exporting port, and the point from which manufactured articles, made with the assistance of western coal will go out.

The recent conferences on the St. Lawrence waterway indicate quite unmistakably that the future will see ocean-going vessels going to Duluth and Port Arthur, which will not displant but will supplement the existing east to west rail lines, and others that are yet to be built. Such a route will mitigate those sea-

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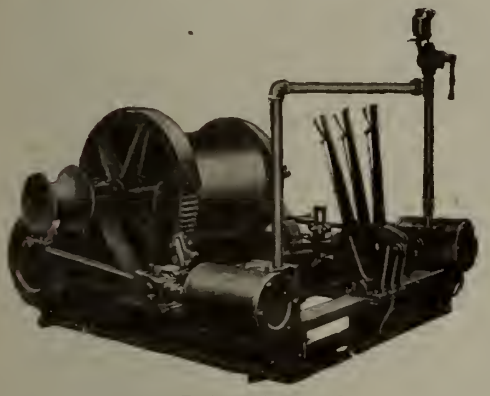

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sonal crises in transportation which the periodical accumulation of crops combined with climatic conditions must always cause in North America, and it will be time to talk about redundance of transportation facilities and competition of facilities when it shall be demonstrated that existing routes are adequate. Most people will be of the opinion that their complete inadequacy has been proven.

From the viewpoint of the coal and steel industries of Canada, the importance of the St. Lawrence waterway—should its possibility be favorably reported upon by the engineers who are studying it—is that it will enable Nova Scotian coal and Newfoundland ore to be brought to steel plants and metal-working establishments in Ontario and Quebec, and thereby lessen a dependency upon our neighbors that has become a national menace.

There is the further consideration that the northwestern states of the Union are about as dependent upon British Columbia and Alberta for bituminous coal as Ontario is upon United States sources of supply. Quebec cannot be said to be dependent upon the United States for bituminous coal, as there is an amply sufficient potential source of supply in Nova Scotia, and the St. Lawrence waterway has for many years carried millions of tons annually from Nova Scotia to Quebec centres of consumption. When the coal fields of Alberta and British Columbia become the main source of bituminous coal supply along the Pacific coast the international exchange of coal between Canada and the United States will not be so humiliatingly lop-sided as is the case now.

There seems therefore emerging from today's readjustments a possibility that at some point in the Canadian West, perhaps not far from the Saskatchewan-Albertan border, there will be discernible the "water-shed" of traffic, from which on one side the stream will flow to the Pacific ports, and on the other side to the Atlantic ports of the Dominion. The shipment of manufactured articles from the East to the three provinces of Saskatchewan, Alberta and British Columbia will lessen as the coalfields provide a domestic source of articles that now originate so largely in the East, and to the southwards, and instead of being exporters of wheat and beef, and importers of mostly everything else, the prairie provinces and British Columbia will become exporters of manufactured articles, in addition to agricultural products, and importers of very little.

The one drawback to industrial eminence in the prairie provinces is the apparent lack of an iron-ore deposit. It is a little too soon, however, to assume that such a deposit may not yet be discovered within transportable range of the western coalfields. In British Columbia this difficulty is not so marked, and, on Vancouver Island, the necessary conditions for iron

smelting and steel manufacture seem to be present.

The inadequacy of rail transportation in North America is generally admitted at this time, and whether it is a breakdown of executive or operating conditions, or simply a reflex of social adjustments, it is difficult to form an opinion, but it is probably a combination of them all. Leaving this aside, the condition of rail transportation is causing much speculation on modes of improvement, prominent among which are proposals of electrification of steam roads, and long-distance motor-truck transportation, which is becoming more and more feasible with improvements of highways and truck design. It appears very likely that much development in both these directions will take place in the immediate futnre. The marked increase in motor manufactures in Canada shows that our manufacturers are reading the signs of the times, and this field has many possibilities in Canada, and is of interest to the steel trade in particular.

—From "Iron and Steel of Canada."

CAPTAIN J. G. ROSS.

Chairman of the Montreal Branch of the C. I. M. & M.

(From the August Bulletin.)

Captain J. G. Ross was born in Embro, Ontario, and obtained his early education at the Embro public school and at Woodstock Collegiate Institute. Later he entered McGill University, and, after taking the mining course, graduated in 1903 with the degree of B.Sc.

CAPTAIN J. G. ROSS

During his student days, Captain Ross had acquired his first mining experiences in British Columbia and Cape Breton, but during the two years following graduation, he was employed as resident engineer on the northern division of the Grand Trunk Railway. He returned to mining work, however, during the Cobalt "boom", and from Cobalt he went to New York as superintendent of construction on the Hudson River tunnels. In 1907 he was superintendent of the Worthington mine for the Mond Nickel Company, and during 1907 and 1909 he was examining mining properties in many parts of the world, including New Caledonia, Australia, South and Central Africa, Asia Minor, etc. After returning to Canada he spent the next year on examination work in Porcupine and British Columbia and in 1911 accepted the appointment of consulting engineer with the Milton Hersey Company, Limited., Montreal.

When war broke out in 1914, Captain Ross was already on the active list of the Canadian Militia and proceeded overseas with the 1st Contingent as Lieutenant in the 13th Battalion (Royal Highlanders of Canada). As battalion machine-gun officer he went through the strenuous fighting of the Second Battle of Ypres in April 1915. Subsequently he was appointed adjutant of the 13th and promoted on the field to Captain. During the next month at Festubert, Captain Ross was badly wounded by shell fire while the battalion was attacking on May 21st. He suffered a compound fracture of the right leg which confined him to hospital in England for many months. After leaving hospital he returned to Canada and was discharged with the rank of Captain. He resumed his consulting work with the Milton Hersey Company in 1916 and at present holds the position of consulting mining engineer for the company.

Captain Ross joined the Institute in 1911 and much of his spare time is devoted to its affairs. He was elected to the Council in 1919 and is also chairman of the Montreal Branch as well as a member of various committees.

ORNAMENTAL MARBLES FROM ST. JOSEPH DE BEAUCE, QUEBEC.

The British Canadian Marble Co., Ltd., of St. Joseph de Beauce, Quebec, financed by British capital, and owing extensive deposits of beautifully artistic green and red marble near St. Joseph village have just completed a mill for the treatment of red slate for the ready roofing trade. This slate is found adjacent to the marble. The mill has a capacity of 100 tons per day and is the first of its kind to be erected in Canada. It was designed, and built by Chas. Spearman, M.E. of Montreal. The marble quarries have been in operation since last April and are shipping to various points in Canada where new buildings require this material for interior finish.

It is understood that St. Joseph marbles will be used in the annex to the King Edward Hotel in Toronto, now building.

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Mussens, Limited.

Alloy and Carbon Tool Steel:
H. A. Drury Co., Ltd.
International High Speed Steel Co., Rockaway, N.J.

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MacGovern & Co.

Spielman Agencies, Regd.
Aluminium:

Amalgamators:
Northern Canada Supply Co.
Mine and Smelter Supply Co.
Wabi Iron Works.

Antimony:
Canada Metal Co.
Antimonial Lead:
Pennsylvania Smelting Co.
Arrester, Locomotive Spark:
Hendrick Manufacturing Co.
Arsenic White Lead:
Coniagas Reduction Co.
Assayers' and Chemists' Supplies:
Dominion Engineering & Inspe tion Co
Lymans, Limited
Mine & Smelter Supply Co.
Pennsylvania Smelting Co.
Stanley, W. F. & Co., Ltd.
Ash Conveyors:
Canadian Link-Belt Company
Ashes Handling Machinery:
Canadian Mead-Morrison Co., Limited
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Assayers and Chemists:
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Campbell & Deyell
Ledoux & Co.
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Canadian Steel Foundries, Ltd.
Hull Iron & Steel Foundries, Ltd.
Fraser & Chalmers of Canada, Ltd.
The Electric Steel & Metals Co.
The Wabi Iron Works.
The Hardinge Conical Mill Co.

Ball Mills:
Hardinge Conical Mill Co.
Hull Iron & Steel Foundries, Ltd.
Mine and Smelter Supply Co.
Fraser & Chalmers of Canada, Ltd.
The Electric Steel & Metals Co.
The Wabi Iron Works.

Balances—Heusser:
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Mine and Smelter Supply Co.

Babbit Metals:
Canada Metal Co.
Canadian Fairbanks-Morse Co., Ltd.
Hoyt Metal Co.

Ball Mill Feeders:
Fraser & Chalmers of Canada, Ltd.
Hardinge Conical Mill Co.
Hull Iron & Steel Foundries, Ltd.

Ball Mill Linings:
Hardinge Conical Mill Co.
Hull Iron & Steel Foundries, Ltd.
Belting—Leather, Rubber and Cotton:
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Canadian Link-Belt Co., Ltd.
The Mine & Smelter Supply Co.
Northern Canada Supply Co.
Jones & Glasco.

Belting:
R. T. Gilman & Co
Gutta Percha & Rubber, Ltd.

Belting—Silent Chain:
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Hans Renold of Canada, Limited, Montreal, Que.
Jones & Glassco (Regd.)

Belting (Transmission):
Goodyear Tire & Rubber Co

Belting (Elevator):
Goodyear Tire & Rubber Co.

Belting (Conveyor):
Goodyear Tire & Rubber Co.
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Blasting Batteries and Supplies:
Canadian Ingersoll-Rand Co., Ltd
Mussens, Ltd.
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Bluestone:
The Consolidated Mining & Smelting Co

Blowers:
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MacGovern & Co., Inc.
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Canadian Ingersoll-Rand Co., Ltd.
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Standard Underground Cable Co. of Canada, Ltd.
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Diamond Drill Carbon Co.

Buggies, Mine Car (Steel)
Hendrick Manufacturing Co.

Brazilian Ballas:
Diamond Drill Carbon Co.

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R. T. Gilman & Co.
Hendrick Manufacturing Co.
Canadian Link-Belt Co., Ltd.
Marsh Engineering Works
Mussens, Ltd.
MacKinnon Steel Co., Ltd.
Northern Canada Supply Co.
Fraser & Chalmers of Canada, Ltd.
The Wabi Iron Works
Buckets, Elevator:
Canadian Link-Belt Co., Ltd.
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Cable—Aerial and Underground:
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Fraser & Chalmers of Canada, Ltd.
Mussens, Ltd.
The Wabi Iron Works
R. T. Gilman & Co.
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Canadian Ingersoll-Rand Co., Ltd., Montreal, Que.
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The Premier of Canada says the tariff policy of this country should be to keep Canadian workingmen in Canada, to make goods in Canada, and to give Canadian industries just enough advantage in the Canadian market to make it pay them better to stay here and expand, than to diminish their plants and leave. Mr. Meighen announces his Government intends to revise the tariff to secure these ends; that wherever a tax exists that is not necessary, it will be wiped out, that no interests, however powerful, will get more; and that no wreckers or theorists, however enthusiastic, will be permitted to imperil the well-being of the country by blindly fixing less. Whether Mr. Meighen's government can carry out this programme or not time alone will tell, but that Mr. Meighen has outlined the specification of national well-being few will deny. The phrase "wreckers or theorists" is a very happy one. Only too often the terms are synonymous, and while the theory is beautiful, the result is most dire.

The statement has been made by Senator Gideon Robertson, Minister of Labour, Ottawa, that there are at present vacancies for 600 men in the coal fields of the Province of Alberta, where miners are paid $10 and laborers $5 and $6 a day.

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:-: EDITORIAL :-:

THE NICKEL INDUSTRY.

At the sixth annual meeting of the Mond Nickel Company held in London towards the end of July, Mr. Robert Mond, the Chairman of the Company set forth the Company's position with regard to the excess profits tax imposed on British incorporations, and among other things said :

"I do not think that any of the shareholders realise "how difficult and complicated taxation has be- "come during the war for a business like ours, which " is carried on not only in this country, but also in " Canada. Our profits are subject to taxation in this " country, in the Dominion of Canada, and in the Pro- " vince of Ontario, and as a matter of fact, we have to " deal with the following taxes: Income tax, excess " profits, and now the corporation tax in the United " Kingdom, Dominion Income tax and business pro- " fits war tax in the Dominion of Canada; and mining " tax in the Province of Ontario. "

This is a formidable list of taxes, and would suggest that the Mond Nickel Company, at any rate, has undergone very considerable "investigation" if the tax-collectors have run true to form.

It is encouraging to know that the cumulative imposts that large mining companies with international interests have now to face does not discourage the enterprise of those who have the direction of business policies, and it is interesting to note Mr. Mond's announcement of the purchase of the firm of Henry Wiggin & Company of Birmingham, England, the oldest established firm of nickel and nickel-silver manufacturers in that country. This Company owns three works in Birmingham, well equipped with rolling mills, wire-drawing plant, refining plant, and other machinery. The Chairman stated that there was an increase of over half a million dollars in nickel stocks in the Company's possession, and that production had been curtailed owing to lack of outlet. The Company was doing everything possible to increase the industrial uses of nickel by making such goods as sheets, nickel coin, wire, and blanks, the purchase of the Birmingham firm being a part of this policy.

The continued demand for nickel will depend, as has been the experience of asbestos, upon the creation of a variety of uses, and one of the most encouraging signs of the times in regard to the nickel industry is the already long list of new applications of nickel, and metals of the nickel group, to everyday implements that is being daily added to by the enterprise of the nickel companies.

MANUFACTURING IN WESTERN CANADA.

Elsewhere in this issue is an excerpt from the monthly Bulletin of the C. P. R. which deals interestingly with the expansion of manufacturing in the West. A single statement is sufficiently remarkable to attract wide attention, namely that since 1900 the value of the produce of western manufacturies has increased from 34 million dollars to over 400 million dollars, or by twelve times. Astonishing as this rapid growth may seem, it may be very confidently predicted that it is but small compared to that which the near future holds for the West.

The value of the manufactured articles of Canada to that of the value of field crops was in 1919 about as three is to one. Up to the present time the ratio between agriculture and manufactures has in the West been disproportionately in favor of agriculture, and has not conformed to the general average of the country. This has in large measure accounted for the traditional attitude of the west towards protective tariffs in aid of domestic industries. We venture to predict that the time is coming when the ratio of manufactures to agricultural production will be more pronounced in favor of manufactures in the West than in the case of the general Canadian average, for the reason that the West possesses the essentials for manufacturing on a scale that the East does not—and in particular it possesses an abundant supply of that indispensable and destiny-disposing material which is the basis of all manufactures—coal.

The possibility of the presence of oil in the Canadian West is one that properly excites much interest, and some justifiable hopes, but we would point out that in its coalfields the West has a more permanent supply of motor-spirit than can ever be looked for from the unknown sources that produce petroleum.

BRITISH COAL MINERS THREATEN STRIKE AS POLITICAL WEAPON.

The threatend coal strike in Britain, the possibility of which has been before the country since before the appointment of the Sankey Commission, will shortly assume a menacing aspect. It seems certain that the miners have voted for a strike, and it seems if anything more certain that the Cabinet will resist the demands of the miners' leaders, so there is every likelihood that a long-deferred issue is about to be fought out.

The disguise of a demand for higher wages, and the other familiar accompaniments of a labor dispute, has

been attempted in this the latest stage of the campaign for "nationalization" of key industries, but this disguise has recently been virtually discarded, and the real objective of the miners' leaders is admitted—both by those who favor and those who do not favor it—to be political rather than primarily connected with a desire for higher wages and shorter hours of labor.

"Nationalization" is one of those mysterious words that mislead the public while concealing the aims of those who invented the term. It is an example of the nickname in politics, used to gain approval instead of opprobium. It is much to be doubted whether any but a small and selected group of the mine workers understand what nationalization of coal mines means in the interpretation of the miners' leaders. Their objective is to destroy private ownership, of every nature, substituting the apparent ownership of the State, but always with the proviso that the worker shall comprise the State.

As controlling the workers in the most essential industry of a modern state, the industry without which continued existence of such a state is unthinkable and quite impossible, the coal miners accepted, at their international convention at Geneva, the leadership of that school of thought which advocates the destruction of private ownership, and the employment of "direct action" to bring about its most speedy consummation.

The strength of the miners, and their selection to lead the frontal attack upon society as it now exists, arises from the absolutely essential and entirely irreplaceable nature of the commodity which they produce, a circumstance that gives to united action of coal miners a greater importance than their numbers would entitle them to under the most representative form of government that could be designed.

It is not, therefore, the legitimate political representation to which coal miners as members of the state are entitled, that they purpose to use, but their control of a necessity of human existence. This is the feature of the miners' policy that will bring their whole strategy into disrepute, and will marshall public opinion so strongly against it, that, if a strike occurs, the probability is it will meet with the failure it deserves.

The policy of the miners is to translate into actuality the principle embodied in the preamble to the constitution of the United Mine Workers of America, namely: "All wealth belongs to the producer." Their demand at this time is that all the apparent profit made in the coal mining industry in Britain shall be absorbed in the payment of increased wages to the miner and by a reduction of the selling price to the domestic consumer. That is to say, it is proposed the industry shall break even, and that coal mining shall show no aparent profit to any person, or to any constituted body—the State not excepted. The accuracy of the bookkeeping of the miners' advisers is not admitted, nor have these advisers suggested what should be done in the not unlikely event of the industry showing a net loss on operations. Presumably the State would be asked to absorb this.

To discuss the rectitude or otherwise of this doctrine would require a re-statement of the science of political economy, and will not be attempted here. Suffice it to say that the granting of the miners' demands would mean admission of the principle that the State can decree abolition of private property rights with discriminatory application to a selected section of its citizens. A further admission would be necessary, namely, that the political power of any group in the State must be measured, not by voting power, but by the industrial importance of the product of a selected group of workers.

It would probably also be admitted by the leaders of the miners that there is no industry in Britain to which the same arguments for "nationalization" cannot be applied.

The miners are presumably counting upon the assistance of the transport workers and other trades union bodies in Britain, but the financial loss and physical suffering which a prolonged strike will occasion to all classes of workers, makes it unlikely that such support will be forthcoming.

It is apparent to all that the paper profits of the industry cannot be absorbed by increased wages to the miners without depleting the revenues of the State—thereby requiring additional revenue. If on the other hand State revenues are to stand undiminished, a further increase in the cost of coal will be required—thereby increasing once more the cost of living to the general public. The idea that any industry can be continued with a profit accruing to some person, or some association of persons, is one that is unlikely to find general acceptance in Britain.

If it becomes generally realised—as seems fairly likely—that the miners are acting as the vanguard of Communism, under orders from a central organization, and assisted by undertakings for an international coal strike, the British Government is certain to be supported in resisting the use of the strike weapon to enforce a political theory that has not received the approval of the nation through the ordinary channels of the ballot.

The British public is unlikely to concede to the miners as a class the preferential treatment they demand, not—and they are quite frank about this—as an inherent right, but because they believe they possess the power to enforce this essentially selfish demand.

BRITISH MINERS ASK PREFERENTIAL TREATMENT.

The demand of the British coal miners is for an increase of two shillings a day in wages, with lesser graded increases to junior workmen, to be accompanied by a decrease of approximately $3.50 per ton in the selling price of domestic coal. That is to say the

miners ask for the establishment of a condition that will simultaneously increase wages and decrease revenue.

The cost of producing a ton of coal in Britain was (using an approximate Canadian equivalent) $1.52 per ton in 1913, and in May 1920 had reached $5.45 per ton, an increase of 218 per cent.

The rate of production is now twenty per cent below that of 1913, notwithstanding that some 73,000 additional persons are now employed in the industry when compared with 1913.

The wages of mineworkers have increased since 1913 by 155 per cent, the increase in the cost of living being estimated by the British "Labor Gazette" at 152 per cent. The wages now earned by the miner remunerate him for seven-eighths of the daily period of labor, and for four-fifths of the daily product of his labor before the war.

The exports of coal from Britain for the period of six months ending June 1913 totalled 37,048,000 tons. Those for the corresponding period of 1920 totalled 16,493,000 tons, a falling-off of 57 per cent. In the meantime coal from other countries is displacing former British markets, such as Norway, Sweden, South America, Spain and the Levant. Britain must continue to import heavy tonnages of iron ore from Spain and grain from the Argentine, and the lack of coal to make an outward cargo is responsible in large measure for the high delivered prices of these essential commodities.

During the war coal proved more potent than gold to maintain the parity of British exchange abroad. The tardiness of the recovery of sterling exchange, and its failure to fulfill confident expectations of renewed strength is largely due to the non-availibility of British coal for export to countries which have an adverse balance against Britain.

A most potent weapon to reduce living costs and deflate currencies would be the increased production of coal. The policy pursued by the leaders of the British miners is a major factor in keeping up the cost of living, and an increase on present rates of wages would have the effect of reducing production and increasing living costs.

In the earlier part of the campaign for nationalization, the leaders of the miners expressed themselves as strongly opposed to working for private profit, which was a fairly understandable viewpoint. Now they express themselves as opposed to working for the profit of the Government, notwithstanding that any surplus of profit is applied to the relief of general taxation. It is not so very long since the miners in South Wales threatened a strike if they were asked to pay income tax as other citizens are.

The miners at this time possesses the following advantages over his position in 1913, namely: shorter hours of labor, a greater margin between his income and his necessary expenditure than ever previously, a larger say in the management of the industry and undiminished extent of the privileges as to free or cheaper coal and house rentals.

As a result of all these concessions to the miner, the country at large pays more for coal and gets less than ever before; the cost of commodities is increased directly as a result of increased wages, and indirectly as a result of decreased exports of coal.

Now the miner asks for a further intensification of these contrasted advantages to himself and the disadvantages to his neighbour.

Meanwhile, production in the United States is increasing. In 1913 the British exports of coal were five times those of the United States. Now the export of coal from the United States far exceeds that of Britain.

The miners are prominent in that group of laborites that desires to direct the foreign policy of Britain, and are offering gratuitous advice, commingled with dire threats, to a Cabinet that does not contain the meanest intellects in Europe. They are amusing themselves passing resolutions regarding state policies, and announcing new and untried theories of political economy and representative government, while rapidly and surely the foundation of Britain's political and military strength is being taken away. No one knows better than the coal miner the national importance of coal, or realises what a powerful weapon he controls as the producer of coal, but, unfortunately for Britain, and in flat defiance of his ostensible desire to save the pockets of the domestic consumer, the miner prefers to put first of all his own sectional desires, and asks for preferential treatment.

It would be desperately unfair to impute such unworthy motives to the individuals amongst the miners, because they number some of the best citizens of Britain. The war record of the miners' regiments is an inspiration, and a source of enduring praise, and is probably the best index to the real worth and ideals of the miner. Unfortunately for Britain, the men who carried the miners' banner in less opulent and more conservative times, and laboriously laid the foundations of the existing power of the miners' unions, have been superseded by men who are using that power with less wisdom and less rectitude than their predecessors.

THE ONTARIO MINING ASSOCIATION.

The Ontario Mining Association held its first Annual Meeting at Sudbury from the 17th to 19th of August. This association of operators is a necessary and logical outcome of the scattered and diversified nature of mining operations in Ontario, a province of Canada that lacks only coal to give it the most all-round importance in mineral production in Canada.

The temporary dominance of agrarian interests in Ontario was probably the deciding factor in bringing

about the formation of the Association, but, in any case, it is a necessary body, and properly directed, it cannot fail to be beneficial to the mining industry, and a potent force in preventing misapprehensions among the general public, for doubtless it will be the policy of the Association to undertake the dissemination of accurate information. There is nothing that the mining industry in Ontario requires so much as accurate and first hand information regarding the industry, which is, and has for many years, been the plaything of ill-informed and interested propagandists.

The first meeting was of a "get-together" character, and entertainment and business were combined through the hospitality of the International Nickel Corporation, whose guests the members of the Association were for the first two days. Visits were made to the Creighton Mine, to High Falls, the Eddy Dam and Copper Cliff. On the concluding day of the meeting the visitors were shown over the British-America Nickel Corporation's mines and smelter at Nickelton.

Among the most important business discussed during the meeting was the unsatisfactory position of Canada as a producer of iron ore, in which respect this country has gone from bad to worse during the past decade.

A Commission was appointed, composed of Colonel R. W. Leonard, Mr. A. J. Young and Mr. G. S. Cowie, to assist the Ontario and Federal Governments in any enquiry they may set on foot into the improvement of Canada's position as a producer of iron ore.

The case for the iron ore industry in Ontario has been given much attention in the columns of the "Journal" during the past year, particularly the question of beneficiation, to which attention has been drawn from time to time by our Port Arthur correspondent, Mr. J. J. O'Connor. Of equal significance to the stand taken by the Association in regard to iron ore, is the belief expressed by the members that Alberta coal could be used as a fuel in metallurgical processes.

The Ontario Mining Association is to be congratulated on dealing at its first session with the weakest link in the industrial position of Canada, namely this country's dependence on outside sources for coal and iron.

PEACE RIVER PETROLEUMS, LIMITED.

In an advertisement of the stock offering of Peace River Petroleums, Limited, which appears in a Sudbury newspaper, there is quoted an article from the Toronto "Star" of August 7th, written by Dr. Sven Lawrence of Copenhagen, described as formerly a geologist and operator in the oilfields of Baku, on the Caspian Sea. This article contains some statements regarding oil occurrences in Canada that are new to this journal, and seem to have escaped the attention of Dominion geologists engaged on elucidation of the economic geology of oil in Canada. With regard to Alberta it is stated : " The tales of its trappers and prospectors sound like fairy tales." (Perhaps they are). "Oil is oozing out of the ground, natural gas wells supply the fuel for their tea kettles, (a weak beverage for such a country) and burning mountains that have been ablaze for perhaps centuries, roll their pall of smoke down the valley of one of the tributaries to the Peace River."

This imaginative writer proceeds to state that in Canada "we have twenty times the oil-bearing area of " Mexico; that is, the third largest oil producer in the " world, and a larger area than the United States, and " still thousands of unknown square miles to explore."

All of this is the purest presumption. Western Canada has not yet been proved to be an oil-bearing country comparable with either Mexican or United States oil regions. All that can as yet be stated with accuracy regarding the oil prospects of western and north-western Canada is that there is a fair presumption that oil is present, and that scientifically directed search with the drill may be rewarded by the discovery of oil in commercially payable quantities. Such search is now being made. The presence of oil has been revealed in the Peace River country and north of the Great Slave Lake, but nothing in the nature of a gusher has yet been encountered.

Mr. H. E. Cunningham Craig, whose opinion is quoted as being a fairly independent one, says : "Con- " sidering the whole subject it may be said that the " verdict at present must be "not proven". There is " no doubt whatever about there being a vast volume " of oil in the country; the only question is—can it be " found sufficiently concentrated under favorable " conditions for development ? " * This opinion corroborates the best informed opinion of Canadian geologists, and in particular the conclusions of Dr. Dowling as set forth in our issue of April 9th last.

Peace River Petroleum, Limited, advertises that it has a paying flow of oil in one well, and it offers shares at fifty cents each in what its advertisement states to be "the best Canadian proposition ever offered the Investing Public". This may be all true, and again it may be quite untrue. The project is the purest gamble. Be this as it may, the promoters do not add to the attractiveness of the offer made by quoting such imaginative and misleading accounts of the oil possibilities of the Canadian West as that of the Copenhagen geologist referred to. The quotation of this article, with apparent approval, is in itself an indication of ignorance of essentials in the advertisers that does not recommend them as guides to safe investment in oil mining.

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* See page 668, issue August 13th.

CORRESPONDENCE

14 Place Royale,
Montreal, Canada.
August, 14th, 1920.

The Editor,
Canadian Mining Journal.
Dear Sir,—

In your issue of the 13th. inst. I note with interest Mr. E. H. Cunningham Craig's "The Search for Petroleum" in Western Canada, being a copy from the "Petroleum Times."

Man is apparently quite as capable of a change of mind as the fairer sex. If Mr. Craig had inculcated into his reports and papers during 1913 and 1914 such information and conservatism he would not have gained the reputation of trying to out-do the writers of the dime novels, and much money would have been saved and a great deal more honest development work would have been performed.

The exploiting of the Southern Alberta Oil Fields during the years mentioned by boomers backed up by engineers of reputation should be a lesson to Canadian engineers in the future. Engineer's reports should be above all honest and not in any way influenced by possibility of material gain.

We should welcome sincerely such changes of opinion and the courage to in black and white record the change.

Yours faithfully,
G. M. Ponton.

The Editor of the "Canadian Mining Journal."
Sir,

This characteristic titbit has been given extended space on both sides of the Atlantic :

London, Aug., 20.—(By Canadian Associated Press.) —The Daily Mail's financial editor, discussing the possibility of the introduction of more Canadian mining shares on the London market soon, remarks that it can hardly be claimed that such investment up to the present, have proved so satisfactory that there is likely to be any great rush for new schemes. The writer says that the Canadians seem to have kept for themselves the best of the mines or let Americans finance them."

The verities were not outraged when that was put into the types.

Had the writer reasoned introspectively, he could have been more interesting—and instructive—and might have explained why "the London market" ought not to be indiscriminate—and how it is that Canadians either have "kept for themselves the best of the mines, or let Americans finance them."

The paragraph is opportune in that "more Canadian mining shares" are about to be introduced "on the London market." Presumably some of those are suspect. Perhaps they are unfit for London consumption. If so, then London should not attempt their "introduction", since it is perfectly true that "Canadians" do not have to go so far afield with "the best" of their mines. Really there is force in the intimation that "Canadians", or "Americans" are sufficiently absorbtive for immediate requirements; because "London" is preoccupied.

In rare instances "the London market" has been sought with deserving mining propositions. As rarely has "the London market" participated in what promised profits. As a rule, the preference is for the sovereign rather than the "almighty" dollar—and yet the experience has been that London was wedded to its ritual—it has "left undone those things" it "ought to have done"—and "done those things" it "ought not to have done."

Homilies, however, will not rectify errors of commission or omission—on either side of the Atlantic. "London" waited too long, was unresponsive—or entertained propositions in which "jobbers" had precedence. At Porcupine, "London" did not rise to the occasion. At Kirkland Lake, the cooperation of "London" was involved in discredit and litigation. Excepting the Townsite property "London" never got nearer than the fag ends of the real Cobalt situation. "London" could have had a larger share of the Nickel Country and defaulted. The "Flin Flon" was preferred to "London" and New York got it to be joined later by the British-Canadian Mining Corporation. The Consolidated Mining and Smelting corporation commands the British Columbia position—but "London" would rather take on something more speculative.

"Canadians" welcome the "Daily Mail's" remarks —if they will serve as the introductory to a more intelligent, active interest in our "best" mines—or prospects. "London" mining financiers thoroughly comprehend the economics of Mining. Whey they are more in touch with the actualities of Canada—when their representatives "on the spot"—and not catch-penny promoters—are authorized to deal—instead of having to await the termination of the grouse season, "London" will get more that is worth having. "Canadians" greatly prefer "London" co-operation in the "best" mining speculative ventures.

ALEXANDER GRAY.

Montreal, 23 August 1920.

PERSONALS.

Mr. J. W. D. Moodie, general manager of Britania Mines, Howe Sound, B.C., has resigned. He is succeeded by Mr. B. B. Nieding.

Mr. John Stirling has gone to Scotland. Mr. Stirling, who is Chief Inspector of Mines of Alberta was seriously ill this summer and he will take a much needed rest before returning.

Messrs. Ross and Cassie, Limited, with offices in Sudbury, Cobalt and Timmins, have been appointed Northern Ontario representatives for the Federal Engineering Co., Ltd., handling their conveyor and transmission belting

Mr. Charles Camsell, Deputy Minister of Mines has arrived in Ottawa, bringing his family with him from Vancouver.

Mr. John McLeish of the Mines Branch, Ottawa, has been called to Toronto by the illness of his father.

Mr. J. T. Kerr, of Detroit, is in Toronto making arrangements for doing some work on the property of the Golden Summit Mining Co., at Sesekinika.

T. J. BROWN LEAVES NOVA SCOTIA STEEL AND COAL CO.

Mr. T. J. Brown, for many years Superintendent of the Sydney Mines operations of the Nova Scotia Steel and Coal Company, has resigned that position and becomes General Manager of the Inverness Collieries, Limited, a Company recently organized to work the properties formerly belonging to the Inverness Coal and Railway Co. at Inverness, Cape Breton.

British and Colonial Petroleum Resources

A Review of the Present Oil Situation

By HENRY B. MILNER, M.A., F.G.S.
Oil Technology Dept., Royal School of Mines.
(From "Discovery" for August)

Nowadays, when public attention is so easily attracted by any matter in the slightest degree sensational, or by one which promises to provide something out of the ordinary for popular diversion, it is not difficult to appreciate the cause of a certain liveliness in that particular section of the daily Press which exists solely for the purpose of supplying its readers with articles calculated to inspire the requisite feelings of satisfaction or apprehension. No matter what the subject under discussion, exaggeration and imagination are called into play in the production of the most misleading paragraphs, and the resulting distortion of fact is only equalled in magnitude by the shameless extent to which scientific or economic principles are ignored.

Quite apart from the complexity of international politics (which surely provide food enough for the most insatiate literary appetite), since the Armistice we have had a succession of Press " scares, " some with a foundation of fact, but most without any. The varied aspects of the present shortage of many of the necessary commodities of everyday life can be attributed, reasonably enough, to one of the more disagreeable legacies of the War; but the startling predictions of a world-famine in such vital essentials as wheat, coal, water, and oil—to cite only a few examples—require a somewhat closer scrutiny of their "bona fides" than the prophets of these disasters would be willing to admit. Articles of this kind, so long as they are confined to the requirements of advertisement or enhanced sales, are harmless enough, for the reader who allows himself to be influenced by their purpose assuredly deserves all he gets. It is only when they are written with the calculated intent of disturbing international relations that they assume a dangerous character; and in such circumstances, no amount of comment and censure should be spared which may proclaim or deny the validity of a particular case.

In the present oil situation we have a cogent example of Press propaganda of the very worst type, whose ulterior object is not so much the creation of an alleged oil famine scare, as the possibility of disturbing our political and economic relations with other countries: in particular the United States. It will have been apparent to those who follow carefully the happenings in the oil world, that the present agitation for a definite Imperial oil policy, to conserve our resources and relieve the tension of possible famine, is but a cloak to hide an attack on American tactics, rather than an honest attempt to review a situation which may or may not have arisen. Briefly, the arguments may be summarised as follows. On the one hand, we are told that the United States, knowing that we are very largely dependent on her for the bulk of our oil-supply, is adopting somewhat the attitude of a "profiteer" in making us pay extremely high prices for a commodity which she could easily afford to sell for less . Against this, we in turn are accused of adopting a "dog-in-the-manger" policy in other fields in which we are interested, especially in Persia and Mesopotamia, our aim being, it is alleged, the elimination of American capital and interest in future developments in those countries. And so as to bring the whole matter to the point of ebullition, the " experts " responsible for these indictments have dexterously juggled with statistics in order to demonstrate a universal decrease in oil output, an ever-increasing demand, and, in consequence, an ultimate famine in what has now become a vital asset to modern civilised life.

It is with the object of inquiring into the true state of affairs that these paragraphs have been written: and, without endeavouring to solve any of the recondite problems of British and foreign politics, it is proposed to present the reader with a survey of the position of our Imperial Oil Resources as it appeals to the petroleum technologist. This entails, among other things, an inquiry into the nature and extent of those resources and the possibilities of future development. If this be achieved, it can safely be left to individual intelligence to decide how far a political and economical impasse may or may not have been reached, and what precisely are the probabilities of an oil famine in the near or distant future.

In order to appreciate the first disturbing element in the matter, it is necessary to gain some idea of the present position of the oil resources of the United States. Writing in 1916 on the subject, Arnold, in the "Annual Report of the Smithsonian Institution," adduced important statistical evidence showing that the total consumption of oil in the United States per year amounted approximately to 265,000,000 barrels. After surveying the possibilities of further development in the principal oilfields, he estimated the probable future supply at about 5,763,100,000 barrels, from which it is evident that in about twenty-two years from that date the United States production of oil would be exhausted . This is a somewhat pessimistic view to take of the situation, and it would seem that he has allowed the barest minimum of supply for unprospected areas in Texas, Wyoming, and other fields. If the bulk of the land to be prospected, not only in the Mid-continent but in the Gulf, Rocky Mountain, and other large fields, is only half as productive as that already proven in those fields, then his estimate of future supply falls short of the probable one by several thousand million barrels. This makes no allowance whatever for possible developments in such States as Alabama and Mississippi, which are regarded favourably in some quarters as potential oil-producers. But even admitting Arnold's figures, he himself states that the estimated supply would probably "spread over a period of from fifty to seventy-five years", mainly on account of the restricted use of petroleum as a fuel, and the gradual rise in price of a commodity of which the supply fails to satisfy the demand. Further, that before the supply of natural petroleum was exhausted, the Colorado, Utah, and Californian oil shales would be fully utilised, and artificial substitutes would largely take the place of petro-

leum as a fuel. From which it is seen that, while there is no need for immediate alarm in connection with the United States oil resources, there is every need of some national scheme of conservation whereby the internal resources of the country may be utilised to the greatest possible efficiency.

The appreciation of these eventualities has led to a good deal of agitation for the introduction of a scheme of this nature, and the Press has, with its customary zeal, seized upon the opportunity to spread the news of famine in furtherance of its own particular propaganda. This, together with the unsettled state of international commerce, has been sufficient to create the feeling of tension in the oil world to which we have alluded.

Whatever the issue, it is obvious that to any policy which America may feel it necessary to adopt ultimately, having for its aim the preservation of her natural oil resources, no sane person can take exception. We have to realise that, like ourselves, America has received an enormous impetus to her motor and aeroplane industry as a direct consequence of the War, and the demand for oil fuel was never so great as at present. To meet this demand she has, perforce, to call on her own resources to a greater extent than before; and consequently, if the limit of wise output be reached, her export trade is the first to suffer, with corresponding effect on those countries mostly dependent on her for their oil-supplies. This possibility constitutes the true danger of the position, and in foreseeing it, it is only reasonable that England should be prepared to meet such a contingency with a policy calculated to relieve any strain to which the British oil industry might suddenly be subjected.

It is common knowledge that we are largely dependent on United States oil for our requirements; and in view of the fact that that country is responsible for nearly 70 per cent. of the world's supply of crude oil, and that we at present only control about 4 per cent., the possibility of the cutting down of American supplies is one to be guarded against. Fortunately, on this occasion at least, we are not content to await eventualities; and although a definite Imperial oil policy has so far not been made manifest, a movement in one direction has resulted; namely, the immediate development of our colonial oil resources. To these must be added our interests in Persia and our ultimate policy in Mesopotamia, concerning which our own Government has been consistently vague. In a contemplation of these possibilities, then, our petroleum experts have been and are being employed, and already some highly interesting data have been forthcoming. For our present purpose, it will help in the understanding of the position if we review the progress made in the past and the developments possible in the future, in the various productive areas within the Imperial Dominions. And for reasons quite apart from natural precedent, it is convenient to deal with the British Isles first.

In selecting our own country as an "oil-producing area", we at once take rather an anomalous step, since although, as mother-country, England must form the ultimate political and economic keystone binding our colonies into one united whole, as a crude oil-producing centre she is sadly insignificant, a statement which will doubtless meet with severe criticism from many quarters. It must be evident, however, even to the non-technical public, that the results of the recent boring operations in Derbyshire and elsewhere have not so far justified the flowery statements of confidence which characterised the scheme in the first stages of its initiation last year. "Hardstoft" is scarcely the great success which it was destined to be, a few tons of crude oil per day (according to the latest reports) being the usual rather meagre yield. Doubtless, with more powerful plant and greater pumping this yield could be raised somewhat, but even then the result could not possibly justify the outlay of capital necessary.

Little good could be served by reiterating the text of the several warnings uttered by expert geologists, both before and after the Derbyshire enterprise was commenced last year. It a very able article dealing with the geological reasons which render it unlikely that England will ever furnish a commercial supply of oil, Mr. V. C. Illing discussed this aspect of the question in the "Geological Magazine" of July 1919, to which the reader is accordingly referred. Writing just a year later, we have to admit that his admonitory predictions have not only been fully justified, but that the search for subterranean oil-pools not only in the Midlands, but in the whole of the British Isles, is a policy only dictated by those for whom scientific principles have little or no meaning.

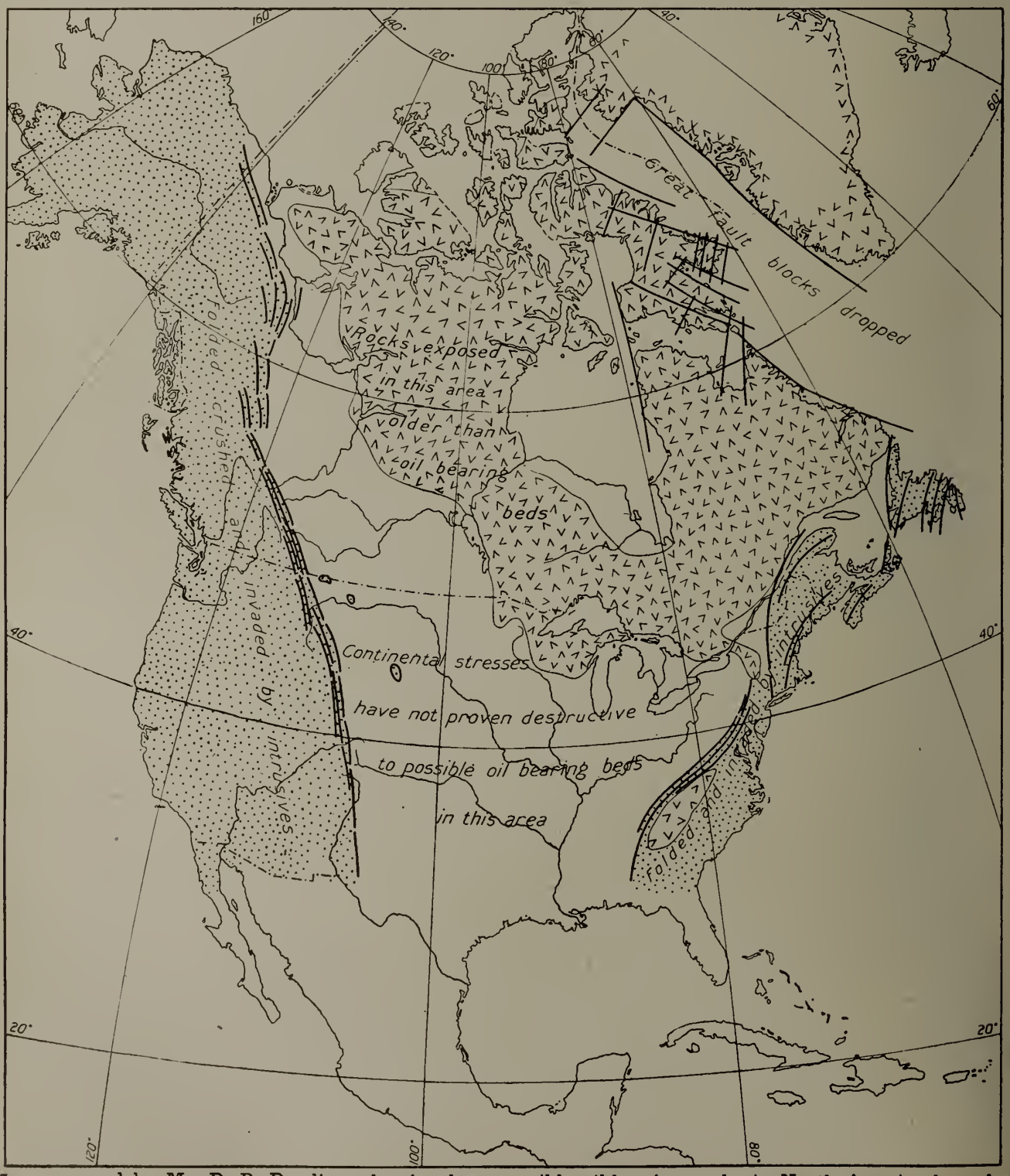
"Hardstoft" and kindred propositions were defended by their supporters principally on the grounds that the requisite geological structures for the preservation of oil-pools were present in the areas, and the dangerous word "anticline" was flung hither and thither as an offset to the adverse criticism which the scheme met with from high scientific quarters. To the general public, and unfortunately to many so-called oil experts, the terms "oil" and "anticline" are almost synonymous, certainly inseparable. It does not follow, because subterranean anticlines can be proved in Carboniferous strata, that there, necessarily, oil will be located. It takes a man with an "eye for country" as the saying goes, to understand three-dimensional stratigraphy; and, unfortunately, such men are the exception rather than the rule in the technical world. However, it is easy to be wise after the event, and one can only hope that this unnecessary waste of money, in conducting what is at most only an interesting experiment, will be speedily terminated; and, further, that it will be a lesson to those who anticipate similar schemes for other parts of the British Isles in the future.

We cannot leave the survey of English oil prospects without reference to the oil-shale industry, which is certainly rather a different proposition from that referred to above. It is a well-known fact that at certain horizons in the stratigraphical series, carbonaceous rocks occur from which, by artificial distillation, a form of petroleum may be obtained; but at present only one large field in this country has been worked for any length of time with success, and that is situated in the Midlothian Carboniferous field of Central Scotland. These shales have yielded over forty gallons of oil per ton in the past—though this is by no means a phenomenal amount for good oil shale—whilst the by-production of ammonium sulphate to the amount of 50 lb. and over per ton has been a contributing factor of no small importance to the success of these operations.

There seems to be no reason why the production of shale oil from this centre should not be a standard industry for many years to come, as the deposits are by no means exhausted. On the contrary, further ex-

tensions of the field should be possible within the confines of the main tectonic trough in which the Calciferous Sandstone series lie in this region. While, on account of certain complexities of structure, there may be an element of risk in putting down trial boreholes for the location of deeper seams, it would not be anything like so hazardous an undertaking as that to which the country gave almost tacit assent last year in Derbyshire.

Another field has come under the public eye of late, and one which promises to afford interesting results; namely, the Norfolk oil-shale field. Very little information has been forthcoming in connection with the development here, though the reader is referred to Dr. Forbes Leslie's paper, read before the Institute of Petroleum Technologists in January 1917, for general details. Geologically, this subterranean occurrence in Norfolk is of great interest, though in the present writer's opinion the structures are difficult of elucidation without adequate borehole data, and Dr. Forbes Leslie's explanations thereof do not always seem to him conclusive. Apart from that, it is certainly a possible field, and as such, a potential asset to our home oil industry.



Map prepared by Mr. D. B. Dowling, showing how possible oil-bearing rocks in North America have been affected by continental stresses.

Other occurrences of oil shale, such as those of Kimeridge in Dorset, the so-called "Kimeridge Coal", have been worked in the past with intermittent success. The Kimeridge shale yielded at times as much as 70 gallons of crude oil per ton, with a rather small amount of by-products. The extent of the shales, however, is extremely limited, and any mining of them would necessitate working thin and probably discontinuous seams over a wide area, a process which is seldom a profitable one.

For the rest, small oil-pools probably will be met with from time to time in various parts of the country during boring operations, particularly in Carboniferous formations; but the public would be well advised to receive such reports with the scepticism, they deserve, and to realise once and for all that oil, in sufficient quantity to make it a commercial proposition, is certainly not one of the many blessings which Nature has seen fit to bestow upon us.

Crossing the Channel into the main continent of Eurasia, the oilfields can be divided into two main groups for present purposes: those in which we have financial interest, and those in which we have or may have both financial and administrative interests. With the former group we are not here concerned; it includes the important fields in Russia, Roumania, and Galicia, and so long as political and economic conditions allow, constitutes an open market from which we, in common with other countries, may draw large quantities of oil for home consumption. The other group includes our own colonies in Asia and the East Indies, and our interests in Persia and Mesopotamia.

In the countries of Burma and Assam occur probably the most valuable oil resources that we possess, the Upper Burma fields being already famous for their oil-production, while the Assam fields only await development on a large scale. The comparatively recent prominence of the Burma fields is largely due to the progress made in overcoming difficulties of transport, which formerly necessitated conveyance of the crude oil for over 300 miles via the Irrawaddy River to Rangoon. With the installation of pipelines, the production has anturally increased and further developments may confidently be expected, particularly in the Minbu and Yenangyat districts. The Assam fields have yet to be fully prospected, but no doubt exists as to the great possibilities of the Tertiary deposits of the Brahmaputra and Surma basins. The petroliferous beds are here often associated with coal seams, and are located along a belt of country stretching from Chittagong approximately N.N.E. for a distance of over 800 miles. At present the Digboi field, near Debrugarh, on the Brahmaputra, is the best-known region actually working; but the results of geological survey at various points along this belt have shown most favourable indications for the location of new sites, though in some places the structures are exceedingly complex, owing to the disturbed character of the strata.

Of the Malay Archipelago, British North Borneo, Brunei, Labuan Island, Sarawak, and British New Guinea (Papua), all show indications of oil to a greater or lesser extent, though little is at present known of the commercial possibilities of the fields. North Borneo and Sarawak are perhaps the most important countries, and drilling is proceeding with a view to locating further supplies. In Papua, petroleum has been found along the same line of earth movement on which are situted the oil-bearing horizons of Java and Sumatra, and Dr. Wade has shown that the oil indications are extremely good, though conditions of climate and native labour have hitherto prevented prospecting on a large scale. Reported occurrences of oil in many parts of the Malay Peninsula have engaged the attention of geologists from time to time; but in the writer's opinion, the knowledge that we have of the geology of this region points to unfavourable conditions for the location of oil in quantity, although certain horizons in the restricted Tertiary formations may give a small yield from time to time.

The economic and political problems with which the future of the Persian and Mesopotamian oilfields is bound up still remain to be solved, and until conditions settle down from the present deplorable state of flux resulting from the War, it is a little premature to venture upon any suggestions as to developments of the petroleum resources of this part of Western Asia. Whatever our future policy with regard to these countries may or may not achieve, once the fields are better known and more widely prospected, the resulting influence on the world's supply of oil fuel will be far-reaching. Our knowledge of the Mesopatamian possibilities is largely based on reports and opinions gained during the War, and, geologically, on analogy of structure and conditions to those obtaining in the better-known Persian field to the east. Here the petroleum deposits lie along a belt of country extending from the Persian Gulf to some miles north of Baghdad, in a direction running parallel to the Turko-Persian frontier. The best-known field is that of Maidan-i-Naphthun on the River Karun. Other districts include Dalika, Zohab, and Loristan, all of which show great promise.

Passing now to the continent of Africa, our most important field is that of Egypt, where on the coast of the Gulf of Suez, at Jebel-Zeit and at Gemsah, a few miles to the south, operations are in active progress. The oil is chiefly found in the Miocene deposits, which are still undergoing energetic examination with a view to locating further pools. Latterly, the lower limestone horizons of the Miocene series have been the subject of detailed investigation, but so far no definite results have been forthcoming. Prospecting is also in progress to the east, in the Sinai Peninsula, where geological conditions are somewhat similar to those of the main Egyptian fields, while one or two islands in the Red Sea have been surveyed, but with negative results from a commercial standpoint. Other regions in Africa have from time to time been searched for oil, notably the Ivory Coast, Gold Coast, Nigeria, and Somaliland, but in all cases the results were extremely poor and unimportant. In Central Cape Colony there have been several petroleum indications in the past, connected with the carbonaceous Karroo shales, and owing their origin to the destructive distillation of those rocks as a consequence of igneous intrusion. In Northern Cape Colony similar occurrences are found in the Dwyka series, while carbonaceous shales, with occasional show of oil, are known from the Orange River Colony and in several other regions of South Africa. A great deal of prospecting has been done in these areas, but, as far as present knowledge goes, the geological conditions are entirely unfavourable to the preservation of oil, and it is unlikely that any important supplies will ever be obtained from this part of the world. There are still large areas in Africa unknown to us geographically, geologically, and economically; and though in mineral

resources she is probably one of the richest countries in the world, the prospects of locating large oilfields are, from geotectonic considerations, essentially remote. Africa, like India, is a fragment of a "lost continent", in which we find no indications whatever of those great post-Carboniferous orogenic movements which have so fundamentally affected the continental mass of Eurasia; in it we are unable to trace the results of such tangential earth stresses as were responsible for the production of structures similar to those obtaining in the important Eurasian fields.

It is otherwise with the American continent, however, where in Canada, and particularly in the West Indies, our resources are considerable. Of the Eastern Canadian fields, in New Brunswick, Quebec, and Ontario, the latter is the most important oil-producing centre. Here the fields are located on what is known as the Cincinnati anticline, a fold extending northwards from Tennessee through Western Ohio to the Province of Ontario, and on which in the States some of the richest oilfields of Ohio and Indiana are situated. The most important fields in the Province are those of Petrolia and Oil Springs in Lambton County, where oil occurs in the Onondaga Limestone series of Devonian age. It is accompanied by large quantities of natural gas, of which the most productive is the Essex-Kent field. In New-Brunswick a great deal of boring has been carried out for oil and gas which has only met with indifferent results, though the oil, when met with, has been found to be of a high grade. The fluctuations in output are largely due to the selection of poor sites for boring, and to lack of penetration to sufficient depth. The exploitation of oil in this province is an example of the dangers attending promiscuous boring for petroleum without regard for anything more than doubtful surface indications. In Albert County, oilshale deposits have been investigated which have yielded up to fifty gallons of oil per ton on distillation: these deposits have been surveyed in several areas within this region, with promising results. In Quebec, on the other hand, the results of exploration have proved unsatisfactory, both for oil and gas. One field (that of Gaspé) has yielded oil, but only in small amount, and the possibility of extensive supply is remote. The "Geological Survey" definitely advised against any further drilling within the province (1915), though this opinion has not met with general credence. In Nova Scotia, Prince Edward Island, and Newfoundland, bituminous shale deposits occur which have of late received attention; those of Nova Scotia are said to be as important as those of Scotland, and richer in hydrocarbon content. The Western Canadian fields embrace certain regions in the Yukon and Northwest Territories, Alberta, Manitoba, Saskatchewan, and British Columbia, of which the Province of Alberta and the Mackenzie Territory seem to offer the best chances of future success. Prospecting in these areas has in the past been rather of a speculative nature, but with the increased data to hand furnished by the admirable work of the Canadian Geological Surveys, coupled with the experience already gained from some of the more promising ventures, future operations should meet with a considerable amount of success.

The oil potentialities of the West Indies have long been regarded as favourable, and of the five islands which have recently received attention in this respect, Trinidad and Barbados have both justified the initial work carried out. The Barbados petroleum deposits are much less important than those of Trinidad at the present juncture; they are mainly confined to the Scotland region of the island, where the oil is associated with Miocene sandstone and shale. The curious desiccated tar product "Manjak" occurs here, which has been mined considerably in the past. The Trinidad oilfields have been much more systematically developed than those of Barbados, and operations are proceeding on an ever-increasing scale. Petroleum indications are mostly confined to the southern part of the island, where the well-known fields of Tabaquite, Guayaguayare, and Barrackpore, yielding very high-grade products, are located. A great deal of prospecting yet remains to be carried out before all the resources of this island are tapped, and, with the increased facilities of transport and the installation of further pipeline systems, rapid development may confidently be expected.

There remain for our consideration the countries of New Zealand and Australia. In New Zealand there are three principal districts from which oil seepages have been known, the most important being that of Moturoa, near New Plymouth, in North Island. From this source small quantities of oil have been obtained intermittently, while the other two fields at Waitangi Hill and Kotuku are at present insignificant, and some doubt exists as to whether these localities will ever yield a commercial supply. The oil shales of the Orepuki region are generally known, but attempts to work them profitably have so far proved abortive. Borings near Greymouth, on the west coast of South Island, have met with little success, though the area between this and Brunnei inland will probably pay further prospecting. In Australia oil has been reported from many places on many occasions, but so far no results of commercial importance have been forthcoming. Dr. Wade has investigated certain supposed oil-bearing areas in South Australia, but concluded that the prospects were not encouraging. West Australia and Victoria have shown small oil seepages in several parts, but nothing has been discovered which would warrant extensive prospecting. In New South Wales, Queensland, and Tasmania, there are oil-shale deposits which have been worked on a large scale, and it must be admitted that the petroleum prospects of the continent, as a whole, seem to be largely centred in these occurences.

This brings our brief survey of the British and Colonial oil resources to a close. It is significant, at all events from a geophysical point of view, that our most productive fields (and, at the same time, those which offer the best possibilities of successful development in the future) are confined to the zone between latitudes 0 deg., and 30 deg., N.; and from what has already been said, it will be apparent that to the West Indies, India, and possibly the East Indies, we have to look for future resources. While we may not hope to discover fields of anything like the magnitude of those of the United States, there are at least equal chances that our own fields, and others as yet unknown, will yield to the prospector supplies of oil which, together with that obtainable from extraneous sources, would be sufficient to carry us through for many a long year. We must not forget that there are enormous possibilities of development in other parts of the world—such as Mexico, the Gulf States, South America (particularly on the north coast), Russia, and possibly Japan. The ultimate location of a productive field in any one of these regions would be quite sufficient to postpone a critical situation, if such were likely to arise. Each new well drilled, each new area sur-

veyed, providing the essential principles of the science be kept in view throughout, brings the chance of further supply nearer. And each addition to the world's market must tend to alleviate any suggestion of famine that may be made. At present there is no oil famine, and in the writer's opinion there is not likely to be one for several generations. Every day, almost, a new wonder is proclaimed from the realms of experimental science, and synthetical productions are ever taking the place of natural resources. The question of substitutes for petroleum as a fuel is engaging the attention of experts all the world over, and if past success is any indication of the future, we cannot justifiably regard the prospects of their work other than with complete optimism. Economy in use of existing supplies, careful prospecting on scientific lines, greater development of the world's oil-shale deposits, and the use of substitutes for petroleum wherever possible, are arguments which collectively must tell in the long-run. We have not yet exhausted Nature's resources of coal, water, or oil; we may not see a generation's supply ahead, but that does not prevent us from continuing the search.

Coal Prices

Toronto, Aug. 25.—Very little coal is coming through, although dealers report a keen demand for steam-sized coal in the Eastern States. Prices remain unchanged from those of last week, namely mine run, $14.25 to $14.50 f.o.b Toronto: smokeless coal, $14.50 to $15.00: hard coal $8.00 to $11.50 gross tons at mines, American funds.

Toronto, Sept. 2.—Stocks of coal are low and, according to the dealers here no one wants to buy any coal in the present unsettled state of the market. The Great Lake district and the New England States are getting most of the coal and very little is coming through Ontario points. According to dealers there is practically no market for coal and last week's quotations prevail with an additional 75 cents on bituminous and $1.25 on hard coal, due to the increased freight rates.

The advance in railway rates will cause an increase of $1.10 per ton in the delivered price of anthracite at Winnipeg after 1st September. This will make the retail cost of anthracite $22.60 per ton.

In Montreal dealers report inability to obtain consignments of coal from the bituminous mines at less than $10.50 per gross ton, American funds. Freight rates, as increased September first, add an additional $5.25 per ton. Bituminous coal is selling at $18.00 per ton delivered in cellars in Montreal. Anthracite is selling at the same price.

SECOND ANNUAL WESTERN MEETING OF THE CANADIAN INSTITUTE OF MINING AND METALLURGY.

Winnipeg, October 25th, 2th and 627th.

The Second Annual Western Meeting of the C. I. M. & M. is to be held at the Hotel Fort Garry, Winnipeg, on October 25th, 26th and 27th.

The Secretary of the Local Committee is Mr. W. W. Berridge, and all members who desire hotel accomodation are requested to let Mr. Berridge know at once.

It is understood the Local Committee has succeeded in interesting local bodies and enterprises to a very considerable extent in the forthcoming meeting.

So far only a sketch of the programme is possible, but it is understood the Institute will be the guests of the Manitoba Government, the City of Winnipeg and the Winnipeg oBard of Trade at luncheons on the three days of the meeting. Special attention is to be paid in the papers to the coal trade in the West and the possibilities of an iron and steel industry in Western Canada.

TORONTO MINING STOCKS.

Toronto, Sept. 2.—The mining market during the past week has been dull with practically no speculating buying going on. The ups and downs of the market were caused by investment orders but generally speaking the market declined somewhat although not to any great extent. Silver reached 99 1-4 and this brought in a small selling of some stocks. Nipissing Consolidated was strong from 9.75 to 10.75, due to a declaration of a five per cent. bonus. It was also stated that Nipissing had acquired some oil properties and it remains to be seen what effect this will have on the stock. In many cases shareholders do not like to see the companies going out of their regular lines.

Following are the average quotations for gold, silver and miscellaneous stocks on the Standard Stock Exchange, Toronto, for week ending August 28th, 1920.

Silver	High	Low	Last
Adanac Silver Mines, Ltd.	2	2	2
Bailey	5	4	4½
Beaver Consolidated	44	41	41
Chambers-Ferland	6	6	6
Cobalt Provincial	43	40	43
Coniagas	2.50	2.50	2.50
Crown Reserve	23½	20	22
Gifford	1 3-8	1 1-8	1 1-8
Hargraves	1½	1½	1½
La Rose	35	33½	35
Lorrain Con. M. Ltd.	7½	2	2
McKin.-Dar.-Savage	59	57	59
Mining Corp. of Canada	1.80	1.80	1.80
Nipissing	10.75	9.75	10.75
Ophir	2 5-8	2	2
Peterson Lake	13 3-4	13	13½
Temiskaming	35	32	32
Trethewey	28½	26½	27
Gold.			
Dome Extension	38¼	35 1-4	38
Dome Lake	3 7-8	3 3-4	3 7-8
Dome Mines	12.25	12.25	12.25
Gold Reef	3 1-8	3	3
Hollinger Cons.	5.70	5.60	5.70
Hunton Kirkl'd G.M.	12	11 3-4	12
Keora	17½	17	17
Kirkland Lake	57	53	53
McIntyre	2.02	1.96	1.96
Moneta	11½	11	11
Porcupine Crown	25½	23	23
Porcupine V.N.T.	24.6	23	23
Preston East Dome	2¼	2 1-4	2 1-4
Schumacher	19	18½	18½
Thompson Krist	8½	8¼	8
West Dome	7	7	7
West Tree Mines Ltd.	6	5	5
Wasapika Gold Mines Ltd.	16	14½	14
Miscellaneous.			
Rockwood Oil, Gas	3¼	3	3
Vacuum G.	26	25	26

METAL QUOTATIONS.

Fair prices for Ingot Metals in Montreal Sept. 1st 1920. (In less than carload lots).

	Cents per lb.
Copper, electro	24
Copper castings	23½
Tin	54½
Lead	9½
Zinc	10½
Aluminum	35
Antimony	8¾

ASBESTOS FIBRE OF CANADIAN ORIGIN SUPPLIED TO JAPAN BY UNITED STATES EXPORTERS.

At the recent meeting of the Canadian Manufacturers' Association held in Vancouver, Mr. A. E. Bryan, Canadian Trade Commissioner, had prepared for presentation to the delegates a comprehensive account of possible trade openings for Canadian goods in Japan, but owing to lack of time Mr. Bryan was unable to deliver his remarks in full.

With regard to asbestos, after detailing the figures of United States' exports of asbestos fibre to Japan, Mr. Bryan said:

Where do you suppose the United States is getting all the asbestos she sells to Japan? Canada prides herself on the assertion that she supplies 85 per cent of the total world's output. From investigations made I find that nearly all this asbestos is purchased from brokers in New York. That is, American firms are handling the sales of our natural products, and are thus taking the cream of the profits for themselves. Gentlemen, it is time we became a little more independent of our southern neighbours. Let us be up and doing! We should handle our own natural products from the time that it is taken from its natural state until it is landed in the various foreign markets of the world. We must have our own export houses, good substantial firms with their own branches in all overseas countries where our goods can be sold. These offices must be manned by good live Canadians who are full of pep and tenacity and who will push their lines against keen competitors. Why should we be dependent on foreign commission houses for the sale of our products abroad? Just before coming away I wrote to seventeen of the largest users of asbestos in Japan. As a result of enquiries made, I found out that in nearly every case they were buying "American Asbestos"—they did not realise that what they were using originated in Canada. But in nearly every case they asked me to have Canadian shippers write to them sending prices and samples. They were all keen to buy from Canada direct.

This asbestos is used in Japan for making all kinds of asbestos products—slates, shingles, corrugated plates, yarns, clothes, packing, jointings, rope, in fact just about everything in the asbestos line. There is a fair demand for imported manufactures, such as millboard, cement, etc., but by far the greatest market is for fibre.

The Government encourages this industry, and is encourages almost all industries in Japan. No asbestos goods of foreign manufacture can be sold to Government factories, arsenals, shipyards, railways, etc., which are of course the largest users. They always specify home manufactured goods.

OIL IN MACKENZIE RIVER BASIN.

The discovery of oil at Fort Norman is considered to be an event of importance. The oil is said to be of good quality and the significant feature of the discovery is that there are hundreds of square miles of the country in which the oil formation occurs. Mr. Chas. Camsell, Deputy Minister of Mines, regards the discovery as one of the most notable events in recent mineral exploration work. Mr. Camsell knows the country well and he is well pleased to learn that its resources are being explored with such good results.

BELCHER ISLAND IRON ORES.

In the Engineering and Mining Journal August 28 number, Mr. E. S. Moore, who examined iron ore deposits of Belcher Islands in 1916 says that: "The maximum thickness of the iron formation is 275 feet, but the great bulk of the formation is hard, highly siliceous jasper with bands of slate or greywacke, the whole averaging less than 30 per cent. iron. One band 35 feet thick, measured in the best portion of the formation and carefully sampled, averaged 30.1 per cent. iron, with 37.97 per cent. silica, 0.039 per cent. phosphorous, and a trace of sulphur. There are considerable bodies of this low grade material close to tidewater. The highest grade sample taken and analyzed ran 50.7 per cent. iron.....There has been much discussion as to whether the iron deposits of the Belchers are of economic value. It is my opinion that they are so lean, and the climate conditions are so unfavorable, that they cannot be worked at present. Electric smelting, with power developed on the falls on the numerous rivers entering the east coast of Hudson Bay might be employed, but even then the conditions do not seem promising."

Some of those who have examined the Belcher Island iron ore deposits during the past few years are much more favorably impressed with them than Dr. Moore. No report of the recent examinations is, however, available for publication.—R.E.H.

SALT MINING AT MALAGASH, NOVA SCOTIA.

Mr. Cavanagh, who is in charge of the unique Canadien rock-salt mine at Malagash, Nova Scotia, recently passed through Montreal. He states that the product of the mine is finding a wide distribution, and is well spoken of by all users. The deposit, which pitches vertically, has an undetermined width, but drilling has disclosed that it is at least over 300 feet. The centre of the vein contains salt of great whiteness and excellent quality.

The potash-bearing streak which was noticed at a point not distant from the surface showed evident signs of leaching by surface waters and replacement by earthy substances, but there is much reason to hope that when a point is reached in the vein, that has not been subjected to surface conditions, potash may be found in greater purity of concentration.

The discovery of this salt deposit was accidental, having occurred through the sinking of a well for water. It promises to prove of great economic importance in Nova Scoita. About twenty tons of salt daily is now being produced, and is finding a ready market.

TORONTO NOTES.

The appointment of a Commission to enquire into the administration of the provincial mining resources of Ontario, which was announced some time ago, has not yet been made. It is thought that the enquiry will not commence until the timber probe is over. Judges Riddell and Latchford will probably have charge of it.

The Height of Land Mining Syndicate, Limited, has been granted incorporation by Ontario letters patent. The syndicate is empowered to engage in a general mining business and carries a capitalization of fifty thousand dollars. The head office is in Toronto and the following are the provisional directors: John Callahan, Frank Regan, Edward Murphy, Glen Sullivan and Loretto Dugan.

Northern Ontario Letter

THE GOLD MINES

The Porcupine District

While no official confirmation has been given by the management of the Hollinger Mine of the report that a diamond drill has shown the presence of gold-bearing ore at a depth of 2,500 feet, evidence is accumulating that the Porcupine gold-bearing rocks are very deep, and that operations up to the present time can only be regarded as preliminary development. Favorable reports regarding the extent of the Hollinger reposit justify optimism regarding other mines in that area, namely the McIntyre Porcupine, the Dome Mines, Porcupine V. N. T., North Crown and Schumacher.

In producing upwards of 37 million dollars, the Hollinger mine has only been extensively developed to a depth of 425 feet. From that depth to the 800 ft. level a moderate amount of development has been done, while the 800 ft. level to the deepest workings at a depth of 1,250 feet only a very limited amount of work has been done. As a result of the work so far done, nearly eighty million dollars in gold has been brought into sight, the reserves now being upwards of forty million. From these facts, and taking into account the likelihood of these enormous bodies extending to great depth, perhaps deeper than it may be found possible to mine, the size of the Hollinger Consolidated mine stirs the imagination.

On the McIntyre-Porcupine which is carrying on the greater part of its operations at its lower levels, ranging from 800 to 1,375 feet in depth, gold values have actually been found to increase, and is another factor which adds to the potentialities of the future of all other producing mines in this field. With such official data forming the basis of calculation, the most conservative mining men are found to be numbered among these who believe the Porcupine field, together with the other gold-bearing sections of Northern Ontario is destined to be a close rival of the world-renowned Rand, of South Africa.

The plan outlined a few weeks ago in these columns, relative to the exploration of a large number of mining claims situated in the township of Mountjoy, and lying just a short distance west from the Hollinger mine, is progressing satisfactorily, and the work in progress. This is perhaps the most interesting exploration scheme under way at the present time in the Porcupine gold area. The work is financed by English interests, and is being supervised by Ernest Loring, of Haileybury. Two diamond-drilling machines have been engaged and are in operation. The area to be explored is made up entirely of level country, commonly referred to as sand plains. The bedrock lies considerable distance below the surface, and the present scheme is to determine the nature of the rock formation and ta also explore for possible deposits of ore. Already some favorable information has been secured, the first hole having entered a formation of porphyry and schist, showing resemblance to the formation of the producing area of Porcupine. The work is being done on the theory that the gold-bearing formations of Porcupine extend farther west than the territory being developed in the proven area.

The Kirkland Lake District.

The producing mines of the Kirkland Lake district are increasing their output. This includes the Lake Shore, Kirkland Lake Gold and the Teck-Hughes. In the meantime, the Wright-Hargreaves is making rapid progress in the work of installing its big new mill, while the Tough-Oakes is also likely to join the producing list before the end of the current year.

The Lake Shore production is now running at the rate of close to $17,000 every twenty-four hours, and is treating an average of sixty tons of ore daily. Mill heads have recently averaged around $28 to the ton, and the mine is easily maintaining the right to lay claims to being the highest-grade producing gold-mine in Canada.

Development work on the 200 ft. level of the Argonaut Gold Mines has been sufficiently favorable as to encourage the operators to decide to continue the work to a depth of 500 feet. This work will be commenced at once. It is learned that provided this work proves to be as satisfactory as in that section now developed, the company will be prepared to instal a large mill. The plan followed heretofore has been to operate the small test mill now on the property and in this way test the ore coming from development work as well as produce sufficient gold to offset the cost of current work.

On the Wood-Kirkland property, in the township of Lebel, work is going ahead at a satisfactory rate. The first test pit has reached a depth of 25 feet, and the mineralization is said to continue heavy. A small steam plant is being taken in, and will furnish power for operations pending the installation of a large mining plant.

At the Bidgood property the main shaft is down 300 feet and crosscutting toward the main vein is underway at that point. A large amount of crosscutting and drifting will be carried on at this level.

The Outlying Fields

According to official advice, the Lightning River Gold Mines will soon issue a report on its property situated in the township of Egan, lying to the west of the Porcupine district. The report will also deal with the water power which this company owns.

The final cash payment for the Murray-Mogridge property is due but at the time of writting it has been announced whether or not it will be made. Rumors have been current that an extension might be requested, while it is understood the vendors are not prepared to grant such an extension. It is believed, however, in view of the fact that a large amount of stock has been sold, that the purchasers will find some way of arranging for the payment or for a compromise.

The Sesekinika Lake Mining Syndicate has been organized for the purpose of exploring and developing a large number of mining claims situated in the Sesekinika Lake and Bourke's gold areas. Eight of these claims are located on an island in Sesekinika Lake, while eight are situated at the corner of the three townships, Benoit, Melba and Maisonville. Camps are to be erected on both groups, a force of men already being on the ground.

THE SILVER MINES

The Cobalt Field

Much added prosperity comes to the silver producing mines of Northern Ontario as a result of the higher price of silver as shown during the past week or so. It is obvious that the higher quotations are due to purchases under the Pittman Act completely absorbing

the output of the United States, and that not only does this relieve the market of the American output, but makes it necessary for the parts of the United States to go into the already depleted world market for requirements.

The present price of close to a dollar an ounce compares with a low of 80 cents an ounce on June 18th and an average of only 90.95 for the whole of June.

At the time of writing, the mines of Cobalt are able to market their silver at around a dollar an ounce in New York, and receive the benefit of a premium of about 12 per cent. on New York funds. Thus, in a market which offers about $1.12 an ounce to these Canadian producers, the hoarding which has gone on for several months appears to have been justified.

While the hoarding commenced at a time when silver had declined to around $1.25 an ounce from a high of $1.37, the slump was so rapid as to make it quite difficult to market silver, and in all probability had the product of the mines been sold "at market", the value received would not have exceeded that of the present.

In this connection, leading producing mines like the Nipissing are now in a position to work off their hoarded supply of the white metal on a market stabilized by steady demand, and it is believed the present strong market will be of long duration, with not a little likelihood of another upward move.

Continued favorable developments are reported on the Lumsden property, an encouraging amount of high grade ore having recently been opened up. It is perhaps too early to estimate the likelihood of steady production but developments hold out promise of such being achieved.

Arrangements have been made to diamond drill the the Crown Reserve mine for the purpose of securing detailed data relative to the diabase sill on the property. A contract for 5,000 feet of drilling has been let, and it is understoods this work will be commenced very shortly, the drilling to be carried in from the fifth level.

A uniform output is reported from the McKinley-Darrah, from 55,000 to 60,000 ounces of silver being produced every thirty days. While costs have advanced several points above the average for last year, the recent increase in the price of silver removes the danger of net profits falling below dividend requirements at the present rate of 3 per cent. quarterly.

On the Beaver Consolidated, as well as the Temiskaming mine, it is learned the present rate of output is quite satisfactory. As regards the Temiskaming Mining Company, a matter of considerable importance has to be dealt with at a very early date. It has to do with the proposal by the company's president, J. P. Bickell, that the Temiskaming Mining Company join the McIntyre-Porcupine Mines in taking over important coal lands in Alberta. The proposal is believed likely to receive favorable consideration due to the possibility of the plan offering an opportunity for the Temiskaming to use its treasury surplus of approximately a million dollars. As regards this, of course, opinion among the shareholders is so far divided, some of those vitally involved believing it would be the better part of wisdom to reward the shareholders by at least a moderate rate of dividend disbursments, rather than entering too extensively into the coal business. However, until such time as a full report is available, outlining the proposed scheme in detail with estimates of expenditure, etc., it will not be possible to weigh the merit or de-merit of criticism or commendation so far offered.

The Gowganda District

Mining enterprise in the Gowganda field still suffers from quite unsatisfactory transportation facilities. The Canadian Light Railway Corpany does not appear to be certain of carrying its proposed construction scheme through, although in the mean time the Ontario Government, following a hasty decision, discontinued the construction of a macadam road. The present uncertainty surround the projected light narowgauge railway seems to justify the very pointed criticism which has been directed at the Ontario Government in connection with its lack of intelligent action in regard to the Gowganda transportation problem.

A scheme is on foot to finance the construction of a power plant at Indian Chutes on the Montreal River. The project is being promoted by Hugh Sutherland, of the brokerage firm of F. C. Sutherland & Company of Toronto. A recent meeting was held, at which were Sutcliffe and Neelands, surveyors who are interested in the ownership as well as being engineers engaged in laying out the development scheme, as well as Hugh Sutherland.

From available information, while the financing of the scheme is still more or less uncertain, there are at least fair prospects of all arrangements being ultimately successfully made. It is believed the Gowganda field as well as Fort Matachewan would furnish a demand for the full 5,000 h.p., which the engineers estimate could be developed.

SILICA PRODUCTS COMPANY TO OPERATE IN CAPE BRETON ISLAND.

For some years a proposal has been mooted to develop the large areas of silica rock which exist in the neighbourhood of Orangedale and Whycocomagh, Cape Breton Island, and it is understood that Canadian letters of incorporation are being sought for a company to be known as the Empire Silica Company. The promoter of the enterprise is Major Burton of New York who is said to have associated with him a number of reputable United States capitalists.

The new company proposes to employ in full operation some one thousand workmen, and contemplates the manufacture of firebrick, cement and lime products.

Railway Branch Suggested for Frontenac Co. Felspar Mines, Ontario

A proposal is mooted to extend the Canadian National Railway from Westport, Ont. into the township of Bedford, Frontenac County, for the benefit of the felspar mines.

Beer, Sondheimer & Co., Inc., has taken legal steps to change the name of the firm to "International Minerals and Metals Corporation. The circular announcing this change states: "The active business management of the corporation and its relationship to its affiliated and subsidiary companies has in no way been affected and will continue as heretofore."

Electric Steel & Engineering, Ltd.

HEAD OFFICE:

WELLAND, - ONTARIO

MINING MACHINERY

ELECTRIC STEEL CASTINGS

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WELLAND - ONTARIO

DOMINION STEEL CORPORATION CREATES OFFICE OF SUPERINTENDENT OF INDUSTRIAL RELATIONS.

The Dominion Steel Corporation have appointed Mr. Angus W. Macdonald as Superintendent of Industrial Relations, having charge of the work of this department as it effects all the operations of the Corporation in Cape Breton, Springhill, Newfoundland and other points.

Mr. A. W. Macdonald has had a unique training for this responsible position. He has been continuously in the service of the Dominion companies since the formation of the Coal Company in 1893, having previously worked for the predecessors of the Dominion Coal Company. Since 1900, with an interval during which he was Superintendent of the Black Diamond Coal Company at Lethbridge, Alt., Mr. Macdonald has been the Employment Agent of the Dominion companies, and has been required to visit Europe on several occasions in connection with the recruiting of labor.

The new department will have three divisions, namely, the work of employment, employees service and safety and first aid work.

The employment division will be charged with the development of sources of labor supply, the selection and placing of workmen, and supervision of the "turnover" of labor, with a view to retaining every employee possible and reducing discharges and notices to quit to a minimum.

A. W. MACDONALD,
Supt. of Industrial Relations, Dominion Steel Corporation.

The employees' service division will have charge of housing plans, sick benefit and pension schemes and general social welfare of employees. The plans of this division contemplate district nurses, hospitals, garden plots, Company's farm, employees' clubs, athletic, musical and dramatic societies, employees magazine, boarding camps, cafeterias, restaurants and the accomodation for single-men boarders.

The safety first division will endeavor to organize safety committees and first-aid work, the compilation of accident statistics, communal sanitation and cleanliness, water supplies, and educational bulletin service.

The assistants which the new Superintendent of Industrial Relations has been assigned are all men of competence and long experience.

There is a widespread and pressing necessity for just such activities as are contemplated in the programme of organization of the Steel Corporation's new department. Many sporadic attempts at improvement of living conditions and the environment of the colliery towns and steel districts have been made, but they have never been co-ordinated, and their continuity has been affected by changes in control and management, periods of trade depression, and, to a large extent, by non-realization of the necessity for a department of corporate industrial activity that is not, as is sometimes supposed, philanthropy or paternalism, but just ordinary common sense and good business.

It is not to be expected that all the various activities contemplated will at once assume full shape, as the new Superintendent will have to overcome a good

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1—20 x 42 Jenckes First Motion, Double Drum Mine Hoist, Friction Drums 72 x 30, Corliss Twin Engine complete with 1200′ 1¼″ Cable.

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1200′ 1″ Cable on Drums.

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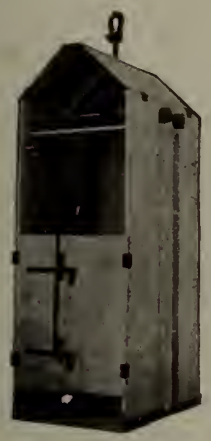

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We supply these Cages with either one or two sets of doors for inlet or exit, to suit your shaft.

Rails are also laid in the floor, if required, for convenience in handling the cars.

The top doors permit the carrying of long timbers, or the escape of the men in case of accident.

The hand rails are properly placed to safeguard the passengers in the quick ascent or descent.

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deal of inertia and incredulity, and he may not inconceivably meet actual opposition, but in appointing Mr. Macdonald to a position that will be in its initial stages an experimental one, the Corporation have acted very wisely, as Mr. Macdonald possesses just those qualifications of patient persistence and ability to impress his views upon others, combined with a unique complete knowledge of the labor situation in the Corporation's works and mines, that will make success probable, given sincere backing by the operating heads.

The paper on "Labor Turnover of Industrial Plants" read by Mr. Macdonald before the Mining Society of Nova Scotia, which appeared in our issue of May 21st, was a convincing presentation of the loss that occurs through unnecessary changes in working personnel, and a strong plea for its minimization.

MANUFACTURING IN WESTERN CANADA.

The western provinces of Canada are generally considered as forming a purely agricultural area, and in the occurrences of new land settlement, increased cultivation and bumper yields, the progress of this region in industry and manufacture is often lost sight of. Nevertheless, the west is making phenomenal strides in manufacture and each week sees recorded the establishment of new industral concerns n the progressive towns of the western provinces.

Remarkable Extension.

An indication of the progress which the west holds in common with the rest of the Dominion is the remarkable enlistment of the last decade in the ranks of the Canadian Manufacturers' Association. The Dominion membership, which in 1910 numbered 2,600 now totals more than 4,100. In 1919 there were in the province of Manitoba 102 members; there are now 343. Alberta and Saskatchewan a decade ago had but 16 members between them; they now have 173. British Columbia's membership, n the ten years, has grown from 113 to 162. Whilst in the decade, the Dominion increase was 1,500 or approximately 58 per cent., the four western provinces combined have, in the same period, increased their membership by 447 or 190 per cent.

The rapid development that has taken place in Western Canada during the past two decades is well illustrated by the records of progress made n the various manufacturing industries, the value of whose products in 1900 was but $34,330,000, whereas in 1917 it was $405,557,000. The following is a comparative statement of capital invested, wages paid, and the value of products covering a perod of 17 years.

Capital Invested in Industries.

	1900	1910	1917
	$	$	$
Alberta	Not given	29,518,346	63,215,444
Saskatchewan .	1,689,870	7,019,951	33,114,630
Manitoba	7,539,691	47,941,540	101,145,033
British Columbia	22,901,892	123,027,521	221,436,100
	$32,131,453	$207,507,358	0418,911,207

Wages Paid.

	$	$	$
Alberta	465,763	4,365,661	10,387,379
Saskatchewan .	No figures	1,936,284	7,007,073
Manitoba	2,419,549	10,912,866	19,599,051
Brtish Columbia	5,456,538	17,204,670	38,269,366
	$8,341,850	$34,455,481	$75,262,869

Value of Production.

	$	$	$
Alberta	.....	18,788,826	71,669,423
Saskatchewan . .	1,964,987	6,332,132	40,657,740
Manitoba	12,927,439	53,673,609	112,804,881
British Columbia	19,447,778	65,204,236	171,425,616
	$34,340,204	$143,998,803	$406,557,660

BOOK REVIEW.

THE IRON ORES OF LAKE SUPERIOR. Crowell and Murray, Chemists and Metallurgists, Cleveland, Ohio. Published by the Penton Press, Cleveland, 1920, 6 by 9 inches, Buckram Boards.

This standard reference work on the Lake Superior Iron Ores and all that appertains thereto is issued in a fourth revised addition. New chapters have been introduced, presenting the average analyses of all the iron ores of the Lake Superior district since 1902. The statistical part of the volume has been added to in order to bring all figures up to date of 1920 from the last edition of 1917.

An interesting chapter is that which describes the method pursued at the loading docks to ensure a uniform analysis of the ore contents of a given pocket. By the addition of one or more cars of ore of known content, known as the adjusting or balancing cars, to a partially filled pocket of ore, the average grade of which is also known, the average grade of the ore in each of the selected pockets is brought up to precisely the analysis specified.

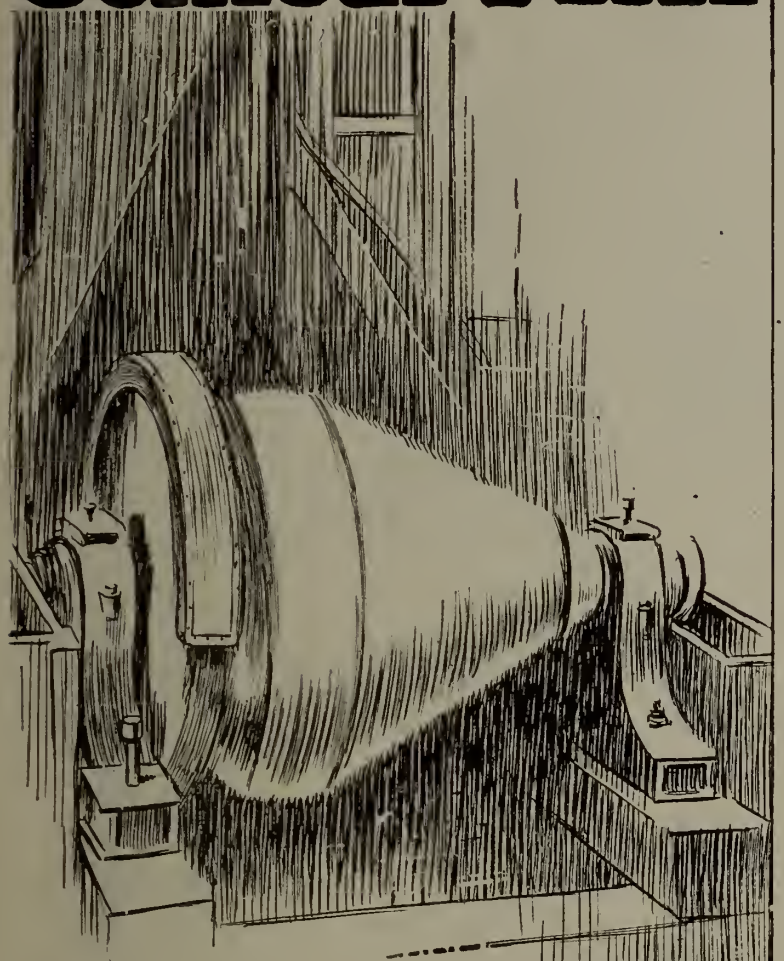
A concisely summarised account of the progress of beneficiating the Superior iron ores is given in Chapter Six.

The following account of the Canadian extension of the Lake Superior deposits is accurate, and we could wish it were more promising. The possibilities of beneficiation, however, allow a more cheerful view to be taken of the future of iron-ore mining in the Lake Superior ranges in Canada than has hitherto been possible.

With regard to the Canadian deposits, the volume states:

"On the Canadian shore of Lake Superior, and in the adjacent territory, there are large areas of iron-bearing formation similar to those found on the American side, but as yet most of the exploration in these areas has been disappointing. The oldest productive range in Canada, and the largest shipper, is the Michipicoten Range, which is lies on the north-eastern shore of Lake Superior northeast from Michipicoten Island. This range was first opened up in 1897, as a gold mining district, but soon became far more valuable as an iron range. The Helen Mine has been a shipper from this range since 1900. The only other producing mine on the range, the Magpie Mine, made its first shipment in 1913. The Moose Mountain District is located about 30 miles north of Sudbury, Ontario. It was first opened up in 1902. The only mine at present on this range is the Moose Mountain Mine, which began shipping in 1908."

HARDINGE Conical Mill



Night and Day they grind away

One of the three Hardinge Conical Ball Mills at the McIntyre plant. An average test of this 6′ Mill showed:—

Feed—Quartz, crushed to pass 2″
Product—10 mesh
Capacity—185 tons per day
Power required—38 H.P.
Ball consumption—0.5 lbs. per ton

They helped McIntyre Porcupine reduce milling costs and increase tonnage

WHEN the McIntyre Porcupine Mill was re-built to reduce production costs and increase tonnage, one of the most important changes made was the substitution of Hardinge Conical Ball Mills for previous equipment of stamps and Chile Mills.

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The way to secure the lowest possible grinding costs is to install Hardinge Mills.

Whether you are planning a new plant or, like McIntyre-Porcupine, re-building an old one, you should know the possibilities of the Hardinge Mill. Send for "Grinding Data" and specific information.

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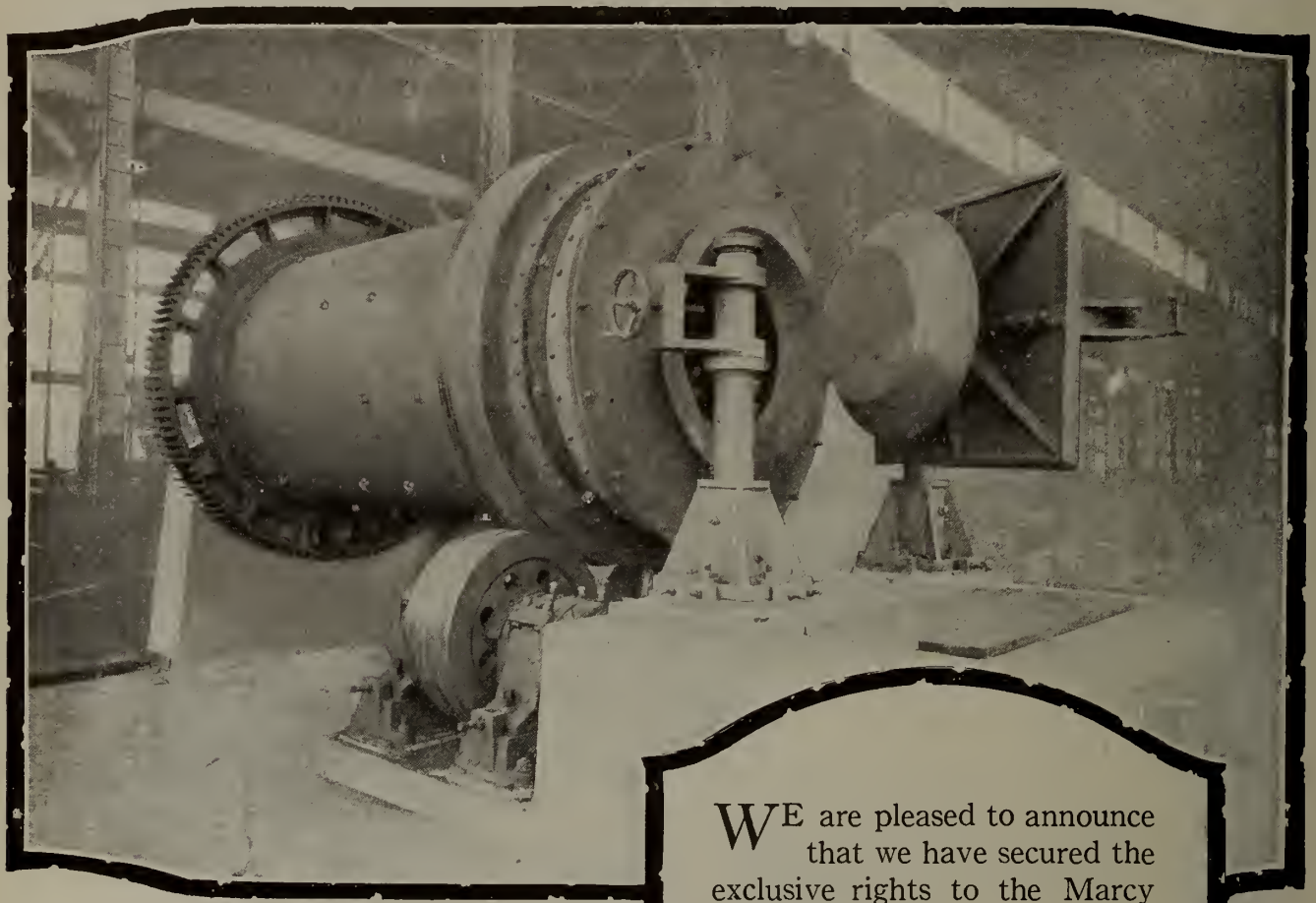

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The service given on outside drives by Goodyear Klingtite Belting (formerly Extra Power) is unusual enough to be of interest to every belt user.

Not because there are a great number of outside drives—but because the outside drive is just about the ultimate test of a belt's ability.

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But the best of cotton will rot and whip to pieces outdoors if not protected.

So we have forced generous quantities of high-grade rubber through and through the plies of Goodyear Klingtite Belting, forming one solid unit, proof against weather and ply separation, yet flexible, pulley-hugging, efficient.

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How well these belts serve is evidenced by this letter from the Beaver River Lumber Co. regarding their Extra Power Belt (now Klingtite). At last report (June, 1920) **this belt was still in service after 32 months' use,** when this mill was burned recently.

In their letter the Beaver River Lumber Co. say : " The belt driving the conveyor runs direct from a small engine to the conveyor drive. It is subject to steam and heat in the engine room and to cold and dampness on the outside. Under these conditions, there is no sign of deterioration and there is no slippage. "

The same testimony is advanced by hundreds of farmers and threshermen who bought Goodyear Klingtite Belts (under their old name of Extra Power) for severe outside service on the farm.

If you have an outside drive, by all means investigate Goodyear Klingtite Belts. If you have **any** transmission drive, let a Goodyear Belting man show you how Goodyear Belts, which are good enough for outside service, will render heaping value on inside work. Phone, wire or write the nearest Goodyear Branch and a man will call without obligation to you.

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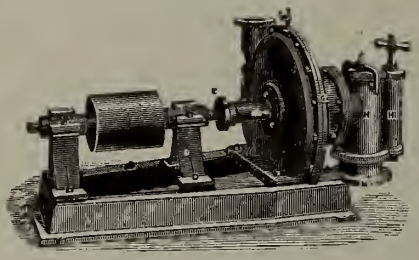

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:-: EDITORIAL :-:

The Proper Use of Self-contained Oxygen Breathing Apparatus

Oxygen breathing apparatus are devices that have suffered in reputation from too enthusiastic advocacy on the part of those who favored their use. Invented in the first instance by an Englishman, forgotten for many years in the land of its birth, and adapted and placed on the market by the Germans, they were hailed by persons uninformed of the obliterating character of modern colliery explosions as a panacea. The reaction of those who knew the realities of colliery explosions, and the very definite limitations of the oxygen breathing apparatus, went too far, and in some instances these devices were as unsparingly condemned as in other quarters their usefulness was overdrawn. The truth is that breathing apparatus are delicately constructed devices ,with a limited range of usefulness, requiring to be used with knowledge and discretion by trained persons possessed of expert knowledge of underground conditions. They should never have been named "rescue apparatus," for that unfortunate misnomer has given rise to much misapprehension. The chief usefulness of the self-contained breathing apparatus is as an adjunct to a mine fire-brigade, and in this respect they are as necessary to a metal mine as to a coal mine. The record of self-contained breathing apparatus is combatting mine fires has established these devices as having very great usefulness, and, properly used, they have saved life on a number of occasions following the outbreak of mine fires and mine explosions.

Unfortunately, a number of fatalities have occurred among men wearing the apparatus, but investigation will show that in at least a proportion of the cases, this deplorable result has followed the use of the apparatus under conditions for which it was not designed. It is also due to many brave men who have worn the apparatus under desperately trying conditions to state that some of the earlier types of apparatus were designed in ignorance of certain physiological phenomena, and that some lives were sacrificed because wearers of breathing apparatus were asked to perform feats beyond human endurance. Admitting this, it is nevertheless true that the greater part of breathing apparatus fatalities have been occasioned by failure to recognize the limitations of a delicately constructed device, and to realize that a person wearing a breathing apparatus in irrespirable air must die if his apparatus for any reason does not function.

We would draw our readers' attention to the report of the Chief Inspector of Mines for British Columbia upon the recent fatality at the Black Diamond Mine near Seattle, the gist of which is contained in his statement that the fatalities occurred because men "attempted a feat in ordinary practice that any sane "man would have given very serious consideration "before permitting even in a case of emergency."* Equally pertinent are the comments of Mr. Rice, the Chief Engineer of the Bureau of Mines of the United States, who fears that misunderstanding of the facts may create a prejudice against "an apparatus which has greatest value when it is carefully used in accordance with well established rules."

To those who are interested in self-contained breathing apparatus there is available a mass of information collected by the United States Bureau of Mines and the Home Office in Great Britain, and by the military authorities of both countries who used oxygen breathing apparatus during the war on a scale that has not been approached in industrial mining.

General agreement among those who have investigated the use of the apparatus under dangerous conditions exists on the following points. The apparatus itself must be in good order, and at least equal care should be given to its condition as is given to the airplane, the diving apparatus, or any other instrument which man has devised to enable him to exist under unnatural conditions of environment. The wearer himself must be in good physical condition, should be certified by a medical man as being a proper person to wear breathing apparatus, not all men being so by any means. The wearer must be expert in the functions of the apparatus, and familiar with the conditions under which it is required to be used. The apparatus must be used with discretion, and with due weighing of the dangers to human life against the object sought to be accomplished.

Self-contained oxygen breathing apparatus is not a plaything, nor a scientific curiosity, nor a device concerning which ignorance is to be excused. It is fitted, within well-recognized limits, to achieve certain objects, but, used as it is under conditions of imminent danger, if these limits are not adhered to, disaster is certain.

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*See page 697, issue of August 27th, 1920.

NEWFOUNDLAND.

We have pleasure in publishing the letter which appears in this issue from Mr. P. B. McDonald of New York. The "Journal" has from time to time given news of mining progress in Newfoundland, but confesses that its extent has been disproportionate to the importance of the subject. The fault is not altogether ours, but, as we have previously pointed out, is one of the disabilities under which Newfoundland must suffer until a government geologist is appointed. It is not to be wondered at that the outside world is poorly informed of mining possibilities in Newfoundland, seeing that the people of Newfoundland are themselves only very partially informed thereon. The best monograph on a Newfoundland mineral deposit was made by an official of the Canadian Geological Survey, and published by the Mines Branch at Ottawa. We refer to Dr. A. O. Hayes's Report on the Iron Ore Deposit of Wabana. This deposit, as Mr. McDonald points out, is not by any means the only one in Newfoundland, although, so far as is known, it is the most important one. We believe that the situation is accurately represented when we state that Newfoundland has not yet been either surveyed or studied from a geological point of view in anything approaching an adequate manner. There is one district, hinted at by Mr. McDonald, near Port-au-Port, the stratigraphy of which is only obscurely understood, but which seems to have very promising mineral occurrences.

If Newfoundland is to progress, it must be in mining, fishing and lumbering, as agriculturally, the country has definite limitations. The appointment of a government geologist, and the provision of some centre from which accurate and informed news of mining progress and possibilities can be disseminated, are two matters long overdue in Newfoundland, and their omission, so long as it is continued, constitutes a definite source of hindrance to the country's progress. Newfoundland played her part well during the war. The drain on her all too meagre man-power was proportionately very heavy, and the bill is proving onerous. All who know the Ancient Colony—now a Dominion—will wish her well, and we trust these comments will be taken in the kindly spirit in which they are conceived.

GOLD PRODUCTION IN ONTARIO.

Ontario, according to the figures recently issued by the Ontario Bureau of Mines, shows an increase in gold production in 1920 for the first half of the year of 22 per cent compared with 1919. In face of the declining gold production of other countries—the United States in particular—this is altogether a matter for sincere congratulation. The passing of the silver production by the output of the gold mines is an interesting phase of the half year's work, but we thing the greatest significance attaches to an increase of gold production in face of all the adverse conditions that are now attached to the production of gold. It bears witness, most effectively, to the favorable conditions under which gold is being mined in Northern Ontario. It is also worthy of note that three great mines, situated not far from each other, contribute 97 per cent of the gold production of the Porcupine area, and 88 per cent of the total gold output of Ontario, to wit, the Hollinger, McIntyre and Dome Mines.

OIL vs. COAL.

The conversion of the "Empress of France" to an oil-burner is not without significance to the Maritime coal trade. When this vessel, under her previous name of "Alsatian" called at Halifax, with other large converted passenger liners, during the war, their coal requirements made large drafts on the coal-handling capacity of Halifax, and on the output of the Nova Scotia collieries. Such vessels as the "Caronia" and the sister ship of the "Empress of France," the "Calgarian," took up to six thousand tons of coal at one time. The available quantity of bunker coal is at this time so insufficient that it matters little where it is obtained, whether in Canada, in Britain or at United States Atlantic ports. It affects the general market fairly equally in any case.

The adoption of oil in substitution for coal is more a matter of convenience than of cost. Many troubles are avoided by the use of oil fuel, notably complications with that trial of the chief engineer, the boiler fireman. It is also typical of the reaction of scientific minds against that most unscientific process, the burning of coal as it is ordinarily employed to raise steam power. It is one of the surprising features of our times that we should have improved so little in practice in the methods employed in the use of coal. Most persons who have given the subject thought are agreed that the use of powdered coal, the use of producer gas made from coal, or one of the fuel oils that can be made from coal, are all preferable to the burning of the raw material under a water-boiler. In each case the advantage lies in the more intimate combination of the fuel with the oxygen of the air that is possible with fuel capable of fine sub-division.

Those who control the coal areas of the world will find it a useless employment to rail against the substitution of what might be termed "fuel essences" for raw coal. A better and more profitable employment will be to adapt their collieries and preparation plants to deliver coal in the forms that the future will demand.

In the above connection it is interesting to note the interest taken in our western cities in the use of pulverized coal for domestic heating and small industrial

plants. The difficulty of adopting pulverized coal, in the case of a small consumer, consists not so much in the actual employment of the powdered fuel, but in its reduction to the powdered state. It is becoming customary now for firms that specialize in the manufacture and sale of apparatus for consumption of powdered fuel to provide a central pulverizing plant, from which delivery is made of powdered fuel. This system is well adapted to territories having access to fuel of only moderate grade, and it has proved successful, for example, in Washington State in the utilization of coals of Tertiary age.

There have been rumors that the rule of King Coal was endangered by the coming dominance of oil fuel, but those interested in coal need worry but little on this score. While it is certain that the future will see coal employed in more practical and scientific ways than has been the case in the past, it is equally certan that the coalfields of the world contain the only reliable and definitely ascertainable reserve of light, heat and power of the future. Oil is, of course, a most important fuel, and one upon which modern transportation is largely based, but it has many elements of uncertainty.

NATURAL GAS IN ONTARIO.

The Report of the Commissioner of Natural Gas for Ontario, elsewhere referred to in this issue, is not a comforting document for the fifteen per cent of the population of Ontario, which, as Mr. Estlin has pointed out, have depended largely on natural gas for household cooking, heating and lighting. The Ontario natural-gas supply is evidently a failing one, and is following the course of other districts in North America, where the supply of natural gas has proved to be limited when subjected to intensive consumption.

The most satisfactory part of the situation as it is revealed by the Commissioner's Report is that under recent legislation the Ontario Government has been able to compile accurate statistics, and is in a position to assess the gravity of the situation. The tendency has been to conserve the diminishing supply of natural gas for domestic uses, and to require industrial nsers to find other sources of fuel supply. In view of the onerous conditions under which domestic fuel has to be obtained in Ontario, the policy of the Provincial Government appears to be correct. Mr. Estlin points out that the 1919 production of natural gas was the equivalent in heat value of 578,120 tons of coal, worth delivered at present day prices, we calculate, not far from ten million dollars.

The Report states that many of the homes in the district hitherto supplied by natural gas are fitted for gas consumption only. This suggests the thought that instead of a general substitution of individual coal-burning appliances, which will take place gradually as the natural gas supply diminishes, some consideration might be given to the generation and distribution through the existing channels of coal gas from a central station, designed to take advantage of the latest methods of by-product recovery, both of distillates and of coke residues.

MINING NEWS OF NEWFOUNDLAND.

To the Editor of the "Canadian Mining Journal".

Sir—As I have scanned the pages of your excellent mining journal I often have wondered at the paucity of mining news from Newfoundland. That Dominion, while separate from Canada, is nevertheless a territory of great mineral possibilities, and exploration goes on ther from time to time, news of which would make interesting reading if printed in your journal. For instance, have you published an account of the new iron-ore discoveries at Indian Head, Port-au-Port, on the west coast, which are said to equal the famous Bell Island deposits? Or, have you published an explanation of the efforts being made to work the coal seams at Howley, also in the western part; and what is the present status of the renowned carbide-manufacturing scheme that was interrupted by the death of "Carbide" Wilson? There are, I believe, some indications of a boom coming to England's oldest colony, but, strange to say the capital and enterprise are coming from Scandinavians, who are alive to the immense possibilities in wood pulp, electric power and minerals of this 40,000 square miles of island in many respects so similar to Norway. As a native Newfoundlander remarked recently: "The Norwegians seem to have re-discovered Newfoundland, but I'd like to see a few more Anglo-Saxons coming in." In addition to the iron and coal already mentioned, there are, of course, on the island deposits of copper, pyrites, lead, barytes, oil, etc.

P. B. McDONALD,
New York University, Bronx, New York.
August 30, 1920.

GOLD PRODUCTION OF YUKON IS LESS.

Dawson, Aug. 26.—The gold yield of the placer camps of the Yukon Valley for 1920, as estimated by competent authorities, will total $4,485,000. Six weeks more will wind up the season, as the Winter freeze-up will begin then.

Volney Richmond, superintendent of the Northern Commercial Company, having posts throughout the North, has arrived here after a tour of 3,000 miles, visiting posts in interior Alaska. He estimates that camps in that region for the season wil yield $2,985,000.

George J. Jeckell, royalty collector at Dawson for the Canadian Yukon, estimates the season's yield for this territory, which nearly all comes from the immediate vicinity of Dawson, at $1,500,000. Practically every camp in the North has suffered a heavy decline in output this season. One reason is that it has been the driest season in the history of the North, this largely curtailing hydraulic operations.

Some plants practically operated none of the season. Other reasons for the curtailment include the heavy cost of supplies, materials being practically twice what they were in normal times, while gold remains at a fixed value, thus reducing its purchasing power one half. This means the cheapening of the commodity to the miner.

The Natural Gas Supply in Ontario

Part V, of Vol. XXIX, the 29th Annual Report of the Ontario Department of Mines, consists of the findings of an Enquiry into the natural gas supply of Ontario made in 1920, and a report on the industry during 1919, from E. S. Estlin, the Commissioner of Natural Gas.

The gist of Mr. Estlin's Report is contained in the prefatory note to the volume, which is as follows:

"The natural gas situation as it stands today is brought out in the following summary of the evidence taken at recent hearings, the general trend of which indicates that:

(1) There are two recognized areas of production commonly known as the eastern and western gas fields, the former having been drawn upon for about thirty years and the latter for about fourteen. Some of the conditions affecting the life of the two fields differ, and they are separately mentioned, where possible, in the evidence.

(2) There is a shortage of natural gas for home use in cold weather, at a time when it is most required.

(3) The shortage is caused primarily by a field depletion common in the history of all gas areas, but this depletion was accelerated by excessive consumption during the war period.

(4) This depletion is not being offset by development work because of prohibitive costs, and for this reason will become more acute each year.

(5) Gas enterprises no longer hold out hope of financial gain under present conditions, and do not attract further capital, which is necessary for the development of new gas-bearing territory.

(6) If a general readjustment in the whole situation does not take place immediately the business will pass into decline, and this valuable fuel supply will be lost to about fifteen per cent. of the population of the Province.

(7) The need of seeking for new sources of natural gas at greater depth is apparent; this not only brings greatly increased costs, but also multiplies the risks, and the production end of the natural gas business is a miner's risk not lightly undertaken.

(8) The commercial end of the enterprise is hedged in with contractual obligations assumed when the fields were young and the wells flush, and the whole situation under prevailing conditions holds out no promise of improvement."

Two significant charts are included in the report on 1919 conditions. One shows the rock pressures in the Kent Field from 1907 to 1919. Pressure has declined from about 565 pounds per square inch in 1910 to about 317 pounds in 1919. During a similar period, namely from 1906 to 1919, the consumption rose from 2.7 million cubic feet to 20 million cubic feet in 1917 and was shown at the end of 1919 as being about 11 million cubic feet. Such a decrease in rock pressure, accompanied by unprecedently heavy consumption can have but one result.

The following information is condensed from the text of the Report on 1920 conditions, which itself is an abstract of the evidence submitted during the enquiry.

Shortage

That a serious and general shortage of natural gas exists throughout the gas area of Ontario is fully borne out by the testimony of many witnesses who gave evidence at the several localities where hearings were held. This shortage occurs during the winter months only, and is most acute when the weather is severe.

The residents of cities have been deprived of gas in about an equal degree throughout the various sections of the city. Here and there a very few urban consumers appear to have suffered less inconvenience owing to their proximity to the point of intake at the city limits.

Some suffering and considerable inconvenience have resulted from the lack of gas during the past winter; the general shortage was first felt in the winter of 1917-18.

The classification provided for in the Natural Gas Act, 1919, and Regulations thereunder, was put into effect at Sarnia, Windsor and Chatham during the past winter. This classification cut off certain large users in the given order of preference in favour of the homes, but in spite of these precautions the shortage continued on very cold days.

During the winter of 1918-1919 the gas supply was fairly adequate to meet the demand, with the exception of a few days of low temperature, because the winter was unusually mild.

The shortage through the winter of 1919-1920 just passed, was fairly uniform throughout the districts supplied by the Kent county gas fields. Gas was not obtainable in the cities even for cooking purposes in many instances on severely cold days.

Some of the evidence shows that rural consumers taking their supply from lines tapping the high pressure pipe-lines have never experienced a shortage except in cases of breakage, etc.; this also applies to smaller towns located near the source of supply.

The general tone of the evidence on gas shortage goes to show that the situation is a serious one. People have used gas for many years, and the shortage has come practically within the last two years. The homes are equipped with gas-burning appliances which do not admit of successful change to coal burning, and the chimneys require in many cases remodelling and rebuilding.

There can be no question that the evidence brings out very clearly the fact that the present available supply of gas is not adequate, under the present conditions of market and consumption, to supply the wants of the people in large centres.

It has been demonstrated that the period of greatest shortage occurs during the meal hours. During a cold wave the pressure at the city limits might be ample in the early hours of the morning, but when all the consumers lighted their cooking fires about the same time, the pressure would very soon drop to a point which made equal distribution impossible. This low pressure would be maintained during the day, but at night when the pull became steadier and more normal the lines would "pack up" and pressure rise again.

Several witnesses point out that the nocturnal rise in pressure is a source of great danger, as it is impossible sometimes to regulate the heaters so that the fire will neither go out nor increase to such an extent as to cause serious damage. No shortage occurs in the summer or during mild days through the winter except where there may be physical reasons such as small or choked service lines.

Causes of Shortage

The chief reason given for the shortage is the decline of the gas fields and the small area of new producing territory explored. It has been shown that the shortage and high price of coal increases the demand for gas. Weather conditions affect the consumption of gas to such an extent that there is four times as great demand on cold as on mild days. The output of the gas fields does not provide for the domestic "peak load", which occurs at a time when the weather is most severe. The decline of the Kent gas field was increased by the heavy output during the war, when industries were using immense quantities.

Supply

Distributing companies have no power to increase the supply of gas. They take the volume as indicated by the available pressure at the point where the distributing system connects with the high pressure supply line, and transmit to their customers what they can get. Distributing companies do, however, make every effort to relieve the situation during a sudden drop in temperature by cutting down the less important consumption. Only small amounts of gas are used in winter for industrial purposes, where gas is an essential part of the manufacturing process.

The number of domestic services is always increasing slightly, so that the domestic load does not become lighter. The supply is adequate at night even in cold weather. It is shown that, while gas is being consumed under present conditions in the homes, as high as thirty to thirty-five pounds "high" pressure at city limits is required to maintain a full distribution service.

The Union Natural Gas Company issued a notice of expected shortage to their consumers in 1917. The general supply will decline more rapidly in the future because adequate development work is not being carried on to offset the decline of the wells. There is a natural depletion of all gas fields which ultimately results in shortage and rearrangement of consumption. The rate of delivery of gas from the field depends upon the pressure behind it, and when this field pressure decreases the supply from the wells diminishes.

Under a general adjustment of consumers' appliances a constant pressure of two ounces would prove satisfactory. There would be sufficient gas in the Kent field for a reasonably good service if suitable changes in burning and handling were made. There should be enough gas for heating with eight to ten pounds at city limits. It can be expected that eight to ten pounds pressure will be the limit if no new wells are drilled and no further supplies of gas located. The service is good for nine months in the year and bad for three.

All distributing and other regulators are seriously affected by the corrosive elements in the Tilbury gas; this is the reason why varying pressures are difficult to regulate. Witnesses claim that the use of coal nearly doubles the cost of heating, and that natural gas should be restricted entirely to household use. If furnaces were taken off in severe weather during part of the winter, there would be ample gas for other purposes.

Consumption Data

If the pressure drops from four ounces to one ounce the reduction in gas volume is 1.3 per cent. As temperature rises and falls, gas expands and contracts; every five degrees drop in temperature causes one per cent. contraction. If gas temperature drops from fifty degrees in summer to thirty degrees in winter, causing a reduction of twenty degrees, the volume of gas is reduced four per cent., and this gives the consumer four per cent. more heat, so that contraction by temperature more than compensation for loss in volume due to low pressure.

On a gas bill of $10.00 there would be an advance of thirteen cents if pressure dropped from four ounces to one ounce. The correct proportion of air for proper combustion is 9½ parts to one of gas. If varying gas pressures prevent the use of proper proportions of air and gas, improper combustion results and the consumer complains of absence of heat. Great waste is also caused in this way. Domestic gas burners are connected with mixers which are set to draw in 9½ parts of air, but when the pressure drops to one ounce the right mixture of air and gas will not result.

Air cannot be introduced into the mains or pipe lines by gas companies because it forms a highly explosive mixture when mixed with gas under pressure. A case is cited where fifteen miles of new pipe-line was blown up by turning in gas to test the line before air had been allowed to escape; the result was that there were not a dozen lengths of pipe left worth picking up.

The best results can be obtained from the use of low pressure gas, but the present equipment in the homes is not suitable. The case of gas engines is cited, where low pressure gas gives the best combustion mixture. The same principle applies to gas used for cooking and other purposes. Satisfactory service was rendered in one home in Petrolia at one ounce pressure. Witnesses complain that at times the flame is yellow and at other times blue. When the pressure is low the efficiency of the flame is impaired and the heat units are not utilized. There is no difference in the quality of the gas; it is the same as it was ten years ago; the difference noticed by consumers lies in there not being enough air introduced at the burner on account of low pressure.

Meters are set to register correctly at two ounces when manufactured and tested, but will record accurately at four ounces with the difference that there will be a better flow of gas at four ounces. If pressure drops to one-quarter ounce the meter will still register the actual amount going through. If gas were flowing through a meter at one pound the customer would gain, because of the increased density of the gas. When pressures are low, the consumer is burning raw gas instead of gas and air in right proportions.

Many complaints were made by witnesses giving evidence at Woodstock, where Tilbury gas is supplied, that the odour given off goes through the homes and is injurious to health and destructive to furnishings. It was brought out that if leaks and unsuitable equipment were given more attention, and more care exercised, the discomfort and annoyance would not be felt. The same gas is used elsewhere without similar complaint.

Witnesses complained at all hearings of the increase of gas bills when gas supply was lowest. This was shown to be due largely to improper adjustment of

air mixer and larger amount of gas required during cold weather.

Transmission

The towns on the Southern Ontario Pipe Line receive their gas supply according to their relative distance from the gas field. Those nearest the fields get the better supply when shortage occurs. The transmission of large volumes of gas under reduced pressures through long pipe-lines is greatly retarded owing to the friction created. This is a serious factor when the field is supplying to its limit and a sudden increase in consumption takes place, reducing the pressure in the lines, so that the gas has to flow faster through the line. Duplicate delivery pipe-lines for conveying the products of different gas fields to market are a great and useless expense.

It was brought out that it is clearly in the interest of the consuming public that independent exploraton work be encouraged and that where small fields are opened (at considerable distance from market but within reach of existing pipe-lines), some method should be found so that present pipe-lines become the carriers of such gas under circumstances encouraging to the smaller operators.

Field Conditions

The decline of the Tilbury gas field was first indicated when gas compressor stations were first erected in 1913 and 1914. In the case of the Tilbury field the presence of salt water underlying the gas is found to be a great menace to the life of the field because, as the field pressures decline, the water invades and seals up the porous rock containing the gas. There was a general decline in rock pressures in the Union Natural Gas Company's field from 540 pounds in 1912 to 318 pounds at the present time. In 1915 the open-flow measurement of the Union wells was 90,000,000 cubic feet. In 1919 it was 33,000,000 cubic feet. Pumping outfits have to be maintained on the Tilbury wells for keeping the water down. These outfits consist of a separate gas engine unit for each well. The Union National Gas Company has 171 producing wells and 14 non-producers.

A former field with conditions somewhat similar to those of the Tilbury field was known as the Essex gas field. This field supplied the city of Windsor and large quantities of gas were exported to Detroit and Toledo. The field was drawn on for about ten years and ceased suddenly, causing great inconvenience. Every gas field begins to decline as soon as it is tapped.

In the drilling of wells in the Tilbury field the gas is encountered just above the big water, consequently pockets cannot be drilled down so as to form a gathering basin for the water at the foot of the well; this is a serious inconvenience because it makes constant and frequent pumping necessary. Wells are tested daily and weekly for shut-in pressures. This is a necessary part of the field work to determine what gas the well is making. Only three wells were frozen during the past winter in the Union Natural Gas Company's field. No producing wells were shut in during the winter.

The evidence goes to show that the Union Company's wells and those of the Glenwood and Beaver Companies, situated in the same field, were given the very best attention.

The open-flow measurements of all the wells in the Tilbury gas field show a decline of about one-third according to measurements taken in 1919. There is a strong possibility of the Tilbury field being drowned out if the output is not materially reduced; water is gaining in the field as pressures are lowered. The gas is being withdrawn at about one-third of the open-flow, which is much too fast for the safety of the field.

Water conditions in the eastern field are not nearly so serious and wells will produce down to a very low pressure. Tilbury field is a "tank" field; one part of the field communicates with another through the porous rock. In the Welland-Haldimand field there are wells where the rock pressures have declined from 500 pounds to 300.

The open-flow measurement of a well is not the amount of gas which the well will deliver into the lines; the actual delivery of the well is about one-third of the open-flow.

Large companies look after the field conditions more systematically than small companies or individuals, therefore the larger companies obtain the better results.

Recent drilling shows smaller results than formerly; this is true of all the Ontario established gas fields. Early drilling in the eastern field brought wells of from 200,000 cubic feet to 500,000 cubic feet open-flow per day. The Port Colborne-Welland Gas Company drilled five wells last year and kept three of them. Deep drilling has been tried in the eastern field and twelve wells failed. One witness claims that he could double his capacity by drilling on his reserve territory in the eastern field. In Rainham and Canboro townships the rock pressure has declined from 200 pounds to 120. The Chippewa Oil and Gas Company drilled eighteen wells in the eastern field at a cost of $21,600 and had five dry holes. It does not take the full output of all the wells to supply the summer demand.

The wet wells in the Tilbury field vary as to the time required to operate pumps. In some wells the water can be removed in a few hours; in others a whole day is required. All wells are operated to full capacity in all the fields to supply the winter demand. Some wells in the Tilbury field are being pumped at considerable expense although not producing gas, as it is found that this method keeps the water off the adjacent producing wells.

In Dover township the six deep producing wells which were drilled within the last two years by the Union Natural Gas Company, and which were connected to the Sarnia pipe line, have declined in production over one-half since they were drilled in. This is a far more rapid decline than that shown by the Tilbury wells. It is estimated that the gas field in Tilbury controlled by the Union Natural Gas Company will yield 58,859,510,000 cubic feet of gas when pressures drop to fifty pounds.

Total gas from the Dover wells drilled by the Union Natural Gas Company was in December, 1919, 5,961,524 cu. ft. per day, and in February, 1920, 3,439,858 cu. ft. per day, a reduction of about two and one-half million cubic feet.

Producing companies endeavour to maintain a reserve acreage in order to drill for increased supply and to protect their producing wells.

In the Glenwood Company's Tilbury wells the pressure is kept back to about 100 pounds to retard the flow of water into the wells. If the compressor plants were operated, the back pressure against the water would be lowered and there would be no gas. The Glenwood Company drilled nine wells in 1919, and the Beaver Company three, in the Tilbury field. More wells drilled in the Tilbury field would deliver the gas more quickly but would not increase the supply. The pressures would decline so much faster. The Glen-

wood Company would not keep a new well unless it measured over 20,000 cubic feet when brought in.

Twice as many pump-men are required to tend the wells in winter as in summer in the Tilbury field. The Union Company has sixty-five pumps out of one hundred and sixty-six wells; siphons are being replaced with power pumps as quickly as equipment can be obtained and installed. The expense in handling the water in Tilbury field is increasing. Water is being pumped from wells drilled as recently as 1918 in Tilbury field, but the greatest amount of water is found in the older wells.

The Glenwood Natural Gas Company has spent seven years in constructing a plant for removing the sulphur content from the Tilbury field. This plant is the only one of its kind in existence and is located in the heart of the Tilbury gas field. Crude ammonia in 17 per cent. solution is reduced to 9 per cent. and the gas passed through the liquid. The ammonia absorbs H_2S out of the gas and ammonium sulphide is the product. The difficulty is in freeing the ammonia from the sulphur. This purifier cannot be operated continuously because of constant corrosion, which necessitates repairs. The only practical purifying plant is the oxide system, but this system develops water vapour which condenses and gives trouble. The life of a gas pipe varies, depending upon the kind of soil in which it is laid, the attack from electrolysis, and the corrosive elements in the gas. Some pipes last forty years and other only one year.

The Dominion Natural Gas Company operating in the eastern fields carries 55,000 acres of operated leases and 64,000 acres of unoperated leases. Some companies hold ten times as much unoperated as operated acreage. The largest area held by the Dominion Company is where the limits are not yet developed; the smaller area is where the district is tested out as in the older fields.

The Dominion Company at the beginning of the year 1919 had 773 wells, and at the end of 1919 had 796 wells (having drilled 38 producing and abandoned 22 wells). Seven dry holes were drilled in 1919. More wells were drilled by them in 1916 than in 1919, but more money was spent on the drilling in 1919. The open-flow of the Dominion Company's wells showed a decline between 1906 and 1919 of about 90 per cent., between 1907 and 1919 of about 95 per cent., between 1908 and 1919 of about 50 per cent.

Increased costs of materials and labour prevent development work. Shallow drilling has been almost abandoned. Deep drilling costs have increased from 100 to 120 per cent. The Union Natural Gas Company has stopped drilling operations entirely. Companies cannot get funds invested in the natural gas business sufficient to continue exploration work and the opening up of new producing territory. The cost of drilling a deep well at the present time is from $20,000.00 to $25,000.00, while wells in the Tilbury field cost approximately $2,000.00.

In Dover township, where new gas and oil production has been opened up within the last two years by deep drilling, there are seven producing wells out of twenty, while in Tilbury the Union Natural Gas Company has 166 producing out of 179. The Union Company drilled eight wells in 1919 (four in Dover and four in Tilbury), not all producers, but got more gas in 1919 than in 1918. The Union Company has drilled thirteen deep wells. The Tilbury gas field is now thoroughly drilled. The drilling of twenty wells in the township of Dover was an effort to recover production. One deep well drilled on Rondeau Provincial Park, Kent county, cost $125,000.00 and was a dry hole.

There are large areas of gas producing formation underlying vast districts in the province of Ontario. The large area held by the National Gas Company, consisting of 30,000 acres in the eastern field, admits of great development. After operating for six years ten additional wells were drilled ;one of them came in with an output of two million and another of one and a half million cubic feet per day. This company have only eighty-five wells on the 30,000 acres and ten of these have been pulled. The territory is good for 200 wells and the output could be trebled if funds were procurable. There are many dry wells scattered over the eastern gas territory. One opinion claims that there is not enough productive area tributary to the city of Hamilton to furnish that city with a full supply of gas.

Many wells are abandoned in both the eastern and western gas fields, which are not replaced by new drilling ;this is a strong factor in decreased production. The Union Natural Gas Company spent $250,000 trying to locate more gas when abnormal conditions caused by the war created a shortage.

Waste

Lack of efficient equipment in the consumption of gas is responsible for a large percentage of waste. There is approximately forty per cent. of waste between transmission of gas and the consumer's burner.

Average Waste Percentage.

	1918	1919
Sarnia	24.8	14.5
Petrolia	41.5	34.0

The decrease is caused by the improvements made in the distributing plants.

The unrestricted consumption of gas without charge under freehold agreements is a very great source of wastage. In January, 1919, 100 free users consumed 46,400 cu. ft., while 100 pay users in Sarnia consumed 24,400 cu. ft. a difference of nearly 100 per cent. Considerable waste was encountered in defective lines in the town of Petrolia, but repairs to these lines resulted in reducing the leakage. Some meters were found to be runnng slow and these are being repaired and tested. The readjustment of all conditions from the gas field is required to reduce the waste of gas to a minimum.

An excellent idea of Canada's great mineral wealth is given in the Ontario Government's display at the Canadian National Exposition, a feature of which is an exact reproduction of the underworkings of a mine —a drift in which the latest type of drill is set up ready for operation and manned by a typical miner. That Ontario is one of the richest provinces in mineral resources to be found in the world is apparent from a cursory glance at the minerals and metalics and a study of the figures that are set forth of the total value of the chief minerals produced in Ontario during 1919. These include silver, $198,000,000; nickel, $150,000,000; iron, $80,000,000; gold, $61,000,000; copper, $54,000,000; cobalt, $7,000,000. These figures indicate that Ontario produces 45 per cent of the total mineral output of Canada, and tell a vivid story of the vast natural resources of this province. The exhibit is well arranged and has attracted a great deal of attention.

Northern Ontario Letter

Owing to the high price of silver during the last half of August having induced some of the heavy holders to release large quantities, quotations commenced to recede again during the opening week of September. It is not believed, however, that the price will long remain at a point near the 90 cents mark, but may be expected to again gradually work up to not far under $1.00 an ounce.

The leading Cobalt producers, in common with other large holders of silver in other parts of the world, took advantage of the recent high quotations and released a large amount of their hoarded stock of bullion. It is still believed, however, that close to $2,000,000 worth of the metal is contained in local vaults.

On Labor Day, September 6th, the members of the Imperial Press Conference visited the mining districts of this part of Northern Ontario. The magnitude of mining operations together with the other industries including agriculture and paper manufacture appeared to be somewhat of a revelation. The thought that all this wealth lies adjacent to the railway and that in the vast stretches lying beyond, no roads have yet penetrated, seemed to impress the visitors with the importance of the future which is unfolding before this country.

Arrangements are to be made to enlarge the milling equipment of the Beaver Consolidated mines, according to unofficial reports. This is said to have been made advisable owing to the large quantity of low and medium grade ore opened up during the past six or eight months. The plan to virtually work the Beaver mine over again promises to have been well advised and, in addition to encountering quite important shoots of high-grade ore, the life of the mine has been considerably lengthened by blocking out a large tonnage of low-grade ore. It is a quite general belief that the Beaver Company, in addition to its own earnings, may commence to receive revenue from the operation of the Kirkland Lake Gold Mines during the coming year. Should such prove to be the case, substantial dividends appear to be indicated for the Beaver stockholders.

A rock crusher together with an automatic shovel and loader is being installed at the Kerr Lake mine for the purpose of handling the large tonnage of low-grade ore lying in the dumps. It is intended to crush the ore to about 2½ inch ring, after which it will be conveyed by aerial tramway to the customs mill of the Dominion Reduction Company. In the meantime, this low grade material is being shipped at the rate of about 4,000 tons monthly, and constitutes at least half of the total current output from the operation of the Kerr Lake. Production from all sources is being maintained at upwards of 50,000 ounces monthly.

Ore shoots, quite rich in places, but more or less limited in extent, have been encountered on the old Lumsden mine. Work has been under way for several months, and it is understood an endeavor will be made to send out a shipment of ore at a reasonably early date.

Leaseholders of the old Ruby Silver property, situated in the south-eastern part of the township of Bucke, close to the old Green Meehan mine, have taken out a small pocket of high-grade ore and will make a shipment this month. The shoot is said to have contained about $5,000. Further work is planned with a view to opening up low or medium-grade mill-ore as well as possible shoots of high-grade ore.

Plans are being arranged to commence sinking to deeper levels on the Oxford-Cobalt property, situated in Gillies Limit. Lateral work at the first level has not opened up commercial ore but has offered encouragement to continue the work to a lower horizon and to a point where lateral work may be carried on in closer proximity to the contact.

The Gowganda District.

Advice from Gowganda indicates that another shipment of high-grade ore will be made this month, and may amount to about ten tons. It is intimated in semi-official circles that current output is about equal to expenditure, and that in addition a substantial quantity of low and medium-grade ore is being blocked out. It is also understood the question of installing a small mill is under contemplation. Should this course be adopted, it is quite reasonable to suppose that the winter roads would be taken advantage of to haul the heavier parts to the property.

The policy of temporarily patching up the Gowganda road has been adopted by the present Ontario Government. This method has already cost the country between $300,000 and $400,000 for work on this 27-mile road, and still leaves the field without satisfactory transportation. Last year, the defeated government recognized the folly of the policy and decided to construct a macadam road, but with the rise to power of the U.F.O.-I.L.P. party, this work was discontinued and the old game still goes on with the mines of the Gowganda field paying the piper.

The first unit of the power plant of the South Bay Power Company, at Gowganda, is said to be nearing completion and current may be turned on within a short time.

Everywhere throughout the active silver-mining districts, including Cobalt, Gowganda, South Lorrain and Elk Lake there is a tendency to look to the coming year as one likely to be marked by continued high quotations for commercial bar silver, and with this belief in mind arrangements are being made to carry on work at the fullest possible capacity.

THE GOLD MINES.

The Porcupine Field.

The trend of the price of commodities during the past month or six weeks has given rise to the hope that a definite turn has taken place in the downward motion of the price of material. If this is actually the case, net earnings at the gold mines will increase accordingly, because with them the gold will always command the standard price, while cheaper material will reduce the cost of production.

An interesting report originated in Porcupine this week in which it is said the Moneta mine which adjoins the Hollinger on the immediate west may figure in a deal with English interests and may be worked in a big way. This property is regarded as one of the most favorable of the undeveloped pieces of ground lying in close proximity to the producing area. With its neighbor the Hollinger Consolidated having actually mined close to $38,000,000 and with more than $40,000,000 more blocked out, and with indications of these bodies continuing to enormous depth, the prospect of the Moneta ultimately developing in a satisfactory manner appear to be extremely good. The

strike of the Hollinger ore bodies is directly into the Moneta.

Concerning this property, it will be recalled that a report was in circulation last spring that interests identified with the Hollinger had offered 25 cents a share for the Moneta, but publicity given to the matter caused the report to subside.

In connection with opening the Porcupine V.N.T. Mines, it is believed the balance of this year may be occupied in de-watering the underground workings, etc., but that by early in the new year the property will be in full operation. The $30,000 provided in the sale of the first block of treasury stock at 15 cents a share is to cover this preparatory work, while the sale of the next block of 200,000 shares at 30 cents each, as per the underwriting arrangement, is expected to place $60,000 in treasury with which the mine can be brought to the producing stage and probably pay its own way. It is just possible the mill may also be overhauled and enlarged so as to treat about 150 tons daily, in which case the operation would become an important one.

Considerable criticism contiues to centre around the McIntyre-Porcupine's purchase of a coal property in Alberta. Full details are not available, but a good many stockholders, particularly those resident in Northern Ontario and familiar with the situation, are expressing open resentment of this attitude of the President of the McIntyre Co. employing funds of the company on a venture of that kind when the McIntyre is itself but getting away to a fair start.

The Davidson Company is also under fire. The company recently made the proposal that the stockholders option at least fifty per cent of their shares "until nine months after the completion of a 500-ton mill," but some of the shareholders see in this a situation amounting to the same thing as though they joined the pool. With their shares tied up, they would not be in a position to take advantage of a favorable market to sell, nor would they be able to get out provided things failed to go well. The company is said to have arranged with English interests to underwrite a large amount of treasury stock, provided they are given an option on 50 per cent of the outstanding stock. Sailing may not be altogether too smooth, judging from the attitude of stockholders who know there is no law to compel them to either option their shares or to place them in a pool.

Reports are current that the Big Dyke property in the township of Deloro may resume operations this fall. The plan is said to be an endeavor to carry work to deeper levels with a view to finding whether or not the gold content increases at depth. Values from surface to a depth of 100 feet, as shown in work done a year or so ago are comparatively low.

A diamond drill is being transported to the Clifton-Porcupine property and will be used for the purpose of ascertaining the extent of the continuation of ore-bodies opened up as a result of the large amount of underground work formerly done. This is expected to serve as a guide in determining the future development policy.

The Kirkland Lake District.

The proposed consolidation of the Kirkland Lake, Teck-Hughes and Orr Gold Mines is one of the chief topics of discussion in the Kirkland Lake district. It is believed, however, to be altogether too soon to estimate the possibilities of this being brought about. Proposals and counter-proposals will probably be made, and no doubt the balance of the year may be occupied in an endavor to arrange terms mutually satisfactory.

The Ontario Government has placed a force of men at work of building a road from the Tough-Oakes mine, east through Lebel township to Mud Lake for the benefit of the property owners in that district. The large amount of activity and the favorable results being achieved on such properties as the Bidgood, Wood-Kirkland, Moffat-Hall and others tends to indicate that another gold mining camp of importance may be in the making. It is believed advantage will be taken of the winter roads to transport a good deal of machinery this winter, and a number of properties will likely be equipped with mining plants by next spring.

Advices from the Argonaut Gold Mines at Beaverhouse Lake continues favorable, and the decision to carry work to a depth of perhaps 500 feet has aroused more than ordinary interest. The proving of a mine some twelve miles east from the present producing part of the Kirkland Lake gold area is regarded as being of the utmost significance—especially so on account of the mine being on an unbroken belt of rock formation extending all the way from Kirkland Lake, which makes the intervening territory highly promising from a mining standpoint.

T. J. Flynn has secured an option on the Patricia mine at Boston Creek. The price is said to be in six figures, and the option of quite short duration. This property was formerly equipped with a small mill, but the entire plant was destroyed by fire in 1919, and the property has remained idle since that time. Dr. Flynn is associated with the Matachewan Gold Mines, but whether or not he is in any way acting on behalf of that company in the present instance is not stated.

On all sides in the gold mining districts of this part of the province, everything points to increasing activity with the approach of winter and a better labor supply.

Mr. P. E. Hopkins, geologist of the Provincial Department of Mines, returned to Toronto this week after spending about three months in survey and geological work in the vicinity of Schreiber, from which localities come reports of a gold strike. According to Mr. Hopkins' report, however, it would appear as if the prospects of any big output of gold from the district are small. The Jackson claim, which was the original strike, is about three miles east of Schreiber. Mr. Hopkins states that it is a high-grade gold prospect with considerable galena also showing. The quartz vein is situated in Keewatin, close to the granite. "It is a very narrow high-grade gold vein," said Mr. Hopkins, speaking of the discovery, "it is likely that more little veins will be found, but whether they will amount to anything I could not say." He was of the opinion that the veins would prove too small to be worked. The prospect looked promising, however, and formations in the district might promise further discoveries. Mr. Hopkins is getting out a map of the whole district showing the territory fifteen by ten miles which should prove of value in further prospecting work.

TORONTO MINING STOCKS.

Following are the average quotations for gold, silver and miscellaneous stocks on the Standard Stock Exchange, Toronto, for week ending September 4th, 1920.

Silver.	High	Low	Last
Adanac Silver Mines, Ltd.	2½	2	2⅛
Bailey	5	4¾	4¾
Beaver Consolidated	42½	39	42
Chambers-Ferland	7	7	7
Cobalt Provincial	45	43	44
Gifford	1½	1⅛	1⅜
Hargraves	1¾	1½	1⅞
La Rose	33½	33½	33½
McKin.-Dar.-Savage	58	55	55
Mining Corp. of Canada	1.80	1.60	1.65
Nipissing	11.05	10.25	11.00
Ophir	2½	2	2½
Peterson Lake	13½	13¼	13½
Temiskaming	33	33	33
Trethewey	27	25	25¼
Gold.			
Apex	1⅞	1½	1⅞
Atlas	13	13	13
Boston Creek Mines	17	17	17
Dome Extension	38½	36½	38½
Dome Lake	4		
Dome Mines	12.50	12.25	12.25
Gold Reef	3⅛	2¾	3⅛
Hollinger Consolidated	5.80	5.70	5.80
Keora	16½	15	15¼
Kirkland Lake	53½	52½	52½
Lake Shore M. Ltd.	1.15	1.13	1.15
McIntyre	1.98	1.93	1.93
Moneta	10	10	10
Newray Mines, Ltd.	6	6	6
Porcupine Crown	25	25	25
Porcupine V.N.T.	24¾	24	24¾
Preston East Dome	2⅛	2⅛	2⅛
Schumacher	18½	18½	18½
Teck-Hughes	10	10	10
Thompson Krist	8¼	8	8
West Dome	6½	6¼	6¼
West Tree Mines Ltd.	5½	5½	5½
Miscellaneous.			
Rockwood Oil, Gas	3½	3⅞	3⅜
Vacuum G.	25	24	24½

TORONTO COAL PRICES.

Toronto, September 9.—Toronto coal dealers report that hard coal is particularly tight and that there is practically no production. Last week's prices remain unchanged, mine run still being quoted at $14,25 to $14.50 f.o.b. Toronto: Smokeless coal $14.50 to $15.00; hard coal $8.00 to $11.50 gross tons at mines, American funds.

METAL QUOTATIONS.

Fair prices for Ingot Metals in Montreal Sept. 9th 1920. (In less than carload lots).

	Cents per lb.
Copper, electro	23¾
Copper castings	23½
Tin	53
Lead	9½
Zinc	10½
Aluminum	35
Antimony	8¾

NOTES FROM THE NOVA SCOTIA COLLIERIES

Production of Cape Breton Collieries of Dominion Coal Co.

The total coal output for the month of August was about 9,000 tons less than the total output for July. The total output last month reached 260,667 tons, while the output for July was 269,116 tons. The output for August, 1919 totalled some 242,495 tons. Several one day strikes and accidents to machinery is responsible for the low output last month. The following are the individual outputs of each colliery.

	Tons.
No. 1	28,693
No. 2	44,564
No. 4	25,537
No. 6	19,980
No. 9	19,541
No. 10	10,317
No. 11	14.634
No. 12	14,520
No. 14	15,939
No. 15	9,066
No. 16	13,078
No. 17	2,540
No. 21	13,442
No. 22	16,898
No. 24	3,979
Total	260,667

The interesting features of the individual production of the collieries is the high percentage of Emery Seam coal, which exceeded eleven per cent of the total; the recovery of output rate in the Waterford District, and the appearance of No. 17 as a substantial producer, and the comparatively small quantity of coal coming from the older mines in the Glace Bay District, from Nos. 2 and 9 in particular.

The shaft of the hoisting engine at No. 12 Colliery broke recently, and repairs may necessitate the idleness of this colliery for several weeks. In the meantime every effort is being made to place the men at the neighboring collieries.

Labor Matters

The Royal Commission is holding final sessions in Sydney, and its Report is shortly anticipated. The miners' leaders are endeavoring to affect the findings of the Commission in their favor by giving out interviews to the newspapers threatening serious trouble unless their demands are granted in full. The judicial status of the Commission, and the etiquette of the judicial procedure is meeting with scant recognition.

In view of the undertaking of the U. M. W. representatives in Montreal in January 1918, which was that wage rates and conditions in the United States were not to be made the basis of comparisons with wage rates and conditions in Nova Scotia, it is revealing to note the statement of the President of the U. M. W. in Nova Scotia, recently given out, as follows: "One thing is certain, if the United States branches succeed in obtaining their demands for increased rates, which they have made, we, of the Canadian United Mine Workers, will make the same demands here, and we will press to have them granted. In this we shall have the support of the American miners without doubt." The President of the Nova Scotia District also expressed his opinion that "nationalization of mines will prove to be the only cure for the miners' troubles, which exist over the world today."

Miners' Relief Societies.

A disappointingly retrograde step was recently taken by the miners and steel-workers at Sydney Mines, who voted for the dissolution of the Benefit Society which, since the full operation of the Workmen's Compensation Act, has afforded relief payments in disability to work arising from sickness. This action is the more surprising, as the Glace Bay miners have decided to increase the extent of their payments and the scope of the benefits. It has been established by careful recording of statistics over many years in the Cape Breton coal-mining districts that two-thirds of the disability to which the miner is subject arises from sickness, and only one-third from occupational accident and disease. Where the sick benefit societies have not been in existence, the miners have usually been frequently requested to contribute to pithead collections for relief of the victims of sickness, and while this system has not of course proved satisfactory or equitable in practice, it has also made greater demands than the regular dues of the sick societies upon men who are thoughtful towards their neighbors' misfortune.

New Bankhead for Nova Scotia Steel & Coal Co.

The Nova Scotia Steel & Coal Company will shortly erect a concrete and steel bankhead at the Jubilee Colliery, Sydney Mines. The existing bankhead was not intended to serve as a permanent erection, and it possesses some inconvenient features. A bankhead capable for handling an immediate tonnage of 1,200 tons, and an ultimate tonnage of 2,500 tons daily is projected. Two electric winding engines are proposed, one to handle the coal from the lower seam, and one to deal with the upper seam output. Modern screening arrangements, including picking belts and shaking screens of the "Marcus" type will be employed. Box-car loaders are also to be provided. The bankhead and its equipment will be electrically operated and will include the labor-saving arrangements for tub-handling that are usual in modern bankheads.

The underground equipment of the Jubilee Colliery is of modern type, including electric storage-battery locomotives. The longwall method has been used with success, the thickness of the seams and the roof cover being, both in the upper and lower seams, well adapted to the longwall system of mining.

JUDGMENT AGAINST GRANBY COMPANY IN DISPUTE OVER TITLE TO CASSIDY COLLIERY SITE.

In giving judgment in favor of the Esquimalt and Nanaimo Railway Company, of Vancouver Island, in a very important settlers' rights suit, entitled E. & N. Railway vs. Wilson & McKenzie, Mr. Justice Gregory finds that the Granby Mining Company loses its title to the property on which it built the fine town of Cassidy a few years ago. The Granby Company has an investment there of close on a million and a half dollars.

It is quite certain—the fact is even mentioned by His Lordship in giving his judgment—that the case will be carried finally to the Privy Council in London. The Granby people are carrying on mining operations at Cassidy, which is a prosperous and growing mining centre, and work will it is understood, go ahead in any event until the disposal of the case by the highest court.

First, the appeal will be taken to the highest court in British Columbia at the sittings in October in Vancouver, and it may be possible to secure final judgment in London some time next year.

The Granby Company purchased the property from Messrs. Wilson & McKenize, who were executors of the estate of the late Joseph Ganner and Mrs. Dunlop. The property involved is in the Cranberry district, a few miles south of Nanaimo. The parties named had received the coal lands under the Settlers' Right Act, having been in possession of the surface rights prior to the building of the E. & N. Railway. Upon application a crown grant was isued to the Granby Company by the Government about three years ago. On February 18, 1918, the E. & N. Railway brought suit for a declaration that the crown grant is null and void, and that the plaintiff railway company is the proper owner of the coal under the old grant made by the Dominion Government in consideration of the building of the railway.

The trial was held at Victoria in January and February of this year.

"It seems to me to be abundantly established," said Mr. Justice Gregory, in giving a written decision of considerable length, "that the legal estate in the disputed lands is in the plaintiff company, and that it is the proper party to bring the action." His Lordship adds that he agrees with the ground set up by Mr. Davis in his argument that there was no proper hearing of all parties concerned as provided by the statensively into the six other questions raised by Mr. Davis in his argument.

Mr. Taylor, for the Granby Company, had urged quite vigorously that no hearing before the Lieutenant-Governor-in-Council, of which the plaintiff was entitled to notice, was necessary. He urged that the hearing was an act of the executive, that it was secret and could not be inquired into, and that in any case the executive probably had complete information before it before giving the crown grant to the Granby Company.

THE LATE MR. BEN COOKE.

Mr. Ben Cooke, who for fourteen years acted as drill demonstrator, and service man for the Canadian Ingersol-Rand Co., died at his home, Garson Quarries, near Winipeg, Manitoba, on August 26th, after a short illness.

Mr. Cooke was a mining man of wide experience, having started his mining career some thirty five years ago in the old Phosphate Mine near Buckingham, Quebec. Working from there through the various mining camps of the east and middle west through to British Columbia. He also spent considerable time in the Sudbury district, working at the Canadian Copper Co. as foreman of the rock house at the old Copper Cliff Mine. He also had an extensive experience in the contracting field, having for some time been in charge of the Kenora Office of the Canadian Ingersoll-Rand Co., Limited, during the time they were double tracking the C. P. R. between Fort William and Winnipeg. He was also for some time in charge of drilling for the Cooke Construction Co. on their work at the Halifax Terminals, in Halifax, N. S. and with the Norman McLeod Construction Co. when they excavated the rock for the Spanish Aero Car installation at Niagara Falls, Ontario.

He leaves a widow and three children.

Ontario's Metalliferous Production, First Half Year--1920

Returns received by the Ontario Department of Mines for the six months ending June 30th, 1920, are tabulated below, and for purposes of comparison the quantities and values are given for the corresponding period in 1919. Tons throughout are short tons of 2000 lbs.

General Remarks.

The aggregate output from metalliferous mines, smelters and refining works of the Province of Ontario for the six months ending June 30th shows a considerable increase in value over the 1919 figures. For the first time since 1903, when the Cobalt silver camp was discovered, the output of gold exceeds that of silver in valuation. The new electrolytic refinery of the British American Nickel Corporation is now in operation at Deschenes, near Ottawa.

Product.		Quantity		Value $	
		1920	1919	1920	1919
Gold	(ounces)	277,656	231,729	5,690,504	4,666,759
Silver	"	4,474,322	5,744,172	5,077,028	5,951,362
Platinum metals	"	184. 45	30. 08	12,433	1,805
Cobalt (metallic)	lbs.	113,239	59,337	266,045	93,157
Nickel (metallic)	"	4,854,979	5,147,745	1,696,687	1,825,347
Nickel Oxide	"	3,491,544	5,503	814,070	1,567
Cobalt Oxide	"	388,318	202,912	645,873	301,791
Other Cobalt Compounds	"	1,417	26,289	1,029	16,164
Nickel Sulphate and Carbonate	"	159,183	133,732	15,308	15,531
Lead, pig	"	749,820	1,481,204	71,006	54,802
Copper Sulphate	"	89,939	.....	4,497	.....
Copper, blister	"	2,918,153	3,080,492	470,949	452,055
Nickel in matte exported*	tons	9,527	7,072	5,338,120	3,535,915
Copper in matte exported*	"	4,434	4,341	1,241,520	1,128,753
Iron Ore, exported x	"	2,189	5,804	18,512	44,309
Iron, pig !	"	28,771	24,095	738,079	670,512
Total		.....	.....	22,101,580	18,759,829

Gold.

Ontario's position as a producer of gold is becoming increasingly important. For the first half of 1920 the output was nearly 22 per cent. greater than the 1919 production. Production of gold by individual mines is presented herewith:

Porcupine.

Hollinger	$2,928,079
McIntyre	1,085,298
Dome	989,566
Porcupine Crown	70,017
Dome Lake	46,809
Northcrown	31,019
Davidson	13,489
Total	$5,164,277

Kirkland Lake.

Lake Shore	243,977
Kirkland Lake	137,676
Teck-Hughes	125,137
Total	$506,790

From miscellaneous mines the output was $17,138, of which the Argonaut in Gauthier township contributed $16,938. There was also a recovery of gold worth $2,498 from nickel-copper refining operations. In addition gold mines produced 49,156 ounces of silver worth $56,364. During the period 673,694 tons of ore were milled — the milling capacity at Porcupine at the end of June was 5,296 tons and at Kirkland Lake 330 tons daily. The 150-ton mill of the Wright-Hargreaves mine at Kirkland Lake is nearing completion.

Silver.

The quantity of silver marketed during the period was considerably less than the output. An average price of $1.30 per fine ounce obtained for the first quarter of 1920, while for the half year the average New York price was $1.17 for silver in the open market as distinguished from the fixed price, retroactive to May 13th, of $1.00 per ounce (1000 fine) under the Pittman Act for metal produced, smelted and refined exclusively within the United States. For the month of June the average open market price in New York was 90.84 cents. This disadvantage to the Ontario producer, however, was more than offset by the exchange rate. Since June the export price of silver has risen gradually until it approaches the quotation for domestic silver.

During the period a total of 4,474,322 ozs. worth $5,077,028 were marketed. Of this total 225,513 ounces came from the Miller Lake O'Brien and Castle properties at Gowganda, 23,414 ounces from nickel-copper refining operations and 49,156 ounces from gold ores. Some producers of silver were paid for the cobalt content of ores, concentrates and residues marketed. In all $138,317 was received for 296,116 pounds.

Refineries.

During the half year 1,445 tons of ore, 581 of con-

*Copper in matte was valued at 13 cents and nickel at 25 cents per pound in 1919. For 1920 the values have been placed at 14 and 28 cents per pound respectively. The total matte produced contained 15,030 tons of nickel and 7,705 tons of copper. See heading "Nickel-Copper" for explanation.

xTotal shipments of iron ore were 13,962 short tons worth $74,073.

!Total output of pig iron was 321,826 tons valued at $8,255,916. Figures in the table represent proportional product from Ontario ore.

centrates and 1,185 tons of residues were treated in the southern Ontario refineries located at Thorold, Doloro and Welland for a recovery of 1,477,490 ounces of silver in addition to arsenic, metallic nickel, metallic cobalt and compounds of these last mentioned metals. The companies operating were the Coniagas Reduction Co., Deloro Smelting and Refining Co., and Metals Chemical Ltd., respectively. The last mentioned operated for the first three months of the year only, after which the plant was taken over by Ontario Smelters and Refiners Limited. Alterations in plant and process were made, which prevented production during the second quarter of the year. This new company also owns the plant at Chippawa formerly operated by the Standard Smelting and Refining Company. Copper sulphate was recovered from residues by one of the companies. It should be pointed out that the output of metallic nickel oxide from silver ores is small compared with that from nickel-copper refining. Only 203,713 lbs. of metallic nickel and 15,384 lbs. of oxide were marketed. In the table under the heading "Other Cobalt Compounds" are included cobalt carbonate, hydroxide, sulphate and acetate.

Nickel-Copper.

During the half year 627,681 tons of ore were raised and 520,705 tons smelted, the total output of nickel-copper matte being 28,365 tons containing 15,030 tons of nickel and 7,705 tons of copper. The British America Nickel Corporation and the International Nickel Company of Canada worked the Murray and Creighton mines respectively, while the Mond Nickel Company raised ore from the Garson, Levack, Bruce, Worthington and Victoria No.1.

Refineries.

As regards shipments of matte, 7,944 tons went to Canadian refineries at Port Colborne, Ont., and Deschenes, Que., 16,323 tons to the United States, and 1,123 tons to Wales. During the period the new electrolytic refinery at Deschenes commenced operations and had 1,185 tons of matte in process on June 30th although no refined metals were ready for market at that date. The new plant which permits recovery of metals of the platinum group in pure form is reported to be working very satisfactorily as is also the smelter at Nickelton, one mile from the Murray mine, where the ore is smelted direct without preliminary roasting. In addition to metallic nickel, nickel oxide and blister copper, there was a by-product recovery at Port Colborne of the precious metals, gold, silver, platinum, palladium, rhodium, ruthenium, osmium and iridium. There was also a small recovery of copper in the United States from Ontario silver ores.

Iron Ore and Pig Iron.

Shipments of siderite ore from the Magpie mine by the Algoma Steel Corporation and of briquettes produced from magnetite ore by Moose Mountain, Ltd., Hutton township, totalled 13,962 short tons valued at $74,073. The first mentioned used its entire output in the blast furnaces of the Corporation at Sault Ste. Marie, while the latter shipped its product to Quebec and the United States. The new Helen mine of the Algoma Steel Corporation has been diamond drilled and it is estimated that over 100 million tons of siderite are available for mining.

The pig iron output by the Algoma Steel Corporation at Sault Ste. Marie, Steel Co. of Canada at Hamilton and Canadian Furnace Company at Port Colborne was 321,826 short tons valued at $8,255,916. Only 58,387 tons or 8.94 per cent. of the total of 653,137 tons or ore charged to the 7 furnaces in blast was of domestic origin, the balance being imported from the United States. Furnaces of the Midland Iron and Steel Co., Parry Sound Iron Co., and Standard Iron Co., were not operated during the period. The output of steel from pig iron was 337,048 tons valued at $1,661,570. These figures do not include any secondary steel produced in the electric furnace from scrap iron and turnings.

Lead.

The entire output of pig lead came from the mine and smelter near Galetta on the Ottawa River operated by the Kingdon Mining, Smelting and Manufacturing Company. The product was consigned to the Jas. Robertson Company, Limited, of Montreal, manufacturers of plumbing supplies. There is a small recovery of lead from the silver ores of Cobalt treated in the United States refineries, returns of which are received at the end of the calendar year.

PRODUCTS OF THE MINES USED IN PAINT AND VARNISH INDUSTRY.

A statistical review of the paint and varnish industry in 1918 in Canada, issued by the Dominion Bureau of Statistics, shows a varied use of the products of the mine in use as solvents, pigments and fillers.

Of interest to the coke oven industry is the use during 1918 of the following thinners and solvents, which are, or can be, the product of coal distillation:

	Quantity	Value
		$
Creosote (gals.)	53,073	13,747
Naptha (gals.)	904,673	286,053
Benzine etc. (lbs.)	2,863,110	166,711
Benzol (lbs.)	338,639	16,133

Among the pigments and driers, is noted the use of 7,198,248 pounds of zinc oxides and lithopone, valued at $721,527, and 1,462,636 pounds of white lead, valued at $168,255.

As a filler, there was used the following:

	Quantity	Value
	pounds	$
Asbestos	3,738,230	24,325
Barytes	4,326,670	76,278
Whiting	8,422,276	116,817
Pig Lead	10,593,351	874,638

Among the exports from Canada during 1918 is included 588,229 pounds of cobalt oxide and cobalt salts, valued at $853,737, together with mineral pigments, oxides and ochres totalling 15,389 hundredweight and valued at $18,377.

Among the exports into Canada are included considerable quantities of various preparations of lead, ochres and umbers, metallic oxides, zinc and coal tar bases.

It is evident from the statistics of the Bureau that the paint and varnish industry is an important customer of our mines, and that notwithstanding that over $17,000,000 of paints and varnishes were manufactured in Canada during 1918, there still remains further room for expansion in the business, seeing that imports totalled $6,309,836 worth in the same period. Of course, much of this import value was made up of primary products which enter into the finished article, and are not the product of Canada.

Stench Warnings in Metal Mines

By A. C. Fieldner (Chemist Bureau of Mines) and
S. H. KATZ (Assistant Physical Chemist,
Bureau of Mines).

Signals and warnings are necessarily of such a nature as to be perceived through one of the five senses. Most signalling devices appeal to the eye or the ear, and the principal means of sending a warning from the surface down to the miners in a metal mine has been by messengers, electric gongs or lamps, telephones, interrupting the flow of compressed air or introducing water in the compressed air lines.

Recent investigations (Katz, S. H., Allison, V.C., and Egy, W. L., Use of Stenches as a Warning in Mines, Technical Paper 244, 28 pp., 1920) of the Bureau of Mines in co-operation with several large metal-miners through the sense of smell are exceedingly simple to install and are on the whole as effective as any other system heretofore used.

Briefly, the door or stench system of warning consists of injecting one-half to one pint of a very strong smelling liquid (preferably one with a vile odor) into the main compressed air line at the surface. The air current quickly vaporizes the stench liquid and carries it to all parts of the mine where compressed air is used. Thus miners in working places operating air drills receive a positive warning to come to the surface within a few minutes after the stench has been introduced at the surface.

Nature of Stench Liquid:

Obviously a stench liquid much not produce a poisonous or injurious vapor. The warning must be harmless under all possible conditions. The odor preferably should be disagreeable rather than pleasant in order to be most effective as a warning, and should be distinctive so that there would be no danger of mistaking it.

Of the large number of substances investigated, ethyl mercaptan (C_2H_5SH) has proven most suitable from the standpoint of cost, availability and effectiveness. Ethyl mercaptan is a volatile liquid boiling at 98 deg. F. and freezing at 228 deg. F. below zero. It has a disagreeable and characteristic skunk-like odor which will not be mistaken for any odors commonly found in mines. Less than 0.01 per cent by volume of ethyl mercaptan vapor in air will give a strong odor.

Ethyl mercaptan may be obtained from certain chemical manufacturers at a cost of approximately $2.25 a pound. It is not usually kept in stock by drug and chemical dealers. For this reason, experiments have also been made with amyl acetate, artificial "banana oil," which may be purchased from any chemical supply house or dealer in paints and lacquers.

Amyl acetate does not evaporate as quickly as ethyl mercaptan and requires a somewhat larger quantity to give a strong odor; however, in actual mine tests it proved quite effective and may be used as a second choice when ethyl mercaptan is not available. The odor is distinctive but rather pleasant to most people, and therefore is not so suitable a warning as the stench.

Practical Tests in Metal Mines:

Practical tests of stench warnings have been made with excellent results in the following mines:

North Butte Mine (copper), North Butte Mining Co., Butte, Mont.

Central Mine (gold), North Star Mining Co., Grass Valley, California.

Empire Mine (gold), Empire Mining Co., Grass Valley, California.

Bennett Mine (iron), Bennett Mining Co., Keewatin, Minnesota.

Caspian Mine (iron), Pickands, Mather and Co., Caspian, Mich.

The test at the Caspian mine with ethyl mercaptan was especially successful. A. H. Trestrail, range safety inspector, stated on coming to the surface after this test was made, that "the entire fourth level was completely saturated in about 2½ minutes and that there could be no mistake in detecting the odor." As a result of this test Pickards, Mather and Co. plan to install stench injectors on the air lines of all their underground ore mines.

Amyl acetate was used in the test at the Central mine, at Grass Valley, California. The time required for the warning to traverse various distances in the mine are given in the following table:

Observer No.	Distance by pipe, Feet.	Time in minutes.
1	4000	3
2	4800	10
3	3600	7
4	3800	4
5	7800	8

The warning was positive in all cases.

Quantity of stench liquid required for test:

One and three-fourths pints of ethyl mercaptan or three and one-half pints of emyl acetate are required for each 100,000 cubic feet of free air (compressed air and ventilating current) entering the mine per minute.

The injector is easily constructed from a stout glass cylinder, or an air-tight metal cylinder with a sight glass, and capable of withstanding the pressure in the line. It is connected both above and below the liquid to the air line with short one-half inch pipes. The stench liquid is put in through a removable plug, a valve is placed in the pipe below the liquid and one in the pipe above, the latter to allow air at the line pressure to fill the space emptied when liquid flows into the air line. Satisfactory results have been obtained by simply running the stench into the air line with no baffle for holding the liquid up to the passing air. Such an installation need not cost more than $20 to $30. Complete instructions for making stench warning tests and details of apparatus required are given in Bureau of Mines Technical Paper 244, which may be obtained by writing to the Director of the Bureau of Mines, Washington, D.C.

Stench warnings are not considered suitable for use in coal mines, as the stench must be introduced into the ventilating current which travels at a much slower velocity than the compressed air used in operating drills in metal mines.—U.S. Bureau of Mines, Reports of Investigations.

CYANIDE IN CANADA.

(By J. A. McRAE, Cobalt, Ont.)

A peculiar situation is developing in connection with the use of cyanide at the precious metal mines of Canada, particular in the silver and gold mining districts of Northern Ontario, including the Cobalt, Porcupine and Kirkland Lake fields.

Up until quite recently, the Cassel Cyanide Company, of Glasgow, Scotland, supplied the great majority of the mines with cyanide, the price of the chemical ranging from around 16c a pound before the war up to about 24c a pound at the present time. Although the increase has amounted to about fifty per cent above pre-war prices, yet it is interesting to note that the manufacturers of similar grade cyanide in the United States are charging the American consumer about 35c a pound. In fact at one time during the war, the price of the chemical in the United States soared to over a dollar a pound. As to this, it has always been more or less a mystery why the Cassel Cyanide Company of Glasgow did not take advantage of this opportunity to enter the remunerative United States market. This is a condition which has given rise to wonder as to whether or not the manufacturers may have some understanding among themselves as to what field they are to bid for business.

The New Competitor.

Recently, however, a new competitor has entered both the Canadian and United States field, even extending its activities to Mexico. This is the American Cyanimid Company, of Niagara Falls. Moreover, it has become quite evident that its bid for trade is one to be reckoned with quite seriously. Already the mines of the great silver mining camp of Cobalt are procuring the greater part of their cyanide from this new source, and although the inconvenience caused by using this low grade article is considerable, yet the saving in cost is said to more than compensate for this added inconvenience.

It is now interesting to learn that the leading gold mines of Canada are turning their attention to the possibility of effecting a saving by using the low grade cyanide, toward which end the Hollinger Consolidated and the Dome Mines have each ordered a carload and will conduct exhaustive experiments. Should the tests prove to be satisfactory, it conveys the threat of possibly eliminating the Cassel Cyanide as a serious competitor.

The truth appears to be that although the product of the American Cyanimid Company is low grade as compared with the Cassel cyanide, yet by using large quantities of the low grade material the same result is obtained, and that about 19 or 20 cents worth of the low grade material goes as far as about 24 cents worth of the high grade article.

It seems to be quite obvious, therefore, that in order to continue to do business in this country the Cassel Cyanide Company will be obliged to do some close figuring and possibly reduce its price to around 19 cents a pound. In event of this, the mines would probably be found giving the high grade article the preference.

An Expression of Fear.

Among certain representative mining men the fear is expressed that the precious metal mines are beset with danger on account of the present situation. They point to the fact that in the chemical industry in various countries a careful study reveals the fact that when one competitor begins to find business unprofitable it is very often found ready to retire entirely from the field, its successful rival paying a fair amount as compensation. This gives rise to the thought that were the American Cyanimid Company to offer the Cassel Cyanide Company a lump sum to retire from the Canadian field, just what would be the result? In event of this it is asked, would the successful competitor be willing to continue to sell cyanide at the present extremely low margin of net profit, or would advantage be taken of the opportunity to increase net earnings.

The mining men anticipating the possibility of such a result as that outlined are in the minority, and the majority seem to believe the Cassel Cyanide Company will never retire from the field. It is due to this that close observers scent the smoke of a possible battle, in a contest wager on the one hand by the Cassel Cyanide Company and on the other by the American Cyanimid Company. It is intimated that interests closely associated with the Dupont Powder Company are vitally interested in the affairs of the American Cyanimid Company. This being so a lively contest may develop provided the Cassel Cyanide Company decides to remain in the field.

Those who have followed the trend of developments in every phase, are free to admit that the fears expressed have some little foundation, and that the present is the time for mine operators to give the matter careful study.

First of all, the body best suited to take up the question is the Ontario Mining Association, representing as it does the great majority of precious metal mines in this country. It does not seem to be too much to expect that this association might find it advisable to encourage the Cassel Cyanide Company to remain in the field as a serious competitor for Canadian business.

Cassel Cyanide of Canada, Ltd.

This view is strengthened by the fact that only a few months ago, the Cassel Cyanide Company of Canada, Ltd., was incorporated as a subsidiary of the parent company in Glasgow. While the functions of this new organization have never been officially outlined, there are many reasons for believing that it may prove to be the nucleus of a powerful company on this continent, with a large plant to be erected along the border of the two countries, Canada and the United States, and bidding for the trade of the entire continent.

Competition of this kind would likely be beneficial to the mines, as it would tend to reduce the price of cyanide to a minimum.

To sum up the situation : On the one hand is the possibility of competition being eliminated with results not beneficial to the mines, while on the other may be seen the possibility of competition being ultimately intensified. The question is: Which will it be?

QUICK LOADING OF COAL FREIGHTER.

What is claimed to be a world's record in the loading of a coal freighter was established by the Baltimore and Ohio Railway at its Curtis Bay coal piers on May 10th. A cargo of 6,967 tons of coal was placed in the S. S. "Malden", belonging to the New England Gas Company, in 2 hours 44 minutes, an average of 2,548 tons an hour. The "Malden" is well known in Cape Breton ports from whence she has freighted coal for the Everett Gasworks.

Contribution of Oil Geology to Success in Drilling

(Bulletin of Associated Petroleum Engineers). FREDERICK G. CLAPP, Chief Geologist.

The question is frequently raised as to what proportion of geological work has resulted in successful wells or what proportion of favorable structures have ultimately been found productive. In the early days of applied geology the percentage of success was not so high as now. Since then geology has attained a high degree of efficiency and accuracy and has become a recognized branch of engineering applied to the oil business. During the first few years of this century oil was suposed to be found mainly in anticlines, or rather, geologists were supposed to credit oil as existing only in anticlines, as anticlines constituted the most important type of geological structure that geologists then knew to be productive. During the past fifteen years the situation has changed to such an extent that a considerable number of other types of structure are known to be petroliferous in regions where other conditions are satisfactory. Every particular type of structure is given a technical name and studied from the standpoint of the habit of oil when associated with that particular type.

When we realize that fully ten different classes and twenty sub-classes of geological structures are favorable for oil, we understand the complexities of the petroleum geologist's work. His difficulties are doubled when it is necessary also to consider the degree of metamorphism or natural alteration in character of the strata, their hardness and porosity, the number and character of the "sands" that are expected to be productive, their known or calculated depth, whether certain beds are persistent or lenticular, their geological age, water conditions, etc. Although some persons expect a geologist or petroleum engineer to be infallible in his advice, it is generally understood, after a realization of the difficulties encountered in making predictions, that infallibility may not reasonably be expected and that the percentage of successful wells depends not only on the accuracy and quality of the geological work and the abundance of geological outcrops but also on the variability of unknown underground conditions, such as porosity, metamorphism, water problems, levels, etc., which frequently have no evidence on the surface.

Consequently the success of drilling based on geological advice can be represented by a different factor in practically every oil producing country, state or county in the World. For instance, in nine townships in Northern Oklahoma, Frederick G. Clapp has calculated that success in drilling increased from about 60 per cent. previous to 1913 (during which time no geological advice existed in the region) to 87 per cent. throughout the years 1913-1916 in the wells drilled entirely on locations made by the geologist.

Dorsey Hagar shows, in a paper presented before the American Institute of Mining Engineer, (Vol. 57, 1917, page 892), that 70 per cent of the pools located in Oklahoma, during the four years immediately proceeding October, 1917, were opened on geological advice. He has also calculated that whereas only one well in 150 had opened a new pool in ordinary haphazard drilling in Oklahoma, on the other hand under geological advice one well in three had opened new pools. Hence, he states, an oil operator who prospects on the basis of geology has 50 times as much chance of striking a pool as one who does not.

Similar results have been found by other writers on the same region, more recently. Oklahoma stands at the head of oil-producing states respecting appreciation of geology, and is fourth from the bottom in the proportion of dry holes. Out of a total of 8,196 wells in 1919, Oklahoma had 62.4 per cent. of oil wells and 10 per cent. of gas, while but 27.6 per cent were dry.

In thfis connection it is interesting to note that Dorsey Hagar in another paper (Trans. Am. Inst. Min. Engrs. February, 1917, pp. 195-8) finds that out of the 75 most important oil pools of Oklahoma and Kansas located during the same year, all but four are on well defined structures such as domes, anticlines or terraces.

It should not be supposed that such a high degree of geological success as in Oklahoma can be attained everywhere. Nevertheless, The Associated Petroleum Engineers had only one failure in Wyoming from 1915-1917; the only wildcat well recommended in Canada was a success; and in Southern Oklahoma three new domes, deciphered in detail and recommended for testing, have all resulted in new pools. Whereas these illustrations perhaps show the extremes of success, the other extreme may be found where a geologist is asked to make a location in a region where he must tell his clients frankly that the chance is not good. Accordingly, all that he can do is to select the least unfavorable location: that is, the location where oil will be found if it exists at all in the territory in point.

In drilling without the aid of geology, there is, of course, complete failure in certain states which have been considerably prospected but where oil does not exists. Among oil producing states, on the contrary, the highest percentage of failure without geological advice has been 45.4 per cent. in the Gulf Coast fields of Texas and Louisiana. This applies where all the fields lie on saline domes, seldom more than one or two miles in diameter, many of them not apparent topographically, and hence with a chance not greater than 1 in 1000 of striking oil by an ordinary "wildcat" well.

The statistics tell us that out of the 1,236 wells drilled in the Gulf Coast fields in 1919, 52.6 per cent were oil wells, 2. per cent. gas wells, while, as above stated, 45.4 per cent. were dry holes. Inasmuch as the figures include both wells located inside or in extension of fields and also "wildcat" it is evident that a consideration of "wildcat" alone would result in an extremely small percentage of success. Although many persons suppose a geologist to be of no great value in the Gulf Coast fields, this is far from being true. Geology has in many cases discovered

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* 120 Broadway, New York City, July 28, 1920.

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saline domes and is furthermore of great value in properly locating new tests on domes which have been inadequately tested. The domes are so peculiar in type and results that after as many as fifteen wells have been drilled on a dome without success, yet later a field has been located on the very same dome. Every well that is drilled on a dome furnishes evidence for the geologist in making recommendations for the drilling of a well that will ultimately find production. The utility of geology in the Gulf Coast dome locations is properly attested by the fact that the Spindletop dome, the first one opened up, was drilled by Capt. A. F. Lucas, a mining engineer, who had given years of study to the subject.

Next to the Gulf Coast fields in proportion of dry holes, considering both those drilled on geological advice and those without, are the Illinois fields, which in 1919, out of total of 370 wells drilled, yielded 68.4 per cent. of oil wells, 1.3 per cent. gas wells and 30.3 dry holes. This is probably a lower percentage of success than would have attained in Illinois during the height of drilling in that state some years earlier. While the original drilling in Illinois may have been done largely without geological information, it is a fact that in recnt years geology has been of tremendous assistance in Illinois, particularly in warning prospective investors away from unfavorable territory. Undiscovered potentially productive domes do exist in Illinois, yet nearly all structures and supposed structures which the Associated Petroleum Engineers have been called to examine in that state have for onc reason or another been decidedly unfavorable. Notwithstanding the general flatness of the surface of northern and western Illinois and its deep covering of glacial drift, there are many portions of the state where detailed geological studies can be made and where results are of great value.

One who understands the high degree of success attained in Wyoming may be surprised to learn that 7 per cent. of the 303 wells drilled in that state in 1919 were dry, 8.9 were gas wells, while only 62.4 per cent. resulted in oil wells. It must be realized that a large proportion of drilling in Wyoming has been of a "wildcat" nature, that not all of the formations outcrop at the surface as prominently as in the Salt Creek, Big Muddy and other well known fields, and that in many cases little data are available to guide the geologist. However, as stated above, the results of at least one geologist as to Wyoming have been 80 per cent. successful.

The Central Ohio fields in 1919, out of a total of 940 wells, had 23.6 per cent, of dry holes as compared with 47.8 per cent. oil wells and 28.6 gas wells. Since Ohio has great gas fields, it is a fair assumption that a large proportion of the gas wells were actually drilled for gas and hence successful. The market is such that gas has sometimes as great value as oil. In the Central Ohio oil fields conditions are more difficult in some respects than in any part of the United States, because in the northern portion the formations are buried deeply by glacial drift, while throughout the fields the general structure is that of an eastwardly dipping monocline or homocline in which oil has accumulated at localities of slight interruption of the dip or of change in texture of the sand. Such localities are found by careful fieldwork south of the drift border and where the drift covering is slight.

Although the value of geology might be supposed to be slight in the Central Ohio fields, yet as the result of extended explorations made in those fields by The Associated Petroleum Engineers and other geologists, several good pools have been opened up. While the proportion of successes there is lower than in many other states, it is, nevertheless, so considerable that, because of the great value of Ohio oil, the geological work has been eminently desirable. In Central Ohio, as in the Gulf Coast, one must not depend on finding the pool by a single test. The proper plan is to drill first on what is apparently the most favorable part of the structure. This generally results in a "showing" of some sort and it is then desirable to work up or rown dip towards the center of the structure,, according to whether a showing of oil or of gas or of both be found. Companies that have proceeded on the assumption that a pool could be located by a single test havc in some cases failed of success, while other companies later entered the very same fields and "proved up" the pool by making two or more tests.

In Kansas, out of the total of 3,432 wells drilled in 1919, 75.8 per cent. were oil wells, 5.5 per cent. were gas wells, while only 7 per cent. were dry holes. A large proportion of the latter were "wildcats" drilled in the extreme eastern part of the state or in outlying unproductive counties in hunting a repetition of the known big pools. The Augusta-Eldorado fields were discovered largely owing to geological fieldwork, and it has seemed reasonable to suppose that similar fields would be found on similar anticlines in central Kansas. This has been tried, and some cases of failure may be due perhaps to the fact that granite comes within drilling distance of the surface under a wide area in central Kansas. These factors bring down the percentage of geological successes in that state, but they do not affect the percentage in non-granite parts of the state or in other states where granite does not approach the surface.

Among the oil-producing districts of the United States, that one with the highest degree of success in 1919 from all classes of wells, including "wildcats" and those geologically located, was Kensucky. There 3,716 wells were drilled of which 85. per cent. achieved success as oil wells, while 3.7 were "gassers" and only 11.3 were failures. This is a remarkable record and refutes the remark sometimes made that geology is of little value in Kensucky. In Kentucky fields geologists have been active as in no other part of the United States, except Oklahoma and Texas, and a large proportion of the pools are in favorable geological. structure.

In a general way, the use of geology has kept pace with the oil industry. Although there were no petroleum geologists for about 20 years after the discovery of petroleum in this country and although in 1908, when the consulting office of Frederick G. Clapp was opened in Pittsburgh, only one other oil geologist in the United States had a consulting office, yet by November, 1918,, the columns of The Oil and Gas Journal carried 19 professional cards of petroleum geologists and engineers. By June, 1920, this number had increased to 43, most of these cards representing more than one individual. This depicts only the private practice phase of the profession. In addition, a number of the larger oil companies now maintain

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geological staffs of considerable size. Thus the petroleum geologist or engineer has taken his place in the business as an essential factor.

Many persons believe that geological activities are directed mainly to the discovery of new pools or new producing regions. This, however, applies to but one part of the profession and that the oldest one. At the present time, fully as important a group consists of the resident geologists in large fields and the research men on the large staff whose business it is to study all factors of importance that may affect the production of known fields or be otherwise of interest to the business.

Another new province is that of appraisal. If proficient in the appraisal field the geologist becomes fully entitled to be known as a petroleum engineer. He is called into consultation by companies desirous of making purchases in order to evaluate producing and potential properties. By means of decline curves, character, thickness and oil content of sands, spacing of wells, water and gas conditions and other factors, the petroleum engineer is enabled to estimate closely what a property will produce in future.

THE POLITICAL EMBARRASSMENTS OF CANADA'S FUEL WEAKNESS

Canada's important function in foreign affairs is frankly stated by Sir Auckland Geddes, British Ambassador to the United States. He calls upon Canada to play a large part in the building of a "golden bridge of sympathy and understanding" between the British Empire and the United States. "On the basis of such a friendship the peace of Europe could be established," says the Ambassador. "I doubt if for many years it could exist in any other form."

It follows that the role this country is called upon to play is an essential one. Upon Canada's service to the cause of world peace the highest considerations depend. The opportunity and the responsibility are both impressive.

In this connection, it is most unfortunate that Canada should depend upon the United States for coal. Canada's fuel weakness is a fertile source of misunderstanding and trouble. It remains an invitation to the worst elements in American politics to involve Canada in their anti-British crusade, and it causes our best friends across the border endless embarrassment. Industrial quarrels, now so prevalent, aggravate the condition.

Sir Auckland Geddes has devoted himself passionately to the cause of Anglo-American goodwill. For the tricks and arts of diplomacy he substitutes a frank and open appeal to the good sense of the people. His is a momentous duty, in which he has the sympathy of all Canadians. He deserves practical assistance as well. Whatever Canadians can do to silence the voices of mischief-makers should be done resolutely and without delay. And let us take steps to wipe out this lingering coal disgrace by developing the huge coal resources of our own country to the end that the American people may have in Canada, a self-respecting, self-sustaining neighbor.—"Montreal Star."

PERSONAL

Mr. Samuel W. Cohen of Montreal, is now in Newfoundland on examination work.

TORONTO NOTES

At a special meeting of the Dome Mines Company, Limited, held in Toronto this week the proposals of the directors to purchase the property of the Dome Extension Company were ratified. The shareholders were represented by proxies exceeding 360,000 shares. With the taking over of the Dome Extension property, 76,667 shares of Dome stock will be distributed among 2,300,000 shares of Dome Extension, which means one share of Dome for thirty shares of Dome Extension. It is generally felt in mining circles that the taking over of the Dome Extension by the Dome Mines will add considerably to the wealth of the Dome if the recent exploration work can be depended upon. It was recently reported that diamond-drilling operations by the Dome on Dome Extension showed important ore bodies. The negotiations between the two mines have been going on for some time, and last March, owing to the incompleteness of the explorations, an extension of the option was secured until September.

The English Electric Company, Ltd., in addition to their four plants in England has purchased the Siemans Works at Stafford and has taken over the business of the Siemens Company of Canada Ltd. The English Electric Co., Ltd., will handle a complete line of electrical equipment. Offices will still be at Transportation Building, Montreal and Mr. C. W. Stokes remains as manager.

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EDITORIAL

The Provision of Housing by Mining Companies

A statement which has attained such wide publicity as to appear in a Toronto newspaper is attributed to an organizer of the A. F. of L. regarding housing conditions in the Cape Breton colliery districts. This observer's comments contain sufficient truth to give them sting, but he goes too far when he says that conditions are far worse in the mining districts of Cape Breton than in the worst slums of the great cities of America, San Francisco's notorious Chinatown not exeepted. The veracity of this much travelled eritic is shadowed by a further remark to the effect that after studying the development of the British Empire Steel Corporation he believes it will attempt to import coolie labor into Canada. As the British Empire Steel Corporation has not yet any corporate organization, having no designated officers, it is difficult to see how such an intention ean be imputed. The gratuitous assumption reveals a bias that would make impartial criticism from this observer rather difficult.

Yet it is nevertheless true that some undesirable community conditions have concentrated themselves into one or two districts in the vicinity of Sydney. It is difficult to assess the blame, but the chief causes have been those which have usually brought about slum areas in Canada, and elsewhere. Lack of any system of town planning, inexensable laxity of building regulations, property speculation, non-Canadian elements of population, transplanted habits of dirt and congestion from European countries, and the ignorance of the immigrant, may be mentioned.

Circumstances have forced the industrial companies to become large providers of housing aecommodation, and the ideas of these companies have necessarily not advanced faster than the conventions of the times and population in which they evolved. The Dominion Coal Company, for example, was founded upon the financial ruins of a number of independent smaller companies which commenced their chequered careers anywhere between 1857 and 1893, and the new consolidation inherited the plants and housing provision of earlier, but not better days. The style of housing provided in the sueeessive stages of the progress and expansion of the Dominion Coal Company has improved, and the company's houses at the newer collieries are eagerly sought after, being better houses at lower rentals than are elsewhere obtainable.

The Dominion Steel Company in Sydney is not a large landlord, and its houses also are sought as a favor.

At Sydney Mines, a very large proportion of the mine workers own their own houses, and slum conditions do not exist in this colliery town. It is also true that a large number of the steel workers and coal miners in the Sydney District are their own landlords.

The provision of houses for employees has been to the coal and steel companies of Nova Scotia a necessary thing, but also an unprofitable thing, a source of much anxiety. Willy-nilly, the Nova Scotia companies—and this is a statement generally true of mining companies in a new country—have been compelled to become landlords, shopkeepers, provider of all public utilities and communal requirements and of transportation. In doing this they have naturally combined the vulnerability and possible points of attack of this combination of much berated responsibilities.

The slum areas, which undoubtedly exist, have evolved as a parasitical growth, and enquiry would reveal that the worst rack-renter and the genderer of undesirable housing conditions is the former immigrant, now grown rich, who takes advantage of the ignorance and trustfulness of his newly arrived compatriots, and sees no hideousness in slums that are an offence to our Canadian ideas. Some of these men, by their control of sources of illegal liquor supply, and their financial grip upon their fellows, achieved through the supply of housing, food, liquor and every possible source of profit, can exercise a sinister influence on labor matters, nor are they lightly offended by either corporation or municipal officers.

It is this position of vulnerability which accompanies the function of general fatherhood of the community, and the impotence of municipalities and corporations, to prevent the growth of parasitical slum areas and their coneentrated evils, that has driven mining corporations in Canada to build "closed" towns, and to oppose municipal incorporation. Labor organizations have imputed other motives, but wrongly so.

A Social Survey was undertaken some years ago of a well-known section of the City of Sydney. The existing conditions were properly criticized, but the

blame was laid upon the industrial companies. The truth is that these same companies have provided the most substantial part of the decent housing accommodation of the industrial centres of Cape Breton, and they probably contemplate with something like consternation the expenditure on housing that will be necessary, at existing building costs, to accommodate all the additional population that mooted expansion of operations will require.

The foregoing gives point to a statement that Mr. Adams, of the Town Planning Division of the Commission of Conservation, is to be asked to advise the Dominion Coal Company, through its newly created Department of Industrial Relations, regarding the plan of a town to serve the workers of a new colliery near Glace Bay. This, at any rate, shows a willingingness to learn, but there will be people, not necessarily in the official ranks of the industrial corporations, who will consider it as fussy faddiness—which it most distinctly is not.

In comparing the corporation-built mining towns in some of the newer fields of the United States, with those of Nova Scotia, it should be remembered that the Nova Scotia companies never had the financial resources to warrant much heavier expenditures on housing than they have actually undertaken, for at no time in its history has any Nova Scotia coal company ever had sufficient funds at its disposal for necessary development work and capital expenditure on new collieries.

More Corporation Baiting

The Toronto "World" animadverting upon our comments on the statements of the Chairman of the Mond Nickel Company in a recent issue, asks: "Is the 'Canadian Mining Journal' with all its claimed professional knowledge, ignorant of the value of the precious metals (platinum, iridium, polonium) the Mond and the International concerns take out of the nickel ore of Sudbury, and of which no return has yet been made?"

Previously dealing with this matter, in the issue of August 27th, the quantities of metals of the platinum group recovered in Canada and in New Jersey from Sudbury mattes was given, as excerpted from the returns of the Ontario Bureau of Mines and the Mines Branch at Ottawa. The latest returns of the Ontario Bureau of Mines mentions the by-product recovery at Port Colborne of "gold, silver, platinum, palladium, rhodium, ruthenium, osmium and iridium. The recovery of polonium is not referred to.

Polonium is an emanation of radium, and was first isolated by Mde Curie, who named it in honor of her native country, Poland. The presence of radioactive substances in the Sudbury ores would not be surprising, as they are widely disseminated in the crust of the earth, but its recovery, and stabilization for sale as an article of commerce, would be extremely interesting to learn about. Perhaps the "World" will vouchsafe more definite particulars regarding this little-reported achievement in metallurgy by the nickel companies?

There is no mystery about the by-product recovery of precious metals from the Sudbury ores, but there has been much definite achievement. It is customary to regard the recovery of the long list of rare metals that are specifically mentioned in the latest figures by the Ontario Bureau of Mines as a *fait accompli*, forgetting the long road of metallurgical research that has made it possible, and forgetting also that chemical and metallurgical achievement are progressive things.

So far as we can gather, our Toronto contemporary accuses the nickel companies of concealing the presence of an element they have probably never found, and certainly never recovered; and of concealing statistics which are public property, and available to any person who will take the trouble to write to Toronto or Ottawa for them. These charges are fairly typical of the complaints made regarding the nickel companies.

Everyone who appreciates the strategic value of Canada's virtual monopoly of nickel and asbestos deposits will desire to see this country obtain full benefit of an advantage that serves, to some extent, to offset our dependency in other and more essential raw materials, and hopes to see in the future more complete refining of nickel and greater domestic fabrication of asbestos goods in Canada; and we take it that the Refinery at Port Colborne and the completely domiciled character of the enterprise of the British-America Nickel Company are concrete realizations arising from this very general and natural sentiment.

The "World," with some lack of elegance, states with reference to Mr. Mond's remarks: "We would fix that gentleman and his corporation so that they "would pay all their taxes to the Dominion of Can-"ada, and the Province of Ontario." Perhaps it would be incorrect to remark—as is remarked of our own observations—that this is "childlike and bland," but the procedure that would ensure this result would be almost as interesting to learn as the achievement of the recovery of polonium from Sudbury mattes.

Western Coal

The progressive and anticipatory spirit that is at this time noticeable in the Western Provinces in regard to the future of the coal mining industry is one of the signs of the times that should gladden the hearts of those who desire prosperity and political permanence to attend Canada in the years to come. Better team work has hardly ever been witnessed than is now being carried on by the combined efforts of the Government of Alberta, the University of Alberta, and the coal operators and dealers.

The first annual convention of coal operators and dealers of Western Canada was held in Calgary during the third week in August, being called at the instance of the Minister of Mines of Alberta. It is an auspicious beginning. The older coalfields of Canada have suffered through lack of such gatherings, and associations of coal operators have been frowned upon, when, had governments been well advised, they would have been encouraged.

The members of the Canadian Institute of Mining & Metallurgy should be pleased to note that the President, Mr. O. E. S. Whiteside, took a prominent part in the convention, and an interesting feature to eastern men was the part taken by men formerly connected with coal mining in Nova Scotia.

Dr. Tory, President of the University of Alberta, stated that two of the ablest and most suitably trained chemists available in Canada had been secured for the University, and that in a year the University expected to have five men employed on research, principally on coal storage, and the peculiar problems of western coal. Dr. Tory correctly pointed out that there was no need to stress the amplitude of the coal resources of Alberta. "We have not found out what "these are," he said, "but we have undoubtedly the "greatest united body of coal resources to be found "in any place in the world, with probably one ex- "ception, and it is necessary that this great asset "should be developed." Light and leading in matters of public interest is precisely what universities are established to provide, and there is no asset of Alberta, or for that matter of Canada, that is so potential for material welfare and so pregnant with promise for our national security, as the great coalfield of the West.

W. J. Dick, of Winnipeg, said that at the present time Winnipeg was using 200,000 tons of hard coal. and 250,000 to 300,000 tons of bituminous coal. If that could be all provided by the West, it would mean up to 600,000 tons, or ten per cent of the present production of Alberta coal. We cannot think of any conceivable reason why Winnipeg should burn coal that is not the produce of Canadian mines. At least not any reason that can be weighed in the balance against the necessity that Canada should be self-sufficient, and not the final mendicant situated at the point remotest from the source of supply. The monetary value or cost of an imported article is one of the least important factors in these times, as a study of the exchange quotations in the morning paper will disclose.

The decision of the Canadian Institute of Mining & Metallurgy to hold its Annual Western Meeting in Winnipeg towards the end of next month fits in well with the events of the summer. The programme indicates that much attention will be devoted to the fuel question, and, while it is hardly likely that the scope of the papers which will be presented can be wider or more representative than those which were prepared for the March meeting in Toronto, it is likely, after the experiences of the summer, that more attention will be devoted to their discussion.

The Convention devoted much time to the consideration of railway rates on coal, and the impression we gain from reading the discussion is that up to this time the railways have not viewed the coal traffic of the West in an understanding manner. That is to say they have not yet apprehended the fact that in days to come the carriage of coal will be the most important function of the western railways, and one, which if it is favored and fostered by the railways, will provide the bulk of the freight revenues. The day is coming when the tonnage of coal, and the tonnage of those things that are made with the assistance of coal, will bulk far larger and be of more financial importance than the grain yields of the prairies. If the railways will cease to regard coal as a necessary nuisance, and will build for that day when Alberta will be the Pennsylvania of Canada, they will get a proper starting viewpoint in arranging appropriations for rolling stock equipment. The carriage of coal, in very large quantities, at all seasons of the year, for very long distances, is going someday to be the principal business of the western railways.

The question of storage was discussed, and it was pretty generally agreed that this was one of the peculiar problems relating to western coal that must be solved before the industry could be really successful. A competent committee was selected to study this question.

The more the various phases of the western coal industry are discussed, the more plainly it is revealed that, at least west of Fort William, Canada can and should be completely self-supplying in coal, whether it be required for domestic heating, steam-raising, metallurgical uses or the production of gas. And, the most pleasing revelation of these days, if the present temper of the West is any indication, is that western Canada has made up its mind to become self-supplying in regard to coal.

THE INCREASE ON FREIGHT RATES FOR COAL.

Mr. Carvell, the Chief Commissioner of the Board of Railway Commissions, states that in consideration of the high cost of coal at this time, the freight rate increase granted to the railways on coal is "less than one-half of what it should have been to be fair to the railways," and he threatens quick action against any coal dealer who uses the freight increase as an excuse for profiteering. We believe the special consideration given to coal freights is well advised, in view of the fundamental nature of coal costs, which are reflected in every stage of manufacture and transportation. Equally well advised is the warning regarding increase of retail costs excused on the ground of increased freight charges, which gives point to the opinion previously expressed in these columns the coal producers should seek as far as possible to control the distribution of coal to its ultimate destination. As in so many other commodities, the price of coal as paid by the ultimate consumer is not necessarily proportionately related to the price obtained by the producing coal company.

"LOST PLACERS."

Those who were present at the Annual Meeting of the Canadian Mining Institute in Toronto last March will recollect that Dr. A. P. Coleman suggested that the debris from the glaciation of the gold and silver bearing rocks of Northern Ontario might conceivably be found under the clays on the way to James Bay. He drew attention to the fact that, with two notable exceptions, placer mining had preceded quartz mining namely South Africa and Ontario. The S. A. Mining & Engineering Journal for 7th August last, contains an article on "Deep Level Alluvial Leads," by "A.D.", who asks: "Is there no alluvial of the present or past age derived from the bankets of the Witwatersrand? Here we have more gold to the square mile than anywhere in the world, reefs outcropping for sixty miles or more. In the past ages there has been enormous erosion from the upturned edges, yet no alluvial gold of any importance has ever been located." The South African writer, as did Dr. Coleman, suggests search under the ice drift along the presumed course of pre-glacial and glacial rivers.

SOUTH AUSTRALIA OFFERS REWARDS FOR DISCOVERIES OF OIL AND GRAPHITE.

The South Australian government, to encourage prospecting for oil, has offered a bonus of £5,000 "to the person or body corporate which first obtains from a bore or well situated in South Australia 100,000 gallons of crude petroleum, containing not less than 90 per cent, of products obtainable by distillation." A bonus of £1 per ton on marketable graphite from a mine in South Australia, on the production, to the approval of the Minister of Mines, of account sales of graphite sold prior to June 30, 1922, is also offered.

MR. CHAS. CAMSELL, THE DEPUTY MINISTER OF MINES, HONORED BY VANCOUVER AT FAREWELL DINNER.

The farewell dinner tendered to the new Deputy Minister of Mines on leaving Vancouver was a notable gathering of prominent Vancouver citizens, and a tribute to the esteem in which Mr. Charles Camsell is held by his many friends in the West.

The Dinner was held under the auspices of the Vancouver Branch of the Canadian Institute of Mining & Metallurgy. Among those assembled to do Mr. Camsell honor were the Hon. William Sloan, the Minister of Mines for British Columbia, W. Fleet Robertson, the Provincial Mineralogist, Mr. Nichol Thompson, chairman of the Mining Bureau of the Board of Trade, Mr. A. E. Haggen, Editor of the "Mining & Engineering Record" and about one hundred other citizens of prominence. Mr. H. Mortimer Lamb, the Secretary Emeritus of the C. I. M. & M. was Toastmaster. Mr. Lamb's remarks, which were in the happiest view, are elsewhere published in this issue. Mr. Camsell was presented with an engraved gold watch, and in his speech evinced that wide knowledge of the mining industry in Canada, and that terseness of phrase that doubtless commended him to the authorities at Ottawa for his new position. Among Mr. Camsell's epigrams may be noted the following : "Canada's resources are only slightly developed, and mining least of all. The only limitations which can be placed on mining in Canada are the boundaries of the country. Today more mineral wealth is being placed on the market than during the Klondyke gold rush." Mr. Camsell expressed his gratitude at the occasion, and for the reception accorded to him, and said that he would strive to do right in the new office he had undertaken.

"Since spending a few days at Ottawa", he said. "I have felt the sense of responsibility more than ever. At first I doubted my ability, but on mixing with those connected with the department and finding my way about I feel now a confidence which will aid me in the work. I have a feeling of optimism in the future of the mining industry of Canada, and when one considers what has been done in this country in a comparatively short time, one is justified in such optimism". Mr. Camsell spoke of the discovery of a new area in which nickel had been discovered in B. C., and said that the report of the finding of oil in the Mackenzie Basin district was of the greatest importance.

The Committee in charge of the arrangements for the dinner included Messrs. H. Mortimer Lamb, Nichol Thompson, G. Middleton of the Dominion Assay Office, J. C. Nettell of the Geological Survey, A. E. Haggen, and F. E. Payson, the Vancouver representative of this journal.

An Appreciation of Charles Camsell at the Farewell Dinner in Vancouver.

H. Mortimer-Lamb.

The Committe in charge of the arrangements for this auspicious event has ordained that lengthy orations this evening shall be taboo. They have handed me a memorandum in this connection, wherein their regulations are set forth. I note therefrom that the Chairman is allowed ten minutes in which to explain "why we are here." Other speakers, with the exception of our guest of honour, are granted three minutes in order to explain why they are here; and

I am particularly desired to request all speakers to stick to the point, and not, even if they be professional politicians, branch off into disquisitions on controversial topics, such as the sex of Dolly Vardon, Ireland, prohibition, why I am a Bolshevist, and so forth. It is reckoned that by adhering to these rules of debate, we shall be able to dispose of all the preliminaries in fairly short order, and thus leave the rest of the evening, say three or four hours, free to us to enjoy and be edified by the address of the Deputy Minister of Mines for Canada, on the theme, "How I rose in Life: or Geology as a Stepping Stone to a Career."

So much by way of official announcement.

To come now to my text: "Why we are here." Gentlemen, this is both a mournful and a joyous occasion. We are here to mourn the translation of a noble and dearly-beloved soul to another more transcendental sphere; and yet to rejoice that one—our own familiar friend—has been called to sit in the seats of the mighty. As "The Province" in an able editorial on Mr. Camsell's elevation so appositely remarked, it is good to have a friend at court, and we all felt that if by giving Mr. Camsell this dinner we could convince him that we were still his friends and place him under an obligation to us on that account, it would be money very well spent. There is a good deal to be said as a business proposition, in favour of throwing bread on the waters. But you may ask, "Why a dinner; wouldn't a trip to the summit of Grouse Mountain, a picnic in Stanley Park, or a garden party at Burnaby Lake, have been equally appropriate and at the same time cheaper." The reply is, "No, emphatically, No. Geologists are not as other men. You can only appeal to them in one way. Feed them. I refer you to the Bulletin of the C.M.M. for July if you would know what privations Mr. Camsell endured in his early career by reason of a lack of proper nourishment, and how for a whole winter on the Skeena he subsisted on a diet of squirrels and frozen blue-berries. He has had a splendid appetite ever since, and has told me confidentially on more than one occasion that nothing pleases him so well as a good dinner. In fact, I question whether Mr. Camsell would have abandoned field-work and its freedom for the worries and responsibilities of his new office, had the gastronomical arrangements of the Department in respect of the former been more satisfactory.

But while we don't want to be too serious this evening, I should like to say a few words in all seriousness. I want to express in the strongest possible terms the acknowledgements of the mining industries of this country to the magnificent services rendered these industries from the time of Logan to the present day of the Department of Mines, and particularly of the Geological Survey; and to pay humble and grateful tribute to the geologists in the public service of Canada, who serve us so ably and so conscientiously. The value to Canada of the labours of the great founder of the Survey, and of the men who have carried on the work he so ably began, the work of Selwyn, Dawson, Fletcher, Adams and Barlow, of Dowling and Faribault, of LeRoy and Broek and Camsell, and Cairnes—to mention only a few notable names—the value of the work of these men to the Dominion is incalculable. And yet there is no class so poorly, so incommensurably, remunerated. If pecuniary reward were the only inducement to scientific men to enter the service of the Dominion Government, the probabilities are that we should have no Geological Survey. But as we all know the world's best work is not done for the sake of pecuniary reward. If it were, if success and high achievement in life, were to be gauged always by the dollar standard, a Charley Chaplin would rank higher than a Shakespeare, a Mary Pickford than a George Eliott, a Beaverbrook than a Borden, a Lipton than a Lloyd George, a Carnegie than an Abraham Lincoln, or a Vancouver plumber than a geologist of the Canadian Department of Mines. But, thank God, money is not the sole, nor the highest criterion by which to measure merit. Yet it is not to the credit of society that all the very highest forms of labour and services are the least well requitted — art and science, pedagogy, statesmanship rank among the most unremunerative of callings; buffoonery, prize-fighting, financial buccaneering among the most profitable.

But while the members of the staff of the Department of Mines are more interested in their work than in their pay, they are now being compelled to think more about the matter of pay. Many, especially those who are married men, find that they can't make ends meet on the wholly inadequate salaries they draw, and so have been practically forced out of the service. The loss to the Survey and to the country has in consequence been most serious. The rectification of this state of affairs is one of the matters with which the Deputy Minister, Mr. Camsell, will naturally concern himself. It is a most vital one. And I can assure him that in this, as in all of his endeavours to maintain the Survey at a high standard of efficiency and usefulness he may depend on the sympathy and active co-operation of not only the mining men, as represented by our Institute, but by all other classes of the country, having its interests at heart. I submit to you that to attain the maximum of efficiency and usefulness, it is not enough that the Technical Departments of Government should be divorced from politics, they should be relieved also of the interference of commissions, Civil Service or otherwise.

Finally, I desire to felicitate our guest on the high honor that has been bestowed on him; and to felicitate the Government on its selection of so capable and worthy an official to fill the exalted position of Deputy Minister of Mines for Canada. It is without doubt the highest honour to which a member of the profession of mining in this country can aspire; and the creditable performance of the duties of that office pre-supposes the possession by the occupant of qualities and talents of no common order. The successor of Logan and Dawson must necessarily be above his fellows in natural ability. The appointment of Mr. Camsell, moreover, is significant and satisfying from another aspect. Political pull had no relation to it. Merit alone determined it. And what is more surprising in this age of advertising, modest and unassuming merit was recognized, and received its just due. I will not embarrass our guest by enumerating all his virtues in his presence, but he will permit me to tell him that those virtues have won our hearts, and that no man in British Columbia is richer than he in the sort of wealth that neither rust nor dust can corrupt—the esteem and respect and affection of his fellow citizens.

Letter to the Editor
THE ASBESTOS INDUSTRY.

Editor "Canadian Mining Journal,"
Dear Sir:

I notice the article in your valued paper on Page 722, "Asbestos Fibre of Canadian Origin Supplied to Japan by United States Exporters."

I believe that Mr. Bryan, Canadian Trade Commissioner, was a little hasty in his remarks. Is he aware of the fact that some of the largest asbestos mines in Canada are owned outright by American interests? Is he aware of the fact that some of the Canadian miners have their selling organizations in the United States? The writer personally has been in Japan on various occasions and is interested financially in some of the largest asbestos mines in Canada. The Japanese buyer knows perfectly well that asbestos is not produced in the United States. He cannot help but know this, for the reason that shipments are made to him direct from Canada via Vancouver. The result is that not alone do the Canadian miners dispose of their material, but the Canadian railroads and steamship companies also benefit through the sale.

The remark:—"it is time we became a little more independent of our southern neighbors," does not cause a friendly feeling. The southern neighbors are the largest customers that Canada has and everything should be done to make business relations still more pleasant than they are at the present time. I do not blame Mr. Bryan for advising the Canadian exporters to have their own branch houses in all overseas countries, but he must grant that if the American has already done so, that it is another example of their "pep" and tenacity as he states. I believe that any asbestos miner in Canada will agree with me and state that to a great extent, the prosperity presently enjoyed by the Canadian asbestos miner is due to a great degree to the American exporter and consumer.

Trusting that you will give the foregoing your usual courteous consideration I beg to remain,

Very truly Yours,
ASBESTOS & MINERAL CORPORATION.
B. Marcuse,
President.

Note:

We are pleased to have the opportunity of publishing Mr. Marcuse's letter. We think, however, that Mr. Bryan missed the main lesson to be learnt from the policy of the Government of Japan in encouraging the asbestos products industry in Japan. The handling of crude asbestos through New York brokers is in line with the practice of mineral brokerage in North America, and it should not be forgotten that not only is the United States the great market for Canadian asbestos, but many of the asbestos mines in Canada are owned by citizens of the United States, and, as Mr. Marcuse points out, the selling organization of some of the Canadian asbestos producers is placed in New York. This is what would be expected, seeing that the market is there.

It is progress towards utilization of Canadian asbestos in the arts in Canadian factories that is chiefly to be desired, but this is a point that the country has not yet attained. The utilization of asbestos in the industrial arts is very varied, quite specialised, and is spread over many branches of industry. A manufacturer of asbestos goods in Canada could only look to Canada for a market, and he would require to make such a variety of articles, that outlay on plant and technical supervision would be disproportionate to the probable sales. That is the existing situation. That this situation will indefinitely continue is not to be expected.—Ed.

Haileybury, Ont.
September 13, 1920.

Editor Canadian Mining Journal.
Dear Sir:—

In the recent issues of Sept. 3rd and 10th, your Northern Ontario Correspondent has referred to the poor road between Elk Lake and Gowganda. That the mining industry of Gowganda has suffered from lack of transportation facility no one will deny. The writer is of the opinion that the present Ontario Government acted wisely in the early part of this year, in holding off the construction of the macadam road begun by the late Government. Such competition as a macadam road would offer, would have very seriously mitigated against the successful operation of a Light Railway, and a part of our Northern Ontario Press advised us a number of times that the Light Railway was assured and would, like the mushroom, develop over night.

The writer understands that the present Government is going to connect Gowganda and the few miles of macadam already laid down with a good gravel road, which can be built in one quarter of the time required for macadam and at one tenth of the cost per mile of road as built by the late Government. In the writer's opinion your correspondent is more interested in adversely criticising the present Government than in the transportation problems of Northern Ontario.

Yours sincerely,
A Prospector.

THE CANADIAN SECTION OF THE BRITISH CHAMBER OF COMMERCE IN PARIS.

Amongst British Chambers of Commerce established abroad, that of Paris is conspicuous for its enterprise in serving the requirements of British Trade and Industry, and, furthermore, possesses a very active Canadian Section.

The Committee of this Section is composed of persons themselves interested in trade with Canada, and consequently is in a position to supply all the requirements of Canadian Members. The membership of the Chamber is restricted to firms of British nationality, it receives no subsidy from the Canadian or British Governments, and carries on its most necessary work entirely through the subscriptions of its members. To enable the Chamber to take up a firm position and thus sufficiently combat foreign competition, it very naturally deserves to continue to add to its membership.

Amongst other things it puts its members into touch with suitable agents in France, obtains information on the Commercial standing of French firms, supplies exact Customs classification of goods, notifies changes in French Customs duties and proposed commercial legislation, communicates enquiries from French buyers of British goods, and, furthermore, publishes a very useful Bulletin of information.

Applications for membership should be made to the Secretary of the Canadian Section, British Chamber of Commerce, Incorporated, 6, rue Halevy, Paris.

The Breathing Apparatus Fatalities at the Black Diamond Colliery, Washington State

Report of Accident of Saturday, July 10th, at the Black Diamond Mine of the Pacific Coal Company, State of Washington, in which Three Members of Mine rescue Teams lost their lives.

By JAMES McGREGOR, Chief Inspector of Mines.

The Hon. William Sloan,
Minister of Mines, Victoria, B.C.

Sir,—In compliance with instructions received from you on the 12th inst. to investigate and, if possible, learn the cause of the accident which occurred at the Pacific Coal Company's Black Diamond Mine, in the State of Washington, in which three men lost their lives while wearing rescue apparatus underground when making an examination of an abandoned slope owned by the Pacific Coal Company, and which had not been operated for four years, I have the honour to make the following report:—

I proceed to Seattle on the above-mentioned date, reaching there at 9.30 p.m. On the morning of the following day I called at the office of James Bagley, State Inspector for the State of Washington. There I learned that the Coroner, Howard McDonald, after questioning some of the men who had been at the scene of the accident, decided that an inquest was unnecessary. From Mr. Bagley I learned the following:

The day previous to the accident Mr. Morgan, the superintendent of the Black Diamond Mine, mentioned to James Murphy, captain of the Black Diamond rescue team, that he would like them to go down the old slope to learn if the water had risen or lowered since their last visit about three months previous, and remarked at the same time that, as they were going to enter the contest which is to take place at Roslyn, Wash., on August 14th, it would be good practice to make the trip through the black-damp area of the slope. It was agreed that they would go on Saturday.

The team was composed of five men—James Murphy (captain), Harry DeWinters, Hugh Hughes, Fred Ponton, and Julian Conda. Mr. Morgan, the superintendent, accompanied the team to the entrance of the slope, where they prepared their apparatus. Before putting them on the superintendent asked them if they had sufficient oxygen. In talking the matter over they were all satisfied they had plenty, remarking that it was only a short trip, the distance down to the water being 1,400 feet from the surface. At about 200 feet from the surface, known as the dead-line, they would be in the gas. They then looked at the gauges and were satisfied they had enough oxygen.

Harry DeWinters, using a Draeger type of apparatus of the 1916 model, had 50 minutes' supply; Hugh Hughes, using the Draeger of the same type, had 50 minutes' supply; James Murphy, captain, using a Gibbs apparatus of the old type with no by-pass, had 45 minutes' supply; Fred Ponton, using a Gibbs of the same pattern, had 60 minutes' supply; and Julian Conda, using a Gibbs apparatus of the same pattern as the others, had 90 minutes' supply.

They started down the slope at about 9.30 a.m. on the 10th instant, the superintendent, Mr. Morgan, going with them to the dead-line about 200 feet underground, where a safety-lamp was left burning. He intended to remain there until they returned and reported. After waiting about twenty-five minutes he became anxious at seeing nothing of them, knowing the trip had been made by the same team three months previous in twenty-seven minutes. In another few minutes he heard a call for help from Hughes. He, being alone and without apparatus, hurried to the phone and phoned the rescue team from the Burnett Mine, also phoning for Mr. Bagley, State Inspector, and Stephen H. Green, the general manager, who both arrived on the scene in about an hour and a half. By this time the Burnett team had arrived and gone underground. The statement made by the survivors of the first team to go down, to the State Inspector, was to this effect:

They went down to the water-line, taking the end of the rope with them to be left there and hauled up after returning to the surface, and there measured to determine the distance to the water. When the water was reached DeWinters showed signs of distress. When the captain examined his apparatus he noticed he was almost out of oxygen and decided to assist him out. After getting De Winters up the slope about 70 feet, Hugh Hughes dropped. When the captain realized by this time that they were all short of oxygen and could not stay longer, he ordered them all to go out and secure help, which was done; being compelled to leave Hughes and DeWinters behind.

The Burnett team, who went to rescue DeWinters and Hughes, were equipped with the Gibbs apparatus. After being underground about twenty minutes one of the party returned in an exhausted condition and was taken to the hospital, where he recovered.

The next to become exhausted and fall was James Hudson, of the Burnett mine-rescue team, who was equipped with a Gibbs apparatus. He was at once brought to the surface and every effort made to resuscitate him. After working with him for one hour and a half there was no sign of life. I was unable to learn whether or not he had any constitutional weakness.

Owing to a scarcity of apparatus to equip the twenty men organized into relief squads, the State Rescue Station having all but three of their apparatus away East to be remodelled, necessitating the use of those which had already been in use that day. Among them was the Gibbs apparatus Hudson had been equipped with. It was taken from him, recharged, and used again without having undergone any repairs, and was apparently in good condition even after having been somewhat roughly handled.

Upon the arrival of James Bagley, State Inspector, and Stephen H. Green, general manager, they organized a corps of twenty men equipped with rescue apparatus, sending four in a team and other teams of four following each other at a distance of 250 feet between teams, and taking a sled with them to where DeWinters was left. Placing the body on the sled and attaching the sled to the rope already mentioned, which had not yet been pulled up, the sled with the

body was hauled by those at the dead-line. The rescue party merely kept the sled in the best course until they met the next party 250 feet farther up, leaving the sled in their care and continuing on out to the surface. Each party did the same until the body was recovered.

I was informed that each apparatus given to the Black Diamond rescue team on the morning of the 10th was tested, before being given out, by the usual method known as the soap test, and appeared to be in good condition. This is confirmed by the same apparatus which Hughes wore being recharged with oxygen and used again the same day without any repairs.

This slope is very difficult to operate in, wearing rescue apparatus, the rails having been removed and many of the old ties having been left, making travelling heavy. The slope pitches about 35 degrees.

The consensus of opinion among the remainder of the first team to go down is that they were too confident and were not well enough supplied with oxygen in case they were delayed, if only for a short time.

The rescuers from the Burnett Mine, upon arriving at the scene of the accident, were somewhat tired and nervous, which accounts for so many of them being unable to proceed far, wearing apparatus.

In all there were three fatalities and five overcome; none of these were shown to be through defective apparatus.

I am greatly indebted to James Bagley, State Inspector, and to S. H. Green, general manager, for what information I have been able to gather. It is unfortunate there was no inquest, which prevented me from securing valuable and important information in detail, which is necessary in such a serious accident as this.

Respectfully submitted.

Victoria, B.C.,
16th July, 1920.

Supplementary Official Comment Re Fatal Accident In Use Of Mine-Rescue Apparatus.

This accident in no way discredits the efficiency and safety of the apparatus when handled properly.

The plain facts of the case are that this team attempted a feat in ordinary practice that most men would have given very serious consideration before allowing it even in a case of emergency.

The place to be travelled was dangerous, being full of carbon-dioxide gas, CO_2. There was no need to take the risk in ordinary practice-work.

The roadway to be travelled by the team was the worst possible for men wearing mine-rescue apparatus, being of heavy grade and very rough.

To go in with such a supply or oxygen, knowing the conditions, was suicidal.

The slope to be travelled by the team is 1,400 feet in length and pitches 35 degrees, and with the rails being lifted was in a very dangerous and rough condition for walking. A person in good physical condition without mine-rescue apparatus would have his work cut out to make this return trip in 30 minutes, yet the men attempted to make it with one of the men only having a 45-minute supply of oxygen, two having 50 minutes' supply, one 60 and one 90 minutes' supply.

It is noticeable that the one with the 45-minute supply was one of the survivors, the machine he was wearing being a Gibbs. This can be attributed to the automatic feed, which would function according to the wearer's demands. Both men lost were wearing the Draeger type of apparatus, 1916 model, whi are not equipped with automatic feed arrangement, the machines giving a constant supply of oxygen and not functioning according to the wearer's demands. This, no doubt, is the reason DeWinters and Hughes, the two wearing this type of machine, came to get in distress on the heavy, rough travelling on the heavy pitch slope. After the accident the machines were all found to be in good condition, and if they had been properly charged before going in the mine there would have been no accident.

The rough conditions encountered on the slope can be imagined when it took five teams of four men each to get out the bodies of the victims.

Why a trial with such risks attached should be selected for ordinary practice is hard to understand, even if the machines had been charged to the limit. But to go in with about one-third full charge is difficult to understand.

PRECAUTIONS IN USE OF OXYGEN RESCUE APPARATUS.

By GEO. S. RICE,
Chief Mining Engineer, Bureau of Mines.

Three men lost their lives in the Black Diamond Coal Mine near Seattle, Wash., recently while wearing oxygen breathing apparatus. The press dispatches stated that these men lost their lives while practicing with the apparatus. Later reports stated that the men died while attempting to make a trip 1,200 feet down a 25 degree slope which was filled with black damp, in order to measure the amount of water that had accumulated at the bottom of the mine, and the trip was attempted with oxygen in the tanks of the apparatus with dials indicating only 45 minutes' supply. The oxygen in the tank was used up and the men therefore lost their lives from a deficiency of air to breathe.

In spite of all the education and training done by the Government to prevent accidents, men are prone occasionally to take unnecessary chances. Every piece of apparatus, no matter how perfect, has its limitations. The Government, through the agency at the Bureau of Mines, has trained many thousands of miners in the use of mine rescue apparatus. The training has been given to all miners who requested it, and the Bureau has gone to the extreme of urging miners to join the rescue and first aid classes. In spite of all the efforts of the Government, men occasionally attempt the impossible.

To go 1,200 feet down a 25 degree slope, make observations, rest, and then return 1,200 feet, thus making a total distance of at least 2,400 feet, in 45 minutes is a quick trip when a man is not encumbered with a heavy load, but to attempt it cumbered by an apparatus weighing about 40 pounds makes it more than a hazardous undertaking.

Modern apparatus when fully charged will furnish oxygen for two to two and one-half hours when used with moderate exertion or with periods of rest, but a person uses four to five times as much oxygen in climbing a steep slope with a load of 40 pounds, than he would when walking at a moderate gait along a level road. It is quite probable therefore, that the

45 minutes charge indicated by the dial will not last 45 minutes with the violent exertion necessary. The Bureau of Mines in its handbook on "Rescue and Recovery Operation in Mines After Fire and Explosions," on page 49 makes the following statement:

"The rescue crews should observe every known precaution for their own safety while travelling in afterdamp or other noxious gases. Each crew should be composed of at least five men, including the captain, and the members of the crew should not become separated. If any one member complains of feeling unwell or is observed to be staggering or breathing unnaturally, the entire crew should immediately return to fresh air. In view of the liability of a member receiving some injury or his apparatus being damaged, a crew should never advance such a distance nor travel over such faults or wrecks as would prevent the crew from carrying one of its members back to fresh air. With the types of breathing apparatus now in service, the maximum straightaway unobstructed course should not exceed five thousand feet with a reserve crew at the fresh air base."

While in the foregoing it is to be noted that the maximum distance to be traversed is 5,000 feet, this for a level, unobstructed road, and as previously indicated, a trip of 2,400 feet down a steep incline would be more than equivalent to a 5,000-foot trip on the level and which maximum distance calls for a fully-charged apparatus, that is, with at least three times the amount of oxygen which it was alleged the three men had who made the disastrous trip in the Black Diamond mine. While all of the details of the affair are not known, at least enough has been indicated to send out a caution against men making such a foolhardy attempt, and it is desirable that full facts shall be known so that the public shall not be prejudiced against an apparatus which has greatest value when it is carefully used and used in accordance with well established rules.—U.S. Bureau of Mines, Reports of Investigations.

OBITUARY.

Mr. Henry Berry, Montreal.

Mr. Henry Berry, the Vice-President and General Manager of the Canadian Asbestos Company died at his residence in Montreal, on the 13th September, after a long illness. The Montreal "Gazette" states that general regret is felt in business circles in Montreal at the passing of Mr. Berry, who had been associated with the asbestos industry most of his life, there having been comparatively few uses for the mineral when he first became interested in it, but in the course of some thirty years of active development work he made it known all over the Dominion. He built up a large business which is now in a flourishing condition.

He had a strong personality, was richly endowed with energy and foresight, and these qualities made themselves felt in the extension of the business, in the interest of which he travelled from coast to coast hundreds of times.

Mr. Berry was 54 years and ten months of age. He was a member of the Montreal Board of Trade, and a member also, of the Masonic Order. In religion, he was an Anglican, belonging to St. Stephen's Church. He leaves a widow, formerly Miss Olive Grout, of Grimsby, Ont., and three sons: John and Frank, of Montreal; and Robert C., B.Sc., C.E. of Ottawa.

NOTES FROM THE NOVA SCOTIA COLLIERIES.

Nova Scotia Steel & Coal Co.

The output for August totalled 47,843 tons, made up as follows, Florence Mine, 16,467 tons, Princess, 13,843 tons, Jubilee, 12,346 tons, Scotia, 5,287 tons. This is slightly less than June and July figures, the lessened production being chiefly due to holidaying. September production will not be high at the Cape Breton collieries, being a short month, and one not generally marked by maximum production.

Labor Matters.

The Royal Commission is stated to have forwarded its findings to Ottawa, and the Department of Labor is expected to make an announcement regarding this during the current week. A significant statement was given to the newspapers by Mr. Wolvin, President of the Dominion Steel Corporation, on his return to Montreal from a visit to the collieries. He expressed the view that owing to the conditions existing in the country at the present time, and with the cost of living on the decline, together with the prospect that there would be considerable unemployment during the coming winter, the commission could not with consistency recommend an increase in wages. The investigation of that body, he stated, would undoubtedly show that the increased wages granted during the past three years had generally resulted in a decrease in the output of coal at the mines.

The miners' leaders have gone out of their way to intimate to the Commission that they not only expect a very substantial increase in wages, but that a new demand will be made immediately following the publication of the findings of the Commission. The original demand of the miners asked for an increase retroactive to 1st May 1920. There is a wide divergence in the declared attitude of the union leaders and the opinion expressed by Mr. Wolvin. It is very much to be doubted whether the increased selling prices obtainable for coal have in the case of the Dominion Coal Company offset the increased costs of production due to decreased outputs, and undiminished—in some cases actually increased overhead expenses, and the lessened turnover of sales. It is generally admitted that one-third additional output could be obtained from the Dominion collieries without adding a single non-productive laborer to the payroll, if the necessary number of coal miners could be placed at work. The attitude of the miners' unions in regard to the distribution of the working forces and general working conditions is a much more serious question than the wage increase question, although that is sufficiently serious to warrant Mr. Wolvin's rather ominous comment.

The Report of the Royal Commission on working and wage conditions at the collieries in Nova Scotia has been forwarded to Ottawa, and it is understood that copies of the recommendations of the Commission are being forwarded to the parties interested. A despatch from Sydney contains what purports to be the gist of the findings of the Commission, which are generally favorable to the case presented by the union, but the Minister of Labor has not as yet announced the nature of the findings.

It is reported the Greenwood Coal Company has been acquired by Montreal purchasers.

Northern Ontario Letter

THE SILVER MINES.

Producers of silver in various instances have come to base their calculations on a minimum of 90 cents silver, with frequent fluctuations up to around $1.00 an ounce. A decline to around 90 cents is usually marked by a curtailment of bullion sales, while an advance to above 95 brings out more or less large quantities of hoarded metal.

Silver production from Ontario mines during the first half of the current year declined more rapidly than previously estimated, the number of ounces produced amounting to 4,474,322 as compared with 5,744,172 during the first half of 1919. The value of the silver produced during the first half of 1920 amounted to $5,077,028 as compared with $5,951,362 during the corresponding period of the preceding year.

In view of the average price of silver having declined still further during the last half of the year, it is quite evident an added decline in the value of the output will result and the value for the whole year may fall below $10,000,000. This compares with $12,747,621 during 1919.

Quite a number of prospectors from the Cobalt district have staked out claims on the shore line of Lake Temiskaming, in the vicinity of Paradis Bay. Oil seepage is said to have been found. At best, however, it is believed but a very limited quantity or basin of oil shale could occur in that section owing to the known occurrence of volcanic formation in the surrounding territory.

The annual report for the fiscal year ended August 31st on the Kerr Lake mine is already in the hands of the printer and will be ready to present to the annual meeting which has been called for September 27th. This is believed to be a record, in regard to the brief time occupied in placing full information before the stockholders, following the closing of the company's year.

Cyril Knight, Ontario Government Geologist, is making excellent progress in the geological survey of the Cobalt field. The Beaver-Temiskaming areas in southeast Coleman has been completed, as also has the southeastern part of the township of Bucke. Mr. Knight will continue the work up until November, and will be obliged to leave the finishing of the task until the Summer of 1921. Part of the current month will be spent in the Kirkland Lake gold area in making an examination of conditions met with at the 900-ft. level on the Kirkland Lake gold mines.

A cross-cut at a depth of 425 feet on the Keeley Silver Mines in South Lorraine has reached the "Beaver Lake" vein, according to a report just received. In view of work in the upper levels having opened up ore in this vein all the way from the surface down to a depth of about 300 feet, the present development is believed to indicate the occurrence of ore all the way from surface to the contact between the overlying Keewatin and the underlying diabase, or a total depth of between 425 and 500 feet.

On October 20th, the Nipissing Mining Company will disburse $600,000 to its shareholders. This will make a total of $1.200,000 in dividends, plus $600,000 in bonuses paid during the current year by this company. The financial statement recently issued, showed a balance of over $5,200,000. In following out its usual policy, the company will likely make another disbursement in January, amounting to $300,000 in a regular dividend of 5 per cent. and a bonus of equal amount.

Announcement has been made that financial arrangements have been made to operate the property of the Cane Silver Mines, situated in the township of Cane on the Elk Lake branch of the T. and N. O. Railway. It is planned to assemble as much high-grade ore as possible from the surface showings with a view to making a shipment early in the winter. The development program includes the sinking of a shaft on vein known as No. 1, and after reaching a depth of a hundred feet or so, to drift east to where the diabase comes in contact with the quartzite formation. In connection with the financial arrangements, it is learned that interests closely identified with the Abitibi Power and Paper Company have become associated in the enterprise, and that earlier reports that one of the Cobalt mining companies had been requested to participate in the venture were erroneous. The silver on the Cane property occurs in veins in the diabase formation, spectacular patches of the metal being found at surface.

The Gowganda District.

During the first six months of the current year, the mines of the Gowganda district produced 225,513 ounces of silver. This was made up chiefly of silver from the Miller Lake O'Brien, the balance coming from the Castle property of the Trethewey Company. The output is somewhat lower than for the corresponding period last year.

The prediction last spring, made by the promoters of the Canadian Light Railways Construction Company that Gowganda would be provided with a narrow-gauge railway within a month or so following the granting of a charter has not been made good, and there is a growing relief that the camp is once more to be disappointed in regard to the question of a solution of its transportation problem.

With the approach of winter, the mines will be able to lay plans to advantage of the sleigh roads for hauling the material and supplies, as well as sending out ore. The freight rate, however, promises to be high and will amount to at least a dollar a hundred, all of which tends to constitute a serious handicap in the development of the district's mineral resources.

Ore and Bullion Shipments.

During the week ended Sept. 10th, five Cobalt companies shipped an aggregate of eleven cars containing not far under a million pounds of ore.

The Nipissing alone sent out six cars containing over half a million pounds, which is shown in the following summary:—

Shipper	Cars	Pounds
Nipissing	6	581,311
Coniagas	2	151,000
La Rose	1	83,902
Hudson Bay	1	62,640
Beaver	1	60,000
Totals	11	948,853

During the corresponding period the Nipissing made two large bullion shipments, the combined consignments amounting to 225 bars containing 299,352 ounces. In addition to this, a large shipment is reported from the Mining Corporation which was not recorded in last week's statement. This shipment amounted to

158 bars containing 162,247 ounces and added to the Nipissing shipments makes a total of 383 bars containing 461,599 for this week's report.

The Nipissing also reports a shipment of 66 bars containing 69,116 ounces, apparently omitted from former bulletin reports. In adding this to the above statement, the total report for this week amounts to 449 bars containing the enormous total of 550,715 ozs.

Figuring the metal at 12 cents to the pound, that sent out by these two big producers amounts to nearly twenty-three tons of pure silver.

THE GOLD MINES.

Next to the nickel mines, the gold mining industry of Ontario is the greatest factor in the mining industry of this province. In the order of importance the three metals produced are nickel, gold and silver. The figures compare as follows for the first half of 1920:—

Nickel matte	$5,338,120
Nickel (metal)	1,696,687
Gold	5,690,504
Silver	5,077,028

This clearly illustrates the relative importance of each, but also requires a note of explanation.

The known silver deposits have been worked extensively for about sixteen years and are declining. The nickel deposits are large, and although worked for many years, are likely to maintain an output for many years, in fact many decades at the present rate. The gold deposits are comparatively new and the industry is growing rapidly. This tends to indicate that gold production is definitely in the lead of the silver mines, and may in time exceed the record of the nickel mines.

As a consequence of this, interest in gold mining is increasing and money for development work in the vast prospective area outside of the proven districts seems certain to flow in larger volume when it becomes fully realized that the prospects are excellent for new important gold mining districts being opened up.

For the first half of 1920 the Hollinger mine alone produced $2,928,079. in addition to carrying out a large amount of exploration and development work.

The McIntyre-Porcupine was the second largest gold producer in Ontario for the first half of 1920, its output amounting to $1,085,298 for the period. This company is also proceeding with the development of its recently acquired coal lands in Alberta, and is placing orders in the East for additional machinery to be shipped to the property. It is believed to be the intention of the company to make as good a showing as possible on its coal lands, so as to impress the stockholders of the Temiskaming Mining Company with the importance of the project and in that way enlist the financial co-operation of that company.

The Dome Mines easily occupied third position among the gold producers for the first half of the current year, the output from the this mine amounting to $989,566. The Dome has definitely arranged to take over the Dome Extension property and assets, both contracting companies having ratified the deal, and thereby leaving it only necessary to carry out the details. This will mean the transfer of one share of Dome for each thirty shares of Dome Extension, the total of the latter to be taken over amounting to 2,300,000 shares.

A feature in connection with the gold mines of the Porcupine district is the increase in the value of the ore as found at depth on the Dome. The indications are said to point to the likelihood of the Dome's average gradually working up to a point almost on a par with the Hollinger.

Cross-cutting is under way at the 250-ft. level of the Porcupine-Keora property. This work is for the purpose of proving up the ore bodies indicated previously by diamond drilling.

A mining plant has been installed on the North Davidson property in north-eastern Tisdale, and the work of shaft sinking will be speeded up. At a depth of over fifty feet, values are said to run high over a width of between four and five feet. The work has so far been financed chiefly by Toronto men, although finances have been subscribed by English interests, the money only being held in England pending a reasonable adjustment of exchange rates.

A statement has been issued by the president of the Clifton-Porcupine Mines for year ending June 30th, 1920, in part as follows:

"During the period under review we have made encouraging progress in the development of the Clifton property. An electrically-driven Mining Plant, of adequate capacity for the complete development of the property has been installed. The main shaft has been sunk to a depth of 225 feet, and several hundred feet of lateral work has been carried out on two levels with encouraging results.

"We have recently embarked on a policy of diamond drilling. It is expected that the information which will be gained from this work will make it possible to conduct further underground development at a considerable saving."

The Annual Meeting of shareholders is called for September 14th.

The Kirkland Lake Field.

Excavations for the foundation of a new 100-ton mill commenced this week on the Ontario-Kirkland Gold Mines. It is planned to get the foundations ready this fall before cold weather sets in, after which the winter months will be occupied in hauling machinery to the property so as to proceed with the installation of the plant in the early spring. Underground developments continue favorable, the grade of the ore at the 450-ft. level showing still further improvement over that opened up at the 300-ft. level.

For the first half of 1920, the Lake Shore mine produced $243,977, while the Kirkland Lake Gold Mines produced $137,676 and with an output of $125,137 from the Teck-Hughes.

The Ontario Government has notified the mining interests of Kirkland Lake that in view of the Government having complied with their request for a macadam road, and on account of the Associated Goldfields of Larder Lake not having been willing to submit its property to an examination by engineers appointed by the Government, it has been considered best not to proceed with the construction of a railway through that district at the present time.

In the meantime, it is learned that some of the heavy shareholders in the Associated Goldfields are planning some move to secure an independent report on the property. They have expressed dissatisfaction over the attitude of the management of the enterprise.

On the Bidgood, King-Kirkland, Wood-Kirkland, Lebel Oro and Moffat-Hall properties in the Eastern part of the Kirkland Lake district, some very satisfactory progress is being made, and the results achieved have been highly encouraging. The correspondent of the "Canadian Mining Journal" has concluded a visit to that district and finds considerable justification for the present enthusiasm over the outlook.

THE GOLD OUTPUT.

Statistics have been published recently by the United States Geological Survey and others showing how the production of gold throughout the world has fallen off during the past eight years. In 1912 the world's output of gold was £95.9 million. Last year the total was only £72 millions, while this year it is likely to be still lower. This is a fact that will probably surprise many people, and it is assuredly a fact that leads to most serious reflections, not only upon its causes, but upon its consequences.

The war has been largely, but not entirely, responsible for this falling off. Labour has been withdrawn from the mines, there have been transport difficulties, high costs and so forth, while some mines have become exhausted and there have been no discoveries of importance. While the output of the precious metal has been diminishing the world's need of gold has increased, and will continue to increase, so that an enlarged production of gold for an indefinite time to come, if this be possible, is imperative. But we see to-day famous mines on the Witwatersrand having to close down because, owing to high costs of working, in which high wages play a great part, they cannot make ends meet. And when once a mine closes down it is difficult to restart it. The greater the number of mines that close down the less employment is there for miners and others who depend for their livelihood upon the mining industry.

We see all the great countries of Europe struggling with immense difficulties owing to the great manufacture of paper money and the resulting inflation, Great Britain's difficulties are bad enough, but those of many other European countries are infinitely worse. The United States is in this respect the most favored of all, and it is practically the only country that can be said to have a free market for gold. The great mass of paper is in most countries no longer linked with gold, but is linked with debt only, and before paper money can become linked with gold once more these massive debts must be removed or considerably reduced. This applies, for instance, to our own mountainous floating debt and likewise to our indebtedness abroad, especially to America.

But a greatly increased output of gold will not remove the difficulties against which these debt-laden, currency-inflated countries labour if they will not make the fullest use of their energies in increasing their natural wealth. Gold from the mines will not irresistibly flow towards any unless they can attract it by the magnet of wealth production. The more rapidly they and ourselves produce wealth the sooner shall we be able once again to link our paper currency with gold—in other words, to re-establish the gold standard. And while producing wealth, nations must likewise economise. In short, they must not consume more than they produce and attempt to exist as a parasitic individual does.—"Financier," London.

CONTINUED DECLINE OF GOLD PRODUCTION IN UNITED STATES.

The gold mining industry of the United States will be completely shut down unless constructive aid is provided without delay, according to H. N. Lawrie, mining engineer and economist of the American Mining Congress of Washington. Mr. Lawrie has just returned from an extended tour of all the mining districts of the United States and says that conditions in the gold mining camps are much worse than he had expected to find them.

"Gold production in the United States has declined from $101,000,000 in 1915 to $58,500,000 in 1919, and from present indications will probably still further decline to about $40,000,000 this year," said Mr. Lawrie. "Now, added to that, the gold stock is being depleted by excessive exportation and industrial use, and this will seriously impair the public confidence in the nation's finance and currency during the present period of credit and currency contraction unless a normal gold output is very shortly insured. The mines are reducing production or closing down, and if this is allowed to continue it will take years to again develop a normal output, and at a tremendously increased expense. Moreover, to shut down the deep mines means that they will become filled with water.

"Industrial gold is the only commodity which manufacturers can obtain today at pre-war prices. The average wholesale price of all commodities for the year 1919 was 112 per cent greater than for the year 1914. The Government is selling gold without limitation for industrial consumption at $20.67 an ounce, the pre-war price, which is less than the cost of production. An ounce of gold had during 1919 a purchasing price of only $9.70. Now the economic pressure which has forced the decline in the purchasing power of the dollar and thereby created the pressure upon the gold mining industry has operated to increase the purchasing power of the public to such an extent that they have been buying luxuries, especially jewelry, and that has made a great increase in the demand for industrial gold.

"The gold produced is in the same position today as a person who received the same income in 1919 as in 1914 and finds that $1,000 has shrunken to a purchasing power of $485. It is an interesting condition when the production of gold has become so expensive that it does not pay to mine it, and the shutdown of our mines for that reason is imminent. The people of this country must recognize the situation and must urge constructive legislation to relieve it if they wish confidence in our finance, currency and the gold standard to be retained in this country and abroad."

PERSONAL.

Mr. Arthur A. Cole, Mining Engineer, T. & N. O. Railway Commission, who was recently operated on at the Mines Hospital at Cobalt, is rapidly convalescing, and was able to leave the hospital for home on Saturday the 4th instant.

MINING INSTITUTE INCREASES FEES.

The several mining societies in Britain, which are federated into the Institution of Mining Engineers, have decided to raise the annual fees to a minimum of three guineas for members and associate members. This is the second increase in some instances since the beginning of the war.

TORONTO MINING STOCKS.

Following are the average quotations for gold, silver and miscellaneous stocks on the Standard Stock Exchange, for week ending Sept. 11th 1920.

Silver	Hlgh	Low	Last
Bailey	5	4½	5
Beaver Consolidated	43	41	41
Cobalt Provincial	44½	43	43½
Crown Reserve	28½	27	26
Gifford	1¼	1¼	1¼
Hargraves	2	2	2
La Rose	35	33	35
Lorraine Con. M. Ltd.	5	5	5
McKin.-Dar.-Savage	58	57	57
Mining Corp. of Canada	1.65	1.65	1.65
Nipissing	11.00	10.75	10.75
Peterson Lake	14¾	13¾	14¾
Silver Leaf	1½	1½	1½
Temiskaming	35	34	35
Trethewey	26	25	25¾
Wettlaufer	3	3	3
Gold.			
Apex	1¾	1½	1½
Boston Creek Mines	15½	15½	15½
Dome Extension	38	37	38
Dome Lake	4	4	4
Dome Mines	12.25	12.25	12.25
Gold Reef	3¼	3	3
Hollinger Cons.	5.90	5.75	5.79
Inspiration	3½	3½	3½
Keora	15½	15	15
Kirkland Lake	52	50½	51
Lake Shore M. Ltd.	1.15	1.08	1.08
McIntyre	2.01	1.94	2.00
Moneta	11½	11	11½
Newray Mines, Ltd.	9	9	9
Poreupine V.N.T.	24½	24	24½
Schumacher	18	17½	17½
Teck-Hughes	9	9	9
Thompson Krist	8	7	7
West Dome	6½	6½	6½
West Tree Mines Ltd.	5½	5	5
Wasapika Gold M. Ltd.	13	12	12½
Miscellaneous.			
Rockwood Oil, Gas	3¼	3	3
Vacuum G.	24½	24	24

TORONTO COAL PRICES.

Toronto, Sept. 14.—Hard coal continues to be particularly tight and although a slight softening in bituminous was noticeable the advance in freight rates just about offset the slight drop. Mine run is quoted at $14.25 to $14.50 f.o.b. Toronto; smokeless coal $14.50 to $15.00: hard coal $8.00 to $16.00 gross tons at mines American funds.

METAL QUOTATIONS.

Fair prices for Ingot Metals in Montreal Sept. 17th 1920. (In less than carload lots).

	Cents per lb.
Copper, electro	23¾
Copper eastings	23½
Tin	53
Lead	9¼
Zinc	10¼
Aluminum	35
Antimony	8¾

ASSOCIATED GOLDFIELDS MINING COMPANY PROPOSES BUILDING OWN RAILWAY FROM BOSTON CREEK TO LARDER LAKE.

The Toronto "Globe" publishes the following letter from the President of the Associated Goldfields Mining Company stated by him to have been forwarded to the Minister of Mines for Ontario under date of 27th July. The letter is as follows:

"In pursuance of our conversation of to-day, and our interview with the Premier a few days ago, I may say that I have taken up the matter with the directors of Associated Goldfields Mining Company, Limited, and those of the Poreupine-Rand Belt Railway, which eharter, as you know, this company owns.

"It was originally the opinion of our directors that our transportations needs would be served more quiekly if our company were to build its own line of railway, and at the same time we would be able to locate it at such points as would serve our interests best, and it was only with the idea of serving as many of the other deserving operators in the distriet as possible that the course of the road was more or less diverted to the Kirkland Lake-Swastika route.

"It is the opinion of our directors that only a very comprehensive investigation of our ore bodies would be fair to the Province, and figuring all the assistance which we would be able to give the men in charge, this investigation would still entail several month's time. Coupling this with the fact that the Kirkland Lake-Swastika route would be more than twice as long our directors feel that our requirements would be more speedily served by the company eonstructing its own line of railway from the point at or near Boston Creek to Larder Lake.

"Presuming from our conversation that your Government has no objection to our following this course, we have deeided to send our engineers at once over the short route and give us facts and figures as to the cost of this line.

"Thanking you and your Government for their kind consideration in this matter, I beg to remain, yours respectfully, Geo. A. MacKay."

BOOK REVIEW.

Compressed Air Power. A Treatise on the Development and Transmission of Power by Compressed Air, by A. & Z. Daw. Sir Isaae Pitman & Sons, London and New York. Cloth Boards. 5½ by 8½ ins. by 5 inch. $7.50.

This volume does not treat so mueh on the applieations of eompressed air, as on the development and application of the prineiples of the compression, expansion, exhaust and flow of air and gases. The mathematical theories underlying the design of compressed-air devices are very fully developed and the steps by which formulae are deduced are exhaustively detailed. The book is designed to fit the requirements of designing engineers and draughtsmen, and students of applied science, and it is not an elementary treatise. The tables and diagrams are partieularly numerous. The Air Lift Pump is very thoroughly investigated, and their authors believe that their presentation of the Displaeement Theory of the Air Lift Pump is the most eomplete mathematieal analysis of its action yet offered. The functions of the receiver and inter-cooler in designing a really effieient compressed-air power-plant are extensively diseussed, as are eontrolling and unloading deviees.

VIRGIN COAL AREAS IN THE ROCKY MOUNTAIN AND FOOTHILL SECTIONS OF ALBERTA.

The Summary Report of the Geological Survey for 1919, Part C., contains reports of explorations in unworked coal areas of Alberta, all lying in remote and mountainous territory, and unlikely for many years to become the scene of coal mining on a commercial scale. The occurrences are all shown on the maps attached to Mr. D. B. Dowling's Report on the Coal Resources of Canada, the essential correctness of which is strikingly illustrated by more intensive subsequent explorations.

Coal Areas Northwest of Brule Lake, Alberta.

This area was examined by John MacVicar in the field season of 1919, with the main object of determining what further Kootenay coals might be found, and also to ascertain the feasibility of a railway line to them, and the coal areas of the Smoky River, by way of the foothill country. The territory examined lies northwest of the Jasper Park area, and consists of a tongue of coal-bearing strata roughly paralleling the crest of the Rocky Mountains. A number of coal seams that will yield bituminous coals, suitable for steam, metallurgical and domestic uses were noticed, but no anthracitic coal, similar to that on the Smoky River was found.

It was found that the country did not present great obstacles to railway building, and a route is suggested, starting from Solomon Creek on the Canadian National Railway, following the water courses to the junction of the Smoky and Muskeg rivers (an airline of about 70 miles), with grades that will not exceed two per cent.

The coal resources of the region have not been prospected, and in this hurried reconnaissance no attempt was made to prospect them in detail. Coal seams were ascertained to occur at three horizons, namely in the Montana, Colorado and Kootenay formations, but only the last-named is important as likely to contain workable coal seams. Outcrops in the Kootenay are sparingly represented, probably because the seams are covered by glacial drift, or only the barren parts of the Kootenay are exposed. A number of seams, varying from 3 ft. to 5 ft. were noted, containing coal generally friable in character. No analyses are given.

Little Smoky River, Alberta.

The field season of 1919 was spent in a reconnaissance examination of the valley of the Little Smoky river, but owing to lack of time and scarcity of outcrops the results were unimportant. Lignitic seams were noticed. The area lies within the general subbituminous district.

Highwood Coal Area, Alberta.

The Highwood area is a continuation of the Crows nest field, and has similar rock successions and structural features. The report is made by Bruce Rose, who has been engaged since 1915 in examining Rocky Mountain coal areas. Mr. Rose is linking up the stratigraphy northwards along the range.

At one point, on Cat Creek on the H. A. Ford holdings, fourteen seams are located in a distance of approximately three-quarters of a mile across the measures. The seams vary from 4 ft. to 38 feet in thickness, and give a total of coal thickness of 151 feet. The seams have been prospected by tunnelling, and analyses are given showing fixed carbon contents of from 60 to 76 per cent. Volatile matter is low, running from 14 to 15 per cent, but the ash is comparatively high, although it is explained that some of the samples analysed included portions of shale parting and roof stone. Making allowances for loss of moisture in transit, and corrections for shale content that would be eliminated in commercial mining, an average analyses of these Highwood district coals is given as follows :

	Per Cent.
Moisture	1
Ash	8
Volatile Matter	16
Fixed Carbon	75

DEMAND FOR GYPSUM PLASTER IN CUBA.

Major H. A. Chsholm, Canadian Government Trade Commissioner in Havana, Cuba, writes as follows:—

"If Canada manufactured sufficient gypsum plaster the Cuban market could consume many times the quantity imported from Canada at the present time, which amounts to some 2,000 or 3,000 barrels a month. It appears that a good deal of the building plaster imported into Cuba from the United States is manufactured from gypsum mined in Canada. I should think that Canada has a good opportunity to build up a new industry in the manufacture of gypsum building plaster for Latin-American countries."

There should be no difficulty in supplying any outside market with either crude or calcined gypsum from Canada, provided shipping facilities were convenient and reasonably priced. Of 304,532 tons of gypsum mines in Canada during 1919 there were calcined 121,499 tons. 148,394 tons of crude gypsum were exported mainly to the United States, and gypsum products were exported to the value of $140,235. There were quite important imports of gypsum, crude and ground, and of plaster of paris. Canada's ability to produce gypsum and gypsum products of high grade is much larger than any market that has as yet been obtained, and during the cessation of building during the war period many of the gypsum quarries and calcining plants in Canada have been idle, and many are yet.

Cheticamp Gypsum Quarries Reported Likely To Resume Operations.

Before the war a gypsum property at Cheticamp, Inverness County, Cape Breton Island, had been quite extensively developed. The gypsum is present in large quantities, and it provides the raw material for plaster-of-paris of very good quality. A good demand for this material came from the Montreal district, before the war stopped building operations, and some of the larger buildings, such as the Ritz-Carlton, used this Cape Breton plaster in large quantities. The quarries are conveniently situated for water transportation to Montreal by small steamers.

It is now stated there is a probability that this property, which includes a short railway line, rolling stock, and factory for making plaster of paris, will operate again in the Spring of 1921. There are a number of excellent gypsum properties in Cape Breton Island, but they have all been idle during the war, and are idle now, with the exception of the quarries of the Iona Gypsum Company, situated near the point where the Canadian National Railway crosses the Bras d'Or Lake at the Grand Narrows.

British Columbia Letter

Dawson, Y. T.

The placer camps of the Yukon Valley, it is estimated, will yield $4,485,000 for the season of 1920. Practically every camp in the North suffered a heavy decline for the reason that it has been a very dry season. Hydraulic operations consequently have been much curtailed. Yields by camps of the Interior of Alaska and the Yukon for the season drawing to a close are estimated by competent authorities as follows: Dawson, $1,500,000; Fairbanks, $750,000; Tolovana, $750,000; Iditarod, $500,000; Tacotna and Ophir, $500,000; Hot Springs, $100,000; Ruby, $100,000; Koyukuk, $75,000; Circle, $70,000; Marshall, $50,000; Forty Mile, $50,000; Rampart, $20,000; Chandler, $20,000. Total, $4,485,000. In commenting on the situation thus disclosed the Dawson "Daily News" observes that, if the decline in gold production is to be arrested, it will be necessary to restore the purchasing power of gold by bonus or otherwise as low-grade alluvial gravel cannot be worked under present conditions.

Stewart, B. C.

It is reported that the present bond holders of the Big Missouri Group of Mineral Claims, Salmon River, Portland Canal District, do not intend to continue development work. Operations have been under way for some time by a syndicate known as the Pacific Coast Exploration Co. prominently identified with which is Sir Donald Mann, of Toronto, Ont. Both diamond drills with which exploration work has been in progress have been withdrawn. The only information made public, and it is unofficial, is that the Big Missouri presents an unusual problem, that the small amount of drilling done has not given satisfactory results, and that the complete exploration of the entire mineralized zone is a work of such magnitude that the Company does not feel disposed at present to continue.

The Dunwell Group of Mineral Claims, adjoining the Lakeview on Glacier Creek, is being developed with promising indications. The ledge has been stripped for 300 feet and cross-cut in places. It is five feet in width and averages $20 in gold, silver and lead.

Stringers of native silver have been struck on the Silver Tip Claims, Salmon River, the samples seen closely resembling those of the high-grade ore of the Premier Mine. This property is under bond to a Vancouver City Syndicate.

The Algunican Development Co. has decided to do some diamond drilling on the Spider Group of Claims. Work of this kind has been in progress on the Northern Light Property.

A recent heavy rain did considerable damage to various avenues of transportation in the Portland Canal District, chiefly in the carrying out of bridges. The Bear River, however, again has been bridged with cables permitting the crossing of prospectors and their supplies.

The Portland Canal Branch of the Canadian Mining Institute held a meeting at Stewart, on September 1.

Alice Arm, B. C.

There are now 250 men employed at the Dolly Varden Mine, Kitsault River, and the output of ore for the month of July totalled 5,600 tons, all of which was sent to the smelter at Anyox. In addition a quantity of high-grade ore was forwarded direct to the Tacoma Smelter. The force indicated has been divided during the summer equally between the Mine and the Railroad and, if the snow of the forthcoming winter makes the continued operation of the railway impossible, only some 65 men will be kept on, their work being the prosecution of development. At present power for the air compressors is secured from oil engines but a hydro-electric plant is being installed on the Wolf Claims which will be used for all purposes. It will be capable of providing 500 horse power for the operation of a 12-drill compressor. The Wolf, which is situated three miles up the river from the Dolly Varden, is reported to have given gratifying indications in diamond drilling and tunnelling is to be commenced without delay.

Good reports have been received of other properties of the Alice Arm Section, notably of the Esperanza Group, from which a quantity of high grade native and ruby silver ore has been taken and now is awaiting shipment to the Tacoma Smelter. There also are the Silver Tip Extension, the Moose, and the La Rose Properties all of which are showing up well and on all of which considerable development has been done this summer.

Hazelton, B. C.

The construction of a waggon road to the Silver Standard Mine by the Provincial Government meets with the warm approbation of those interested in the development of the mineral of the district. It is stated that the road when completed will be a "regular speedway."

The Peerless Mine, Kleanza Creek, is attracting much attention. Last year some 150 tons of ore were taken out and this season there have been shipped 100 tons. The work at present consists for the most part of development and the ore blocked out, it is stated, runs about $100 to the ton in values. That the property has merit is indicated by the fact that the Provincial Government is improving the trails to it.

Other prospects on which development has been done are the Continental on the north side of Bornite Mountain, the New Era Group, the Montana, and the Golden Crown. The latter was purchased recently by the Kleanza Mining & Development Co.

Slocan, B. C.

The "Evening Star Mine," Dayton Creek, is being opened up and there is every reason to believe that it will be shipping again soon. Pumps and other plant necessary for the unwatering of the shaft and workings of the No. 3 Cameron Group were installed some time ago and have done their work well, it being stated that a body of high class ore has been uncovered. Work has commenced on the construction of a 50-ton flotation mill for the Ottawa Mine, Springer Creek, near Slocan City. L. H. Biggar and A. L. McPhee hold this property under bond from the Consolidated Mining & Smelting Co. and the mill referred to has been designed by Mr. Biggar, who is an Eastern Canadian engineer. A tramway from the mine to the mill is to be built, the distance being about half a mile and a pipeline also is to be installed. It is planned to have the mill ready for operation in the course of a month or more, but the heavy machinery is to be taken over the snow.

Nelson, B. C.

The Perrier Mine, situated on Cotton Wood Creek on the slope of Morning Mountain and close to the line of the Great Northern Ry., which recently was taken over by a re-organized Company with a capital of $250,000 and the officers of which are: C. E. Crossley, president; R. W. Hinton, vice-president; W. M. Cunliffe, secretary-treasurer; and A. H. W. Crossley, George Leece, T. H. Turner, and Ralph Young, directors, was discovered in 1910 and named after the late King Edward's famous horse. Mr. Turner, one of the original discoverers, states that the property is and always has been owned by those responsible for its staking. The main shaft of the Mine has been sunk 120 feet and there are two others on the vein, one 40 and the other 20 feet. The present plant consists of a small Huntington three-foot mill of five-ton capacity for taking care of ore from the drift. From this mill $3,300 in gold has been taken, other values not having as yet been recovered. There also are a Rand drill, a Rand hammer-stopper and a three-drill Rand compressor driven by a Pelton wheel. There is an abundance of water, and Messrs Crossley and Turner claim they have invented an automatic pump to keep the mine free from water which will work for 12 months without attention. It is planned to put in a stamp mill and a modern hoist equipment. There is to be considerable more underground development. Abont 80 per cent of the ore is free milling.

A second vein has been discovered by surface stripping on the property of the Mountain Chief Copper Mine, Renata, on the lower Arrow Lake. A tunnel has been driven exposing considerable mineralization, the ore for the most part being oxidized.

Another property on which a new vein is reported to have been found is the Barnett Silver-Lead Group at the head of Lemon Creek. The new lead is very similar to that on which work has been done and runs parallel to it. Already ore from this source is being sacked for shipment. The Barnett Mine was re-opened by R. G. McLeod some four or five weeks ago. It has been a shipper in past years.

Ymir, B. C.

Good progress is being made in the opening of the Yankee-Girl Mine. Operations underground are proceeding satisfactorily. Considerable new development has been done and a substantial body of ore has been blocked out. John W. Shaw, superintendent, has left for Toronto, Ont., to submit a report to the Mining Corporation of Canada which is behind the enterprise and in the meantime A. W. Newberry, of New York, is in charge. Development is being prosecuted upwards on No. 5 Level by means of two raises and each now are up a distance of some 300 feet on the dip vein, both being in ore. There still is about 400 feet to go before No. 2 Level, the next in the vein, is reached. Exploration of the ore body has been carried on from No. 2 Level and at present four hammer-drills and two piston drills are being used.

Trail, B. C.

Ore receipts at the Trail Smelter of the Consolidated Mining & Smelting Co. of Canada for the last 10 days of the month of August totalled 11,257 tons, making the aggregate for the year 221,312 tons. The feature of this period was the return of the Iron Mask Mine, of Kamloops, to the list of shippers.

THE HISTORY OF SILVER MINING IN ONTARIO.

An Address to the Imperial Press Conference by the Secretary of the Ontario Mining Association.

On the occasion of the recent visit to Cobalt of the members of the Imperial Press Conference, an address was given by Balmer Neilly, secretary of the Ontario Mining Association, voicing the opinion of mine operators of Ontario in general, and dealing specifically with the silver mines.

Particular emphasis was laid on the necessity for mining men to deprecate and challenge any suggestion made by any public man in Ontario that would cast suspicion on past and present relationships, between the Department of Mines and the mining operators of the province. It should be kept clearly in mind that Mr. Neilly made reference to mining operators, and did not mention in any way promoters or stock operators.

Following is a verbatim record of Mr. Neilly's address reported by our correspondent:

"The time at our disposal tonight is limited by arrangement and our guests must be indeed tired of speeches and possibly of speakers. However I would here tender to the Delegates to the Imperial Press Conference on behalf of those more particularly interested in the Mining Industry, our very keen appreciation of the honor they do us with their presence here tonight. Their presence in Canada is of peculiar significance to us, because we look upon them as British Prospectors in the fullest sense, and just as mining cannot hope to prosper without keen energetic and intelligent prospectors to prepare the way, neither can our British Empire develop as it should, without prospectors such as these.

"We have undertaken to sketch in the briefest possible way tonight the history of Silver Mining in Ontario, with particular reference to the Cobalt Camp.

EARLY HISTORY OF SILVER MINING.

"Back in the early sixties some small and unimportant discoveries of silver had been made along the north shore of Lake Superior, but in the Spring of 1868 the first real discovery was made on Silver Islet, a small bare rock 25 miles from Port Arthur and having dimensions of only 80 x 100 feet.

"In these days Ontario, then known as Upper Canada, gave little promise of its world position of to-day. The Government attached little importance to the Mining Industry and insisted, where the prospector desired to back his opinion with his money, that he should take up a mining claim 5 miles long and 2 miles wide and pay for the land at the rate of 4 shillings per acre. Moreover all rights for gold and silver were reserved to the Crown.

After the discovery at Silver Islet the Government decided to encourage real mining by giving up their rights to Gold and Silver, but as an offset levied a royalty of from 2 to 10 per cent. No royalty accrued to the Crown and the year following the royalty was struck off and real mining commenced.

The first round of holes blasted on Silver Islet blew out all the silver ore above water, but it was rich and they continued to mine under the water and during their first summer mined ore to the value of 6,751 dollars.

During the succeeding summer 10 men in 14 days took out another $16,364, and the engineer in charge feeling sure they had a real mine, asked the British owners for $50,000 to install plant and equipment. However the reports as to the richness of the ore sounded too good to be true and they preferred to sell and did sell their entire interest to Americans for the sum of $225,000.

For the next few years the company were most successful. The island by breakwater was built up to 2 acres, splendid accommodation was provided for the men, and in the mainland schools, churches and hospitals were built and a thriving community established. Such was the history of the first silver discovery of importance, in Ontario down until 1883, up to which time ore valued at $3,500,000 had been produced. In that year the ore mined was low grade and a cargo of coal failing to arrive before the close of navigation, the Company were forced to pull their pumps and the mine was closed down.

Why have I taken your time in describing the work at Silver Islet?

HISTORY REPEATS ITSELF.

Because there is an old saying that history repeats itself and it is true with respect to Cobalt.

In 1903 the Ontario Government were engaged in constructing a railway now known as the T. N. O., between North Bay and New Liskeard. This was projected as purely a colonization railway with the idea of linking up what is now known as the Great Clay Belt, with the older portions of the Province.

A blacksmith named LaRose in the employ of one of the railway contractors found or had brought to his attention a peculiar piece of ore which he proceeded to melt in his forge then situated on the present LaRose property at the north end of this town. This was the beginning and soon Dr. Miller, Provincial Geologist, pronounced the find genuine. To stimulate interest he had samples of this extremely rich ore prominently displayed in the Parliament Buildings. However, like the original owners of Silver Islet, the public refused to believe the ore was anything like as rich as was represented. Moreover they had just passed through the Rainey River Gold Boom and were they thought sufficiently acquainted with mines and mining men. Even experienced mining men from other countries considered the high grade samples, but a freak of nature and were sure the deposits so rich would prove mere pockets as to size and of little real importance.

In 1904 some four veins produced important quantities of silver but the public remained uninterested and good ground in the productive area still remained open to the prospector.

However, during the winter of 1904-1905 a real mining fever developed in this province and by spring not only were the original reports believed, but many men who had visited the North Country or had had a friend visit this district, not only confirmed original reports, but were reading and willing to enlarge on these reports to the extent of their imagination. Cobalt was on the map as a mining province.

The Cobalt silver deposits were confined to veins comparatively narrow—measured in inches—but prenomenally rich. The better surface deposits would average well over 3000 ozs. silver to the ton and about 7 cubic feet of this ore would weigh a ton. The outcrop of the ore shoots was on the surface and the crudest of mining methods enabled the lucky discoverers to produce a fortune with practically no necessity for capital. Never since the placer booms of California and the Yukon had the mining prospector had such a chance.

A railroad with pullman accommodation, a night's run from Toronto, provided transportation of every kind. Fuel grew on the property and good water was everywhere. Labor was plentiful, law and order were well maintained and the Geological Department had published a map showing the geology of the country pointing out the special significance of the different formations with respect to the known ore deposits. Surely never was a setting better prepared for a mining boom on a large scale.

By the spring of 1905 the fame of the camp had spread far and wide. Prospectors started to arrive by the train load and one is probably safe in saying that practically every known country had its representative here.

The price of silver had jumped from an average of 58c. per fine oz. in 1904 to 61c. per oz. in 1905. Buyers were paying 65 to 70 cents a pound for Cobalt—12—15c. per lb. for nickel and 1c. a lb. for arsenic. If a prospector had located a claim with none of these minerals exposed in quantity, but able to show even a little Cobalt bloom in a narrow crack, his property could be and often was sold for outrageous sums.

265 new Mining Companies with a gross capitalization of $185,357,000 were chartered by the Province in 1906. Promising mining locations were at a premium.

Government Helped.

The Provincial Government were interested, insisting on a policy of fair treatment to all. The Mines Department offered their assistance in many ways supplying geological maps of Cobalt and the surrounding country and advice to prospectors that proved most useful. Since the early days of Silver Islet the size of a mining claim had been reduced from 10 sq. miles to 40 acres and again so far as the Township of Coleman was concerned, the area that could be staked on one discovery was reduced to 20 acres.

This condition of feverish activity continued until the apex of production was reached in Cobalt in 1911. In this year 31,507,791 ozs. were produced, or well over 14 per cent. of the whole world's production during that year.

While production from that time forward has steadily decreased Cobalt in 1918 still produced 17,661,694 ozs. and the increased market price of the product still gave returns $1,387,943 in excess of the amount received in 1911, when the greatest production in ozs. is reported.

Summing up then Cobalt has produced, up to the end of 1919, silver to the value of $182,145,699 and at the same time has paid to the shareholders of the different mines $80,780,513, or nearly 50 per cent. of the total value of the output. Naturally you will ask how long can Cobalt continue at its present rate. The only way in which this question can be answered is by asking another, viz, what is likely to be the future price of silver per ounce ?

British and Canadian Capital Shied at Cobalt.

At the outset and after having sketched the somewhat early history of the Silver Islet, the statement was made that history repeats itself. In the case of Cobalt, as also in the case of Silver Islet, the value of the early discoveries was doubted and when British and Canadian capital refused to come through, American capital stepped in and reaped much of the reward and properly so. The same condition holds true with respect to Cobalt.

Permanent industry has been established to the mining operations carried on here and a new portion of the great Northland opened up and settled by a stable, industrious people. The gross production of the Cobalt Camp will exceed the Silver Islet production many times and again let us say, history repeats itself and I believe I am perfectly safe in predicting that at some time, some place and perhaps in the no distant future, new Cobalts will be discovered that in their final production will be as much larger than Cobalt, as Cobalt is larger than Silver Islet.

The Result.

Now we have traced the growth of the Cobalt Silver Camp and one naturally asks what good have the people of this Province derived directly and indirectly from this most fortunate and profitable discovery.

1.—The T. N. O. Railway, projected as a Colonization road at great expense to the people has been continued to Cochrane with branches each and west and instead of a weekly service as at first proposd, three first class trains run daily in each direction and the line forms an important link in our National Transcontinental Railway System.

2.—Populous centers have been established all along the Railway and towns of importance have been established for all time.

3.—Hydro electric power has been developed and is now available here to the extent of 23,000 H.P.

4.—Men who made their fortunes have struck out to develop new districts and the result is that to-day we have very important camps at Porcupine, Kirkland Lake, Boston Creek and Gowganda. Canada was one of the few countries to show an increased gold production in 1919 and there is some reason to expect that this year the value of gold produced will equal that of silver.

5.—Our mining success has directed to the Northern District men interested principally in other industries and today for example on this T. N. O. we have the largest paper mill on the American Continent. The country is growing rapidly, but the great expanse of territory yet to be prospected and settled is so vast that what we have already accomplished seems small indeed.

6.—To give you some idea of the direct benefits derived in terms of money let me state that in the years 1917-1918 the different Governments received from the silver mining industry, by way of taxes and fees of one nature and another, almost $1,000,000 and the expenditures of the silver operators represented a purchasing power in Canada equal to $24,257,000.

7.—Finally if a circle with a radius 70 miles long be thrown over a certain portion of this Province, it will include within this area three and possibly four wonderful mining camps. On the west we have Sudbury, producing 85 per cent. of the world's nickel supply. On the north we have Porcupine producing, during the first six months of this year, gold the value of almost $6,000,000 and showing an increased production over the same period last year of 22 per cent. South-east of Porcupine we have Kirkland Lake, already now producing and probably destined to become another very important Camp. Last of all we have the Camp under consideration, which may properly be described as the world's greatest silver camp.

Our past progress must be taken as some slight indication of what may be expected in the future and when we say that since 1903 the gross wages paid miners in Ontario have increased over 400 per cent. the average annual wage per miner over 325 per cent. and the gross production over 490 per cent. who is optimistic enough to properly estimate the conditions likely to exist in, say 1930 ?

Critics Are Challenged.

There can be no doubt as to Ontario's ability to greatly increase this production, under careful and intelligent guidance ? We require and will continue to require for many years to come, both capital and labor and in our effort to

obtain them we would deprecate and do everything in our power to discourage any attempt to tell anything but the truth and the whole truth and we will deprecate and continue to challenge any suggestion made by any public man in Ontario that would cast suspicion on the relationship that has existed and does exist between the Department of Mines and the mining operators of this Province.

The message we would leave with our Guests this evening is that Northern Ontario is the Land of Promise to all who are willing to work. Drones we don't want and will not support. Capital invested with the same care as that given to investments in other lines, must in the end bring a fair reward and we would therefore ask these Delegates to the Imperial Press Conference to stake out Northern Ontario in their minds and advise their people at home to give this district proper and careful consideration when they are formulating their future plans for development within the British Empire.

DIFFICULTIES OF DEEP MINING.

In the course of his presidential address before the South African Institution of Engineers, Mr. James Whitehouse dealt with the problems of ventilation, underground temperatures, and pressures encountered in the Rand mines.

The rock temperatures continue to rise at the rate of one degree for every 253.9 ft. of depth. From determinations made recently in the Village Deep Mine, the rock temperature at a depth of 5,487 ft. has been found to be 89.4 deg. Fah. The temperature of the air current which reaches to this depth is 72.6 deg. Fah. dry bulb, and 71.6 wet bulb. This low rise of rock temperature is probably unique, and compares favorably with the temperatures experienced in the St. John del Rey Mine, which is the only mine in the world which is deeper than the Village Deep, and where the air temperature is 109 deg. Fah. dry bulb, and the rock temperature is 114.4 deg. Fah. The depth of this mine is 6,126 ft. vertically. At depths between 5,000 and 6,000 ft. it is necessary to install equipment for circulating large volumes of air.

Whilst the effect of depth on the temperature of underground workings is less serious at the Village Deep Mine than, perhaps, in any mining field, this cannot be said of the resulting pressure, and the difficulty which this causes in deep workings. From a comparison of the actual cost of support of working on a deep-level mine today and in 1914, it is found that the cost of timbering and rock-walling in 1914 was 10d per ton crushed, and in 1919 this charge had increased to 2s 5.4d. On the basis of wages paid in 1914 and the cost of raw material at that time, the cost for this work in 1919 would have been 1s 9.6d per ton, that is an increase equal to more than double the 1914 cost. This represents the increase which is entirely due to depth, the difference between the present cost is 1s 9.6d per ton, which is 7.8d per ton, being due to the increase in wages and cost of materials. Similarly the cost of winding has risen from 1s 8.6d in 1914 to 2s 9.7d for 1919, of which increase 8.5d is due to depth, so that the cost for this work, apart from charges due to the war, would today have been 2s 5.1d per ton. From the above figures, and, quite apart from the increase in operating costs due to the war, the conditions obtaining in deep mines today are very different from those of 1914. To overcome some of the difficulties of increasing depths many suggestions have been made, and these include one that the reduction works should be removed at once from the surface and erected underground in order to save the cost of hoisting.

The Electrical Location of Lodes from the Surface

For many years past, periodical attempts have been made to evolve a practical method or system of applying electricity in one form or other to the locating of lodes and metalliferous ore deposits which are believed to exist underground, but of which there are no surface indications.

Until recently nobody thought the ideal system had a chance of realization, but with the rapid advance of electrical science during the past decade a new vista has been opened up and many things hitherto thought to be dreams have become accomplished facts.

Therefore, it is not surprising to learn that Mr. Victor Nightingall, a well-known electrical engineer and wireless expert of Melbourne, has worked out and patented an up-to-date system which, after a long series of experimental operations in the Laboratory and practical tests on mining fields, it is claimed, surpasses everything previously attempted in this direction, in that, by combined telephone and scale-readings, a chart or graph of underground deposits may now be prepared with a great degree of accuracy.

Mr. J. A. Dawson, also a well-known electrical engineer, who for some years occupied the Chair of Electrical Engineering at the Ballarat School of Mines, was associated with Mr. Nightingall in the developmental and experimental field-work, and is undertaking the management and working of the system —registered as "Electrical Mine Surveys Pty., Ltd.," 339 Collins-street.

Practical Application: Quite recently these gentlemen were afforded an opportunity of proving their system in a practical manner—being engaged by the Indooroopilly Silver-Lead Mines N.L. (a Bendigo company) to go to Brisbane and make an electrical survey of the company's extensive mining leases.

This company, we are informed, had sunk a shaft about 100 ft. north of the G.O.M. mine—in which a rich body of ore was being worked—but the continuation of this lode was not picked up as anticipated in the shaft, the crosscut to the east of the winze, hence the directors decided upon having an electric survey made in order to locate the exact position of the ore. This was done, and a crosscut put in in the opposite direction soon revealed the ore coming in from the west, as the instruments indicated that the main body was on that side of the shaft. The entire survey, by the recorded indications, show that extensive silver-lead ore bodies traverse the Indooroopilly Co.s leases from near the shaft for a distance of half a mile.

It is interesting to note that the instruments also accurately indicated the position of the lode on which the adjoining (G.O.M.) mine was working—though this position was unknown to the electrical surveyors, who, on inspecting the underground workings afterwards, found the ore body exactly below the points indicated on the surface.

Far-Reaching Effects.

The plan we reproduce, showing the results of Messrs. Nightingall and Dawson's survey, is not only interesting but is certainly unique in the annals of mining, for probably never before has a plan been published purporting as this does to show the position and extent of ore bodies which lie hidden underground.

This, indeed, is "seeing the end from the begin-

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ning!'' The general application of such a scientific system, provided it proves successful, will usher in the dawn of a new era for the mining industry, and should do for the miner what the X-ray does for the surgeon, who sees the exact location of the metal in the human body before commencing his operation, likewise the miner will practically be enabled to see an ''X-ray'' chart of his metal underground before commencing mining operations.

Such a system comes at an opportune time, and will be welcomed by the mining world, for mining at the present time is in need of a stimulus.

The application of electricity in some such form offers a key to unlock the underground mineral wealth of the world, and the system under review appears to go far towards the accomplishment of that aim. With experience in practical working and further development, it should prove a most valuable adjunct to mining.

Personnel: Mr. W. H. Cundy, of Bendigo, is associated with Messrs. Nightingall and Dawson as Geological Survey and Mining Engineer.

Electrical Mine Survey work is to be undertaken at once, and in the hands of these three gentlemen, who —together with Mr. W. F. Spry—are directors of the company, the system should soon give a good account of itself by reporting practical results of commercial value.

Description of the System.

The system may be described as an application of high-potential electricity applied to the earth's surface by special generating and transmitting apparatus. The presence, position and approximate depths of reefs, lodes, and metalliferous deposits underground may be ascertained and mapped out.

It is based on sound, fundamental principles and electrical laws. An electric current producing a certain sound is propagated through the earth's crust by special electrodes connected with the transmitting instruments, which operates to almost any desired depth and through any given area.

By means of special telephone receivers and graduated visual indicators, worked in conjunction by the electrical surveyor, who ''stethescopes'' the earth's surface, this not can be picked up anywhere within the area under test, his ear detecting and interpreting any variations which may occur as indicating the presence, or otherwise, of any lode or metalliferous deposit, either near the surface or to considerable depths below, enabling its position, area and continuity, or otherwise, to be marked out on the surface.

Advantages: A moment's reflection on these facts is sufficient to show the far-reaching effects such a scientific system must have upon the whole system of mining when it is put into regular practical operation, with experience and further development.

Giving information within a few days that, with boring or shaft sinking, would take months to ascertain.

Directing operations as to the best sites when shafts are being sunk, by giving the position, length and width of the lodes.

Locating the position of known valuable lodes lost through faults.

Ascertaining whether a given lode continues through extended leases.

Indicating the presence of hitherto unsuspected parallel lines of lode on the same lease, etc.

In Fact, scientifically prospecting the interior of the earth from the surface, inexpensively, prior to undertaking costly mining operations to search for minerals or lodes which may or may not be there.

Efects on Mining:—*The Electric Mines Survey System* hopes to reduce mining to something like an exact science, so that all operations will be undertaken scientifically and all work—sinking, driving, or crosscutting—be directed towards a given objective at a pre-determined point, so that every penny will be expended on useful, definite work instead of the old empirical, wasteful method of haphazard exploring underground—with the pick, shovel, and candle as the only instruments and guide—in the endeavour to ''pick up'' a valuable lost lode, and for want of scientific knowledge often ceasing operations within a few feet of it.

The substitution of scientific methods for the old methods eliminating almost entirely the elements of risk and uncertainty, should place mining on more of an industrial than a speculative basis and as a consequence, attract more capital for development of gold and metal mining generally and bring about a general revival of the industry.

The capital saved by cutting out the wasteful expenditure involved in unsuccessful underground work would naturally be diverted to the development of new or old lodes the position of which has been located electrically.

Scope of the System: It is not claimed that this system will do everything and find everything underground, but sufficient practical work has been done to prove that it is sound in principle and will indicate the position of ordinary quartz reefs, which are worse conductors, and silver, copper, lead or similar deposits, which are better conductors, than the surrounding earth.

The method does not consist of a single instrument or indicator only, but is a flexible system, and such that the electrical impulses transmitted into the earth can be radiated, focussed or directed as desired in any plane entirely on the surface or entirely underground, where the workings are accessible, or in the vertical plane connected from the surface to the lower levels o fa mine to suit varying conditions.

It should also with development and experience give valuable information to the miner in ascertaining whether a bore is anywhere near its objective or not, and generally be a scientific aid, in expert hands, to the mine manager in solving difficult problems in connection with developmental and prospecting work, and should be the means of saving annually large sums of money now expended in useless, unproductive work.

Note: The foregoing is taken from ''Industrial Australian and Mining Standard'' issue of 5th August last. It is important—if true.

NEW BRUNSWICK COLLIERY CHANGES HANDS.

John Henderson, formerly Manager of the Minto Coal Company, and lately operating an independent mine at Minto, N.B., and Harvey Welton of Minto who has for some years been interested in coal mining in the Minto area, are stated to have purchased the Coakley Mine, in the Grand Lake area. The price is understood to have been about $35,000.

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FOR SALE—Property adjoining the great Premier Mine in the Stewart District of British Columbia located on strike of the vein. Apply, Box 19, Canadian Mining Journal.

PRESIDENT OF IMPERIAL OIL COMPANY REPORTS ON FORT NORMAN OIL WELL.

Mr. C. O. Stillman, President of the Imperial Oil Company, recently returned to Toronto from a western trip and confirmed the statements that have been made regarding the finding of oil at Fort Norman. President Stillman said that while the quantity of oil so far tapped only runs about eight barrels per day it is oil of promising quality. He stated further:

"What we have uncovered at Fort Norman is as good commercial oil as has ever been produced in Canada and runs about 40 Beaume gravity. This is the character of oil the world is looking for as it appears to contain large yields and refined contents.

"Our Fort Norman rigs first struck oil at 80 feet and again at 200 feet and the third strike at 425 feet. We hope to put the hole down 1,000 ft. this fall, which will be sufficient to test the territory."

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Department of Colonization, Mines and Fisheries

The chief minerals of the Province of Quebec are Asbestos, Chromite, Copper, Iron, Gold, Molybdenite, Phosphate, Mica, Graphite, Ornamental and Building Stone, Clays, etc.

The Mining Law gives absolute security of Title and is very favourable to the Prospector.

MINERS' CERTIFICATES. First of all, obtain a miner's certificate, from the Department in Quebec or from the nearest agent. The price of this certificate is $10.00, and it is valid until the first of January following. This certificate gives the right to prospect on public lands and on private lands, on which the mineral rights belong to the Crown.

The holder of the certificate may stake mining claims to the extent of 200 acres.

WORKING CONDITIONS. During the first six months following the staking of the claim, work on it must be performed to the extent of at least twenty-five days of eight hours.

SIX MONTHS AFTER STAKING. At the expiration of six months from the date of the staking, the prospector, to retain his rights, must take out a mining license.

MINING LICENSE. The mining license may cover 40 to 200 acres in unsurveyed territory. The price of this license is Fifty Cents an acre per year, and a fee of $10.00 on issue. It is valid for one year and is renewable on the same terms, on producing an affidavit that during the year work has been performed to the extent of at least twenty-five days labour on each forty acres.

MINING CONCESSION. Notwithstanding the above, a mining concession may be acquired at any time at the rate of $5 an acre for SUPERIOR METALS, and $3 an acre for INFERIOR MINERALS

The attention of prospectors is specially called to the territory in the North-Western part of the Province of Quebec, north of the height of land, where important mineralized belts are known to exist.

PROVINCIAL LABORATORY. Special arrangements have been made with POLYTECHNIC SCHOOL of LAVAL UNIVERSITY, 228 ST. DENIS STREET, MONTREAL, for the determination, assays and analysis of minerals at very reduced rates for the benefit of miners and prospectors in the Province of Quebec. The well equipped laboratories of this institution and its trained chemists ensure results of undoubted integrity and reliability.

The Bureau of Mines at Quebec will give all the information desired in connection with the mines and mineral resources of the Province, on application addressed to

HONOURABLE J. E. PERRAULT,
MINISTER OF COLONIZATION, MINES AND FISHERIES, QUEBEC.

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Has produced Minerals valued as follows: Placer Gold, $75,722,603; Lode Gold, $100,272,431; Silver, $50,432,304; Lead, $43,821,106; Copper, $153,680,965; Zinc, $16,818,487; Coal and Coke, $199,123,323; Building Stone, Brick, Cement, etc., $29,991,757; Miscellaneous Minerals, $786,918; making its mineral production to the end of 1919 show an

Aggregate Value of $670,649,894

The substantial progress of the Mining Industry of this Province is strikingly exhibited in the following figures, which show the value of production for successive five-year periods: For all years to 1895, inclusive. $94,547,241; for five years, 1896-1900, $57,605,967; for five years, 1901-1905, $96,509,968; for five years, 1906-1910, $125,534,474; for five years, 1911-1915, $142,072,603; for the year 1916, $42,290,462; for the year 1917, $37,010,392; for the year 1918, $41,782,474; for the year 1919, $33,296,313.

Production During last ten years, $322,829,310

Lode-mining has only been in progress for about twenty-five years, and not 20 per cent. of the Province has been even prospected; 300,000 square miles of unexplored mineral bearing land are open for prospecting.

The Mining Laws of this Province are more liberal and the fees lower than those of any other Province in the Dominion, or any Colony in the British Empire.

Mineral locations are granted to discoverers for nominal fees.

Absolute Titles are obtained by developing such properties, the security of which is guaranteed by Crown Grants.

Full information, together with Mining Reports and Maps, may be obtained gratis by addressing

THE HON. THE MINISTER OF MINES
VICTORIA, British Columbia.

:-: EDITORIAL :-:

THE MINING INDUSTRY AND THE TARIFF.

THOSE features of the Canadian Tariff which are most objected to by non-industrialists attach to discriminative duties imposed upon imported articles. Those who advocate discriminative tariffs upon manufactured articles and raw materials which complete with a domestic product are loosely termed protectionists.

It has been well stated, however, that the term protection, as now used to describe the commercial policy of a nation, should be so defined, "as to include all "the means by which a country undertakes to secure "through the positive efforts of the government the "complete industrial and commercial development of its "resources, and of its parts." These efforts include not only protective duties, but the system of bounties offered for introduction and establishment of new industries; the policy of restricted immigration of the less desirable class of laborers, botanical and geological surveys, experimental farms, fisheries protection and the re-stocking of rivers, afforestation measures, the building of railways and canals and the deepening of waterways and harbors, and the provision of technical education. The successive administrations of Canada have not been backward in such positive efforts to foster our internal development and external importance.

While in theory it may be held that this general programme of national self-help could be carried out without the inclusion of discriminative imposts upon imported commodities, in practice it has not been considered possible by the successive governments of Canada, none of whom—despite much campaign argument—have ever dared to test the theory by making it a fact when they had the opportunity.

The chief reason for this practical diffidence of non-protectionists has been the proximity of Canada to that nation, which pre-eminently among modern nations has adopted the completest programme of national protection, and has pre-eminently prospered.

No person has ever yet satisfactorily demonstrated how a small and undeveloped nation could protect its economic self-sufficiency or its political independence by pursuing a non-protective policy, if, as is the case of Canada and the United States, the smaller an infant nation were geographically a continental extension of a large and developed nation, irrevocably committed to the ultimate exposition of the whole theory of national protection.

It is this dominant consideration that explains why no Canadian Government has ever considered it possible to abolish tariffs that are intended to deter the importation of commodities that compete with domestic industry.

THE theory of free-trade is admittedly a cosmopolitan concept, and it is apt to be unsympathetic towards a strictly national viewpoint. The persistence of nationality has been abundantly demonstrated in recent years, for, long before President Wilson put the pregnant word "self-determination" into a memorable state document, the leaven of national aspiration, of national languages and ethnological bonds was disturbing Europe, and played no small part in precipitating the great war. Whether it shall prove to be beneficial or not, it must be admitted that the trend of thought is towards national self-consciousness and the strengthening of nationality as distinguished from cosmopolitanism.

There is simultaneously working another ferment, namely the communistic idea of the world unity of the proletariat, with a somewhat visionary concept called "Capitalism" as the great enemy of mankind. Unfortunately for the world, every conception of civilization, every outward expression of man's long upward climb in invention, every outward expression of the resources of earth, every safeguard that men have thrown around family life and the prudential effort of men who strive to assure the comfort of their offspring, is involved in the social framework known as "Capitalism," and is threatened by barbaric ruin by those who would destroy, in order—as they probably sincerely believe—to build a better world.

It is therefore no coincidence that the concrete expression of national aspiration that we call Protection; the guarded and accumulated wealth of the nation that is called Capitalism, should view with distrust any principle that includes cosmopolitanism, or permits another nation to control the economic life of this country to an extent which, if unchecked, would permit of powerful outside influence being brought to bear upon our political life also.

It is well to be frank about these matters, and to admit that the chief objection which protectionists in Canada have against free-trade is the cosmopolitan tendency of that principle. It is, in the position occupied by Canada, one that always has been, and always must be, corrosive of our nationality.

HOW do these conditions relate to the mining industry? The mining industry, so far as the actual application of the existing tariff is concerned, is not a unit. Using the classification adopted by the Mines Branch, of metallics, non-metallics and structural materials, we find that the metallics are little affected by the tariff, and the same may be said of the non-metallics and structural materials, with the two important exceptions of coal and cement; and with the further exception that there are some minerals, such as cobalt, molybdenite, asbestos, chromite, felspar, gypsum and magnesite, that find their most important market in the United States, of which free entry into that country is desirable. Certain concessions are made to miners in the free admission of drilling and cutting machinery not manufactured in Canada, but, generally speaking, the production of minerals in Canada is not materially affected by tariffs, except as the workers in the industry, in a manner analagous to the agriculturists, pay their quota of the cost of protective duties as borne by the consumer in Canada. With one or two important exceptions, hereinafter referred to, the revision of the tariff is a matter in which the miner is little concerned directly.

Indirectly, however, we believe the mining industry is vitally concerned in the maintenance of tariff protection as one of the main props of our national credit and security, and it is possibly more directly concerned, inasmuch as the product of the mine in Canada looks more and more to domestic manufactures for a market, and for that ultimate profitableness which can only accrue to a mining industry when the substances it produces are worked up into finished products in the country of origin.

We believe, therefore, that the interests of the mining industry lie in a continuation of that wide policy of national protection in which the tariff is but one factor, although admittedly a very important factor, and necessary to the maintenance of the whole.

There are some cases in which the wording of the tariff can be made more specific, and some matters of detail that will no doubt be brought to the attention of the Tariff Enquiry Board during its itinerary, but it is to be hoped that local circumstances will not be allowed to obscure or to vitiate the general dependence of the industry upon a retention of protective duties, which we believe to be synonymous with the maintenance of national prosperity.

THE duties on coal and cement are objected to by the agriculturists on the general ground that they add to the cost of living of the farmer. Generally speaking, the tariff has for the past two years played second-fiddle to the discount on the Canadian dollar. The total consumption of cement in Canada during 1919 was approximately 4¾ million barrels valued at about 17½ million dollars. For the first time, the exports of cement from Canada exceeded the imports into Canada. This is the kind of corrective of the exchange situation that all well-wishers of Canada desire, and it may be regarded as the outcome of the policy of fostering a Canadian industry by judicious tariff protection. How much cement was used by agriculturists is not ascertainable, but a comparison of the size and value of agricultural yields in Canada would not indicate that the financial position of agriculture suffered from the cost of protecting the cement industry, whereas, were the protection removed, the cement industry could not persist in Canada.

In regard to coal, the tariff applies to bituminous coal, that used in making coke for metallurgical processes being imported free of duty. Slack bituminous pays a duty of 15 cents per ton, and round bituminous a duty of 53 cents per ton, the duty having been reduced 15 cents per ton at the last revision of the tariff. There was never any justification for that reduction, and as things have turned out, the net result to Canada has been the loss of 15 cents per ton revenue on each ton of bituminous coal imported, without any saving to the Canadian consumer. Where the whole duty remitted on coal, the Canadian consumer would never know it from inspection of his coal bill. Coal is at this time a very excellent example of an import tariff that functions only as a source of revenue to the Government, the duty being entirely too small to act as a protection in favor of the Canadian producer.

The readers of the "Journal" are familiar with the history of the coal industry in Canada, and reiteration becomes irksome, but perhaps we may be allowed to epitomise the justification for a protective duty on coal by remarking that, east of Fort William, the cost of producing coal in Canada is, and always will be, relatively more than in the coalfields of the United States to the immediate south, and that the duty of 53 cents per ton does not begin to balance the differential in production costs.

We desire, in all seriousness, to make the assertion that Canada, in the great continental stretch that includes Nova Scotia, New Brunswick, Quebec, Ontario, Manitoba and a large part of Saskatchewan, is most meagerly supplied with coal; and that no mine in Nova Scotia or New Brunswick can produce at a cost that is less than two dollars a ton in excess of the average cost of coal production in Pennsylvania and Virginia. This condition is one that is not related to

questions of wages, labor or management, but arises from the more favorable natural conditions under which coal is mined in the United States, and the infinitely largely quantity of coal available there.

Coal production demands consideration from our government much more from the standpoint of national defence than on purely commercial grounds. It needs not only the maximum protection that the tariff can give without crippling other industries, but, in addition a greater share of those "positive efforts of the government", hereinbefore referred to, than any government in Canada has yet extended to it.

The idea of self-sustenance can be, as the Toronto "Globe" points out, carried to the stage of absurdity, but over indulgence in this idea is the last thing that Canada can be accused of. The "Globe" itself, however, indulges in an indefensible generalization when it says that "a year's working out of the theory that a nation should be 'self-sustained' would put Canada where Soviet Russia is today." Canada will have to be sadly changed before her people go collectively daft, or hazard "the cessation for a considerable time of foreign trade," to which condition the degeneration of Russia is attributed. Most people think there are other contributory factors to the present state of Russia.

There are, however, some "raw materials" (perhaps the "Globe" will excuse the use of what it terms "the jargon of the protectionist") without the internal production of which no nation can be self-sustained or even politically independent. Coal is one of these materials. Iron is another. In both these commodities Canada is unnecessarily dependent on the United States. To the extent that this dependence is unnecessary it is evil and nationally dangerous, and it is Canada's most exigent problem to find out how much of the international trade in coal and iron is unnecessary. It can hardly be stated that Canada has erred on the score of advocacy of the "self-sustained school" in the light of the present rate of production in coal and iron in Canada, both of which in 1919 reached their lowest ebb for many years, and promise during 1920 to show little, if any, improvement. Simultaneously, the production of coal and iron reached heights in the United States that are not only unprecedented, but in the nature of a world portent.

COAL SUPPLY STATISTICS.

IN this issue will be found a review of the coal situation in Canada prepared by the Chief of the Mining Division of the Dominion Bureau of Statistics, Mr. S. J. Cook, which contains the important information that a monthly bulletin on coal supply is proposed to be issued by this department, being a continuation of the work of recording, and publication inaugurated by the Fuel Controller of the Dominion during the period of his administration. This is a service that will be much appreciated by the public at large, and by the section that is more intimately interested in coal statistics from a connection with the production or distribution of coal. A similar service has for some time been conducted by the United States Geological Survey. The new service is important as indicating a realisation by the Federal Government of the national viewpoint upon coal supply, and it gives rise to the hope that the easier availability of centralised coal statistics, and their more frequent publication, will lead to the formation of some body empowered to take such action as the statistics may indicate to be desirable.

The review surmises that Canadians will not be content to remain so absolutely dependent on the United States coal miner as is the case at this time. We hope not, but they have remained content for a very long time. "Co-ordination of effort, with elimination of obsolete methods and unnecessary local competition" is advocated to improve our coal supply. There is a nearer approach to co-ordination of effort and the elimination of local competition at this time than has ever been observable before in domestic coal mining circles, insofar as the operators are concerned; and while there is not that unanimity between the employers and their workmen that is desirable, we cannot admit that here lies all the reason for the small production of Canadian coal mines at this time. There is a very serious numerical shortage of miners in Canada and only the slimmest hope of new men being obtained. We would suggest to the Bureau of Statistics that a comparison of the number of men now employed in coal mining in Canada with those employed in the period from 1914 to 1916 would show a large decrease in numbers, particularly in the number of men actually engaged in mining coal. One typical coal company in Canada had in its employment in 1918 precisely half the number of men employed at the actual mining of coal in 1916. Since that date, and almost two years after the Armistice, it has succeeded in adding only 150 men, and is still short by approximately 1,500 men in the mining coal section, or in that class of workers which decided what the output shall be. No cleverness of management or adoption of new methods can produce output without producers.

We cannot admit that obsolete mining methods are in existence in the coal mines of Canada. There has been a concerted stand amongst coal miners of which we have noted instances in Canada, the United States, Australia, Great Britain and Germany, to blame the reduction in coal output upon the shortage of modern mining equipment, when, as is very well-known to all readers of technical literature, the equipment of collieries was never so perfected as it is today. It is true that the pit-room has been restricted by shortage of workmen during the war period, which prevented ordinary progress of advance development workings.

but to suggest that the collieries of every important coal-producing country have suddenly become old-fashioned is self-evidently untenable.

There is, admittedly a lack of new collieries, because in coal-mining, as in building, domestic housing and railway construction, the exigencies of the war forced the cessation of new development, and caused the existing openings to be forced beyond the point where a maximum output could be maintained.

The coal industry of Canada is in a state analagous to a person convalescent from disease. It needs building up. More capital expenditure, more workmen, less "controlling" and more encouragement from the powers that be are required. The market needs no enlargement. At no time has the Canadian coal output approached within measurable distance of satisfying the domestic demand.

The Bureau of Statistic's Review mentions that production during the first quarter of 1920 exceeded that of 1919 by half a million tons, and that a continuation of this rate of increase would result in the production during 1920 of an output exceeding that of 1913. Unfortunately, the rate of the Spring months has not been maintained. While there would be some satisfaction in seeing the Canadian coal output return to the figures of 1913, it cannot be admitted that even this record year showed a satisfactory production, and there should have been a progressive annual increase since 1913, bringing the output at this date to somewhere around 18,000,000 tons. The production of coal per capita in Canada is about 1½ tons per annum. In the United States and Great Britain it is about 5 tons per capita per annum. The comparison speaks for itself.

THE AFTER-TREATMENT OF INJURED WORKMEN.

The efficacy of massage, electrical treatment and exercises for the limbs and body, have been demonstrated during the war on an unprecedented scale, and certain definite advances in surgery and the cure of physical injuries have resulted therefrom. It is interesting to learn of similar methods being applied on a large and centralized scale to the treatment of physical injuries received in industrial occupations. A Report by Dr. Lister Llewellyn, Medical Officer to the North Staffordshire Coal & Iron Masters, describes in the "Colliery Guardian" for August 20th, the establishment of a massage centre for the intensive after-treatment of injuries by daily massage, suggestion and exercises. The coal and iron operators in the district referred to are united in a mutual indemnity society, and they have established the centre for the free treatment of injured workmen in receipt of workmens' compensation payments. Some striking instances are given by Dr. Llewellyn of the rapid recovery which followed treatment. One important feature of the establishment has been that many cases of long-standing have been taken over, and that return to work does not necessarily mean a return to old employment. Out of 446 completed cases which have passed through the centre 425 returned to work, 12 settled for a lump sum compensation, 6 were not improved by treatment, and 3 refused treatment.

Dr. Llewellyn states that the loss of function which results from disuse, formation of adhesions in joints and, above all, from the mental inertia that follows most serious injuries can only be satisfactorily treated in large infirmaries, hospitals or specially provided centres. The establishment is stated to be no longer an experiment, and the employers concerned have recently purchased accommodation for a permanent establishment to take place of what was in its initial stages a temporary provision for experimental purposes.

While the actual saving on compensation payments will be sufficient to make such an establishment advisable from a purely financial point of view, there can be but little doubt that the advocacy of medical men and the action of employers has been stimulated by the remarkable results obtained in medical treatment and the civil re-establishment of injured soldiers, and by the knowledge possessed by these men that many a temporary injury has become a permanent one precisely through lack of persistent and patient application, day by day, of the slow but certain curative methods of the modern hospital. The mental inertia referred to by Dr. Llewellyn is a condition that all who have had to do with occupational injuries will recognize.

Where medical aid is afforded under the operation of Workmen's Compensation Acts, it may be anticipated that establishments of this nature will find general adoption, and, under the powers conferred by most of the Compensation Acts now existent in Canada, the provision of such establishments is within the scope of the expenditures and provisions that may be made by the provincial Boards. The provision of artificial limbs, and their proper fitting and adaptation to the requirements of mutilated persons is a service that could conveniently and properly be centralized in similar manner.

CONDITIONS AT NOVA SCOTIA COLLIERIES.

The Royal Commission which has investigated wages, and working and living conditions at the collieries in Nova Scotia, conducted its enquiries with great thoroughness, being indeed accused of a too deliberate procedure, and has made a report that will prove a landmark in the social evolution of the colliery districts.

The Report may be regarded as a constructive document in two very important particulars, namely, in the recommendation that a joint permanent conciliation board be constituted, and that a sliding scale based on the daily per capita production of coal should be

adopted. These are two suggestions that should be workable if both sides will co-operate to make them so.

Certain recommendations regarding the larger use of the radial-post type of undercutter in substitution for the "puncher", and the introduction of the cap-type of portable electric lamp in lieu of the oil-flame safety-lamp; and the extension of washhouse accomodation, merely confirm the policy that the coal companies have been following as funds and opportunity would permit.

The Commission do not appear to have noted that the mining practice at Nova Scotia collieries is in some most important respects burdened with methods that are designed to secure the safety of human life, and it is this fact that to a larger extent than the Commission appears to have realised, increases the cost of coal production in Nova Scotia as compared with the cost under the methods used in the United States. The use of underground electric trolley-haulages, (involving naked power-wires on the haulage roads), black powder for blasting, naked lights, blasting "out of the solid," are all examples of methods that lend themselves to cheap and rapid production of coal on a large scale, and are very generally practised in the United States, but, in Nova Scotia, are prohibited by law and by general sentiment. In no small measure, the preference for safer methods in Nova Scotia, accounts for the lower cost of production in the United States to which the Commission refers as threatening the existence of the Nova Scotia industry.

The unqualified condemnation of the general living conditions voiced by the Commission, and the implication that this is something that the companies can remedy, or should have remedied before this, is not exactly fair to the companies, nor is it correct in the assumption the such thoroughly remedial action as is recommended is physically or financially possible. The truth is that there are some of the older collieries, where, if the coal companies had been actuated by purely utilitarian motives, operations would have long since been abandoned and the houses dismantled. In this respect, the coal companies, who have the misfortune to be large landlords, are not better situated or more able to help themselves, than many municipal authorities who contemplate the demolition of slum areas and the erection of new tenements, but are unable to find either the money or the labor to carry out their desires.

The Royal Commission has frankly voiced a viewpoint that is the more understandable because none of its members have ever worked or resided in colliery districts, and so far as it may prove possible, the conditions of which they complain will probably be sought to be remedied, but, to an extent that only the search for a remedy will demonstrate, the Report will be found to be a counsel of perfection so far as the recommendations on social conditions are concerned, and it is not possible for the coal companies—unaided—to make the expenditures recommended, combined with the increased wages also recommended, and the capital expenditure that is desperately required to rehabilitate the capacity of the mines for output.

The Commission has not, so far as the Ottawa report indicates, taken cognisance of the numerical shortage of miners, or the necessity to provide new and additional housing for the men and families that must be brought in if the coal production is to be increased to former figures.

All of which, we believe, confirms the opinion we have previously expressed that the expenditure required to put the coal mines of Nova Scotia on a basis commensurate with their potentialities and the country's coal requirements, is beyond the financial ability of the coal companies.

THE MINING LAWS OF QUEBEC.

A Defense by the Superintendent of Mines.

An article which appeared in the Northern Ontario newspapers and also in one of the Toronto newspapers, made reference to "the complicated mining laws of Quebec" and the fears felt towards these laws by experienced prospectors. Mr. Théo. Denis, the Superintendent of Mines for Quebec, was quick to traverse this reference, and the following excerpt from his comment may be of general interest to our readers, and should serve to offset what appears to be a widespread impression regarding the mining law of Quebec. The steady uninterrupted growth of mining in Quebec was referred to at length in our issue of August 27th (page 695), and there is some significance—in the light of Mr. Denis's letter—in the growth of the value of the mineral production of Quebec from $7,323,281 in 1910 to $20,813,670 in 1920. No other province in Canada can show a better rate of increase in mineral production.

Mr. Denis' remarks are as follows :

"Such fears are quite unfounded, and I believe that they relate to the Old Quebec Mining laws, which ruled before the year 1910. In that year the principles of the Quebec Mining laws were entirely changed, and they are now practically the same as in Ontario; if anything they are more liberal towards the prospector. The enclosed leaflet will convince you, and also the advertisement which is appearing regularly in the "Canadian Mining Journal", in which the basic principles of the laws are clearly set forth.

"As you will see, a prospector is allowed to stake out claims up to 200 acres, or if in surveyed territory 4 half lots of 50 acres each. He records them without having any fees to pay and may keep them six months, (the months of December, January and February being eliminated) without any expense, except doing 25 days work on each claim. At the end of six months, he may apply for the concession or (crown grant) or if not yet convinced that the ground is worth the five dollars or the three dollars an acre (according as to whether he wants to acquire the rights to the higher or lower minerals), he may continue to keep the land by a mining license, for one year, at the rate of 50 cts an acre. During his holding of the titles, as a recorded claim, or as a mining license, or as an applicant for Crown-grant, his property of the claims is absolutely undisputable, if he has complied with the working conditions, which are very lenient.

"Moreover, the Minister of Colonization, Mines and Fisheries, is always open to advice, and as he has at heart the development of Quebec mineral resources, you may be assured that any concrete constructive suggestion to improve the law always receives his earnest consideration."

Hollinger Mines as a Criterion

By ALEXANDER GRAY

There is the authority of a Director of Hollinger Consolidated Gold Mines that no diamond drill has penetrated their property to a vertical depth of 2,400 feet.

Without detracting from the integrity of Hollinger strata, this semi-official denial of a report that a drill-hole definitely determined the continuity of the geological features characteristic of these mines insofar as they have been developed, should set at rest injudicious assumptions that the ore bodies exist here, there and everywhere.

Representations, therefore, that the drilling disclosures "in the western end" of the Hollinger properties will benefit this, that, or the other area, can be dismissed as nothing more than a periodic indulgence in indiscriminate projections designed to attract public participation to impending distributions of shares.

That Hollinger Directors and the Management would welcome the further proof of their geology at greater depth, goes without saying. They have no apprehensions in this respect—but they would not select the "western" section of the former Miller-Middleton area for exploration by means of a diamond drill. It is no secret the "western" end of the Millerton is not altogether in the Hollinger geological horizon, and as the Hollinger Central Shaft may reach 2,000 feet by January 1st, the Management has other employment than drilling "stunts" in doubtful territory.

At this writing the Central Shaft is at or about 1,600 feet vertically. The intention is to carry it down to 2,000 feet, and to inaugurate a development programme at that level. Labor shortage is the greatest deterrent, and the attitude of Ottawa toward relief sought for this, is not reassuring. To the urgent petitions for permission to recruit somewhat unskilled labor overseas, the nonchalant official contention is that "muckers" must be "British". It is not material to Ottawa that the Hollinger output in 1920 may be almost a million dollars less than what it was in 1919, or that other mines are similarly affected. Mines producing an average of $488,000 in gold per month in the first half of this year, but having a daily average of 161 men less in that period than was employed in 1919, are told "muckers" will have to be "hall-marked" neither "Allies" nor "Neutrals" need apply or expect work. Gold, silver and nickel producers are preferred, this as an alternative—while the politicians clamor for "production" as a panacea for economic ills, "British" Miners and "muckers" and their confrères in the States, are "holidaying". Only the practically unskilled of Italy, Poland and Hungary are available in quantity, and they alone are willing to submit to underground conditions. At their own expense mine owners are prepared to bring what labor they need. Confronted as they are by competition, they counted upon government co-operation. Instead of that, there is official diffidence if not dissent, consequently the Hollinger for example crushed only about 360,000 tons in the first half of this year—assuming that the grade of ore milled averaged about $9, whereas the hope of the management at one time was that at least a million tons would be put through this year.

Bearing in mine that the average number of men employed was 1,098, as compared with 1,259 in 1919, and that the average tons broken and milled in the six months ended with June showed a gain of about sixty tons per day, the efficiency in force and effect cannot be questioned. The management accomplished important economies. That, however, failed to achieve anything like what was contemplated in the matter of tonnage milled and development. Crushing to only 60 per cent. of the possible capacity and endeavoring to increase ore reserves, hardly is economical, and yet such companies cannot obtain relief. At this moment, when as much as $6 per day with board is being offered laborers by pulp and paper companies, it is not to be wondered why gold and silver production is less than what it would be were official solicitude bestowed upon mine owners. Men can get more in "the bush", where no questions are asked as to their "British" antecedents, than precious metal mine owners can afford to pay in justice to shareholders. In the aggregate, Ontario's gold output is growing, but the larger mines cannot maintain their ratio without encroaching upon ore reserves. The decrease in the Hollinger gold output, as indicated by the Ontario Bureau of Mines in the figures covering the first half of the year, is disconcerting if not discouraging. Had the Hollinger contributed as much as its General Manager and the Board anticipated, the Ontario aggregate for 1920 would have favorably compared with any of the United States, where California is leading with a gold production valued at $17,398,200, Colorado being second with $10,249,300, and Alaska third with $9,963,-500. These totals relate to 1919 production of the yellow metal by those three states. In that year the Hollinger alone produced $6,924,214.05, of which $6,-722,266.81 was recovered. Pursuing the comparison, Ontario is accounting for more gold than Colorado, and the Hollinger Mines in 1919 yielded 65.589 per cent. of the total reported by the State of California, the "Golden State", so-called.

Obviously the gold mines of Ontario, having superseded the silver mines—the phenomenal silver mines of Cobalt—merit more than the consideration of the tax-gatherers. Regardless of their handicaps, they will excel those of Colorado and measure up to about 70 per cent. of the California production. This, though, does not warrant the rash assumptions occasionally recorded that Northern Ontario will rival the Witwatersrand Gold Fields, from which approximately £600,000,000 had been extracted to 1920. "Boundless optimism" with regard to the future of Ontario Gold Fields, expensive as they are, is apt to undergo revision after a closer analysis of "the Rand"—the only "Rand", of "Rand" age and uniformity. The sixty-odd miles of the Main Reef Series north, west and east of Johannesburg, and dipping south to great depths, hardly will be paralleled. They need not be, it is no disparagement of Ontario to give precedence to the gold mines between Randfontain and Heidelberg, in the Transvaal. Since 1886 the South African Gold Mines have continued to be the chief source of the world's yellow metal and fifty of the mines still possess 89,000,000 tons in their ore reserves. The first gold from the conglomerate beds of the Witwaters-

rand was panned in 1885. In 1886, the year before the first stamp-mill started there, the gold output of the Transvaal was $420,000, or thereabout. In 1919 the Transvaal contributed $171,460,123. Nearly $3,000,000,000 had passed through the mortar boxes of the "Rand" mills at the end of 1919, and there was a further $600,000,000—or so with more to follow—in the known ore reserves on last New Year day. So horizontal deductions about the similarity of Northern Ontario and Witwatersrand formations, at this stage, partake of an element of "incorrigible optimism". Deep-seated as the Ontario gold-bearing ore bodies are acknowledged to be; widespread as the Ontario gold-bearing areas are known to be, they are altogether dissimilar to the "banket beds". As to the genesis of the "banket", the conglomerates of the Witwatersrand, geologists and engineers differ. Leading authorities assume the conglomerate beds and enclosing sandstone and quartzites were seashore deposits formed during subsidence of a coast line, that after their deposition and consolidation, the banket bearing strata were folded into anticlines and synelines. While decided differences of opinion always existed, the origin of the gold is held by most scientists to have been by means of impregnation, the gold and pyrites present having been deposited in the beds by infiltrating solutions, which sought the pebble beds as the planes of least resistance. There are other "bankets"—pebble beds—but they are not of Witwatersrand age. Misinterpreted to begin with by mining scientists who doubted the vertical continuity of the so-called "reefs", they are yielding one-half of the world's gold. The "Rand" revolutionized gold mining. Porcupine also reversed the order of things and convinced those who were unfamiliar with the occurrenee that Canada had disclosed a gold field of first magnitude. Further explorations lent importance to the development. Now, and notwithstanding the adverse conditions prevailing for six or seven years, there is greater appreciation of the gold-bearing sections of Ontario and Quebec—not to speak of the northwest. It is immaterial whether the veins were formed at high or intermediate temperatures. They are in a country of igneous origin, largely so; roeks of Keewatin, Timiskaming, pre-Algoman and Algoman age, a certain amount of the ore deposits being augmented by metasematic replacement. As was pointed out by Mr. A. G. Burrows of the Ontario Geological Bureau, a great part of the Keewatin is composed largely of volcanic rocks. Considerable of the Keewatin now is altered schist, "and such terms as grey schist, green schist, hornblonde schist, carbonate schist, are used to describe certain rocks in various localities. These rocks do not give much idea of the original mineral composition; for example, a grey schist may have been derived from a hyolite, or from basalt. It does not therefore seem advisable to make any separation of the volcanic rocks of the Keewatin. They can be referred to as a basaltic greenstone series, which may include types of rock from rhyolite to basalt but are now so altered that a division is not advisable. They have all been subjected to vein-forming influences. There are also rocks throughout the Keewatin areas which are diabases and diorites. Rocks which are probably alterations from basalt are of frequent occurrence. They may now properly be called meta-basalts. In various parts of the areas associated with the Keewatin rocks are carbonates to which various terms have been applied, such as dolomite, ferro-dolomite, ferruginous carbonate and ankerite."

These generalizations need not be carried further. They will suffice to demonstrate that there is nothing in common between Northern Ontario and the Witwatersrand, beyond the fact that precious metal values persist to great depths. Westralian mines relate more closely to those of Northern Ontario, the comparison favoring the latter, as will be more fully demonstrated when labor is more plentiful and development can be prosecuted. Already the Hollinger is in the front rank of the world's greatest mines. It is the richest of the four greatest gold mines. In the matter of grade it is first: in ore reserves it stands fourth, in tonnage, and third in the gross value of its ore reserves. Its development does not call for extravagant conjectures. So extensive is the fissuring there is every reasonable guarantee of longevity. At the same time it is not to be denied that the Government Areas at the Witwatersrand have 10,055,000 tons, worth about $80,000,000, in their proved reserves; New Modderfontein has 8,800,000 tons, worth $76,146,000, and Crown Mines, 8,298,000 tons, worth $52,800,000. Hollinger has the advantage in that it will grow, whereas others of the quartette of greatest mines have their end in sight. Crown Mines have paid between £9,000,000 and £10,000,000 in dividends, and have as much more in the gross value of their reserves. The elastic limits of Hollinger are a long way from being reached; consequently Northern Ontario is deserving of stronger constructive policies at Ottawa and Toronto.

DIAMOND DRILLING AT THE HOLLINGER MINE.

The Sullivan Machinery Company has issued a compact booklet on "Core Drilling by Contract", which gives typical examples of the varied uses to which the diamond drill has been put. Included in the examples is a reduced section of the principal workings of the Hollinger Gold Mine, showing the course of a 2,000 ft. angle prospecting drillhole, traversing the strata from the surface to the 1,400 ft. level, and showing the intersection of the veins encountered, and their extent and character as deduced from the drill-cores. It is this definite ascertainment of the character, stratification, and extent of the rocks encountered that makes the diamond drill so useful in proving the value of a given property.

No confirmation has been given of the report that the Hollinger property has been diamond drilled to a vertical depth of 2,400 ft. It is understood the Main Central Shaft is down to a depth of between 1,600 and 1,700 ft. and that within a few months a depth of 2,000 ft. will be attained by this shaft.

METAL QUOTATIONS.

Fair prices for Ingot Metals in Montreal Sept. 24th 1920. (In less than earload lots).

	Cents per lb.
Copper, electro	23¾
Copper casting	23½
Tin	52¾
Lead	8¾
Zinc	10½
Aluminum	36
Antimony	9

Northern Ontario Letter

THE SILVER MINES.

The Cobalt District.

The decision of the Crown Reserve Mining Company to put down a diamond drill hole to a depth of 2,000 feet on the incline from the 500-ft. level of the mine, or a total vertical depth of 2,000 feet from surface, is one of the most interesting exploration efforts ever undertaken in the Cobalt district. The hole is being put down on the theory that another sill of diabase formation may be found.

In order to gather a correct idea of what such a discovery would mean, it is only necessary to keep in mind the fact that the one great diabase sill which passes through and over the productive mines of Cobalt is regarded as the "mother of silver", this having been the agent which carried with it the silver-bearing solution which found its way into the fractures, cracks or crevices of the adjacent rocks where the silver was deposited, thereby forming veins of ore. These veins occur in close proximity to the diabase and have never been known to extend for more than from 500 to 1,000 feet from this formation. Accordingly, it is obvious the silver deposits have quite clearly defined limits.

It is true that many years will be occupied in mining out this zone of mineralization adjacent to the present known diabase sill, but with ore deposition confined to definite limits, the life of the camp may be measured with a reasonable degree of accuracy.

From these facts, and keeping in mind the other details in regard to an output of more than three hundred million ounces of silver from this one great zone, it is clear that very great importance attaches to the effort on the part of the Crown Reserve to prove whether another diabase sill occurs at a lower horizon, or not—or whether or not another Cobalt may be found lying beneath the old.

At the time of writing, advice has just been received, telling of the discovery of silver in a drift at a depth of 60 feet on the Cobalt—53 property situated in the Gillies Limit. Early reports are very good, but until further work is done it will not be possible to correctly estimate the importance of the find, but it will stimulate interest in that very promising section of the Cobalt field.

One of the heaviest individual shipments in recent years went forward from the Nipissing mine during the third week in September, the consignment consisting of 219 bars containing 299,587 fine ounce of silver bullion and being billed to Shanghai, China.

Opinion is swinging to the belief that some difficulty may be experienced in securing the consent of the shareholders of the Temiskaming Mining Company to join the McIntyre Porcupine mine in the purchase and operation of coal lands in Alberta. On the other hand, certain of the officials of the company appear to be confident no such difficulty will be experienced.

The cross-cut at the 100-ft. level of the Conroy-McAndrews property in the Gillies Limit is at a point where it is believed likely to encounter the vein almost any day. This vein at surface was strong and carried encouraging silver values.

During August, the Nipissing mine produced $238,959 and shipped bullion and residue from Nipissing and custom ores of an estimated net value of $701,981, according to the regular monthly statement submitted by Hugh Park, manager, to the president and directors.

The usual amount of development and exploration work as done at all shafts, says the report. No large veins were found, but general operations continued satisfactory.

The low grade mill treated 7,961 tons, a new high record for any one month. The hugh grade plant treated 222 tons, while the refinery shipped 598,199 fine ounces of bullion.

The following is a summary :

Low grade mill	$158,654
Washing plant	80,305
Total	$238,959

Ore and Bullion Shipments.

During the week ended September 17th, two companies shipped ore from Cobalt, a feature being exceptionally heavy shipments from the Nipissing mine, which company alone sent seven cars containing 610,235 pounds of ore. The only other shipper was the McKinley-Darragh with one car containing 84,874 pounds.

The Elk Lake Field.

According to official advice just obtained, the management of the White Reserve mine, in the Maple Mountain section of the Elk Lake silver area, has received an offer from English interests which appears attractive to the White Reserve, and also advantageous to the other contracting parties. As a part of the negotiations and terms, mining operations are to give place to exploration work by diamond drilling. Accordingly the mine has been closed down and contracts are to be let shortly for diamond-drill work.

Considerable high-grade ore is being taken out from the surface of the veins on the Cane Silver Mines, and it is believed a medium-sized shipment may be made just as soon as sleigh roads make hauling easy. The distance to the railway is about four miles. As a part of the scheme to work the property, additional camp-buildings are to be erected, and arrangements will be made to carry on aggressive underground operations during the coming winter.

A deal is being negotiated on the Legault property, lying along the north boundary of the township of Auld, and close to the Triangle Silver Mines, and it is intimated there are fair prospects of the deal going through, with prospects of this property also being worked during the winter. The Cane Silver Mines as well as the Triangle Silver Mines, may be reached by mail at Kenabeek, Ont.

The Gowganda Area.

The mining plant on the Silver Bullion property, at Leroy Lake in the Gowganda district, has been installed, and will expedite the underground work which has been outlined. Shaft sinking will be continued on the incline from an old 50-ft. shaft which previously yielded encouraging quantities of silver ore.

The mining plant on the Walsh property has not yet been removed from the mainland to an island in Miller Lake owing to financial arrangements not having been completed whereby operations, could be conducted on a large scale. It is believed, however, a satisfactory arrangement may be made at a reasonably early date.

The latest example of "class consciousness" is the Undertakers' Association of St. John, New Brunswick, which has protested against burial at sea.

THE GOLD MINES.

The Porcupine District.

The great merit of the mineral deposits of the Porcupine gold area has been most satisfactorily demonstrated by deep mining operations on the leading properties, and, also, by the geological data gathered by the Northcrown Mines during the course of drilling its Porcupine Crown mine to a depth of close to 2,300 feet.

It has been found that the greenstone formation broadens out at depth and that much of the prophyry area as found on surface is actually underlain with greenstone. As it is in this last-named formation where the gold-bearing veins occur in close proximity to the porphyry, the broadening out of the greenstone area at depth is of exceedingly great importance to the properties lying on porphyry formation, but on the edge of greenstone as shown on surface.

The Northcrown Mines has outlined an extensive exploration and development program on both of its properties, the Porcupine Crown and Thompson-Krist. This includes driving a cross-cut about 1,900 feet from the 500-ft. level of the Porcupine Crown, calculated to cut the entire prospective area through 700 feet of Porcupine Crown ground and 1,200 feet of Thompson-Krist. The object is to cut the one known ore-bearing vein on the Thompson-Krist, some 1,900 feet away, and to learn what lies in the intervening distance. It is believed quite reasonable to expect that other veins will be opened up in this work. In addition to this cross-cut, as well as operating the mill steadily at from 75 to 100 tons of ore daily, it is planned to drive three diamond-drill holes along the west part of the Porcupine Crown.

A matter of interest to stockholders of the Northcrown Mines is the intimation that some move may be made to increase the capitalization so as to provide funds for even more extensive work. This matter, of course, is merely under discussion as yet, and has not been definitely decided upon.

It is said the main central shaft of the Hollinger Consolidated is to be put down to a depth of 2,000 feet, and that diamond drill results have shown no change in geological conditions at this depth. Some years ago, core was drawn from a depth of 1,800 feet on the Hollinger, while recently core has been taken from a depth of nearly 2,400 feet. In connection with this latter report, some of the officials are reported to have denied its accuracy, but in Porcupine it is generally accepted as being correct. It is said the hole was put down at a point some little distance removed from the main central shaft of the Hollinger.

As a result of success at depth on the Hollinger, as well as the geological data gathered on the Porcupine Crown, interests identified with the Moneta mine appear to have just cause for optimism. The property lies adjacent to the Hollinger on the west, and has greenstone formation along part of its property. The data which shown this formation as likely to broaden out at depth is regarded as being important to the Moneta mine, especially so on account of the general trend of the orebodies of the Hollinger being toward the Moneta.

The annual report on the McIntyre-Porcupine for the fiscal year ended June 30, is entirely favorable and shows an increase of about $1,000,000 in the ore reserves, as well as showing a total production of $2,080,178 for the year. An average of $11.02 was recovered from each ton of ore treated, as compared with $9.76 during the preceding year. Operating costs increased to $900,495 as compared with $825,998. Net profit, before providing for depreciation of plant, amounted to $818,020, compared with $683,350 for the year preceding.

The Kirkland Lake District.

Litigation is again involving the Orr Gold Mines, and the minority interests have taken action to endeavor to restrain the directors from issuing 800,000 treasury shares to Hamilton B. Wills. The now defunct Kirkland-Porphyry Company which was formed some two or three years ago by Mr. Wills, purchased the control of the Orr Gold Mines, and spent a large amount of money on development work. The Kirkland-Porphyry later went into voluntary liquidation, its assets being purchased by Mr. Wills, and Mr. Wettlaufer. As near as can be ascertained, the object of Mr. Wills, is to obtain reimbursement for the money spent, and in view of the details likely to be thrashed out in the courts, it might be injurious to certain of the litigants were a brief and necessarily incomplete analysis of the affair to be presented in these columns. It is clear, however, the minority interests have made the financial arrangements to carry the case through the full course of litigation, if necessary, in an endeavor to prove their opinion.

The work of deepening the shaft of the Lake Shore mine from the 400-ft, level to a depth of 800 feet has commenced.

In connection with the proposed merger between the Kirkland Lake, Teck-Hughes and Orr Gold Mines, such a possibility is now regarded as more or less remote. The Teck-Hughes is generally conceded to be in favor of remaining out of such a consolidation, and the pending litigation on the Orr property is believed as likely to hold up definite negotiations on this property.

Mining operations have been suspended on the Peerless property, formerly the Mondeau, at Boston Creek. The "Journal" has been officially advised the reason for curtailment was not due to lack of merit in the property, but has to do with other matters, one of which has been a failure to get reasonable efficiency from the mine workers engaged. The curtailment is stated to be only temporary, and that the favorable results met with on the property warrant aggressive work.

Progress in the Label township area at Kirkland Lake continues to be very satisfactory and the work of the coming winter is expected to prove up resources of much value. At least such is the opinion of those operating in that district, who base their opinion on the logic that where this series of rock formation has been opened up in the central part of Kirkland Lake it has been found to be rich, and that where it is now being opened up under equally favorable conditions it is reasonable to expect good results. Already the number of gold discoveries made are bearing out this opinion.

LESS TRANSVAAL GOLD.

London, Sept. 16.—(Special Star Cable).—The monthly return of the Transvaal Chamber of Mines for August giving the gold output of the Witwatersrand and the outside districts is 702,083 ounces, as compared with 736,099 ounces for July, a decrease of 34,016 ounces. The daily production was 22,647 ounces as compared with 23,745 ounces in July.

British Columbia Letter

Hazelton, B. C.

After having examined a mica property situated about seven miles from Tete Jaune Cache, John D. Galloway, resident engineer for northeast British Columbia, has returned to his headquarters at Hazelton. Regarding the mica he says that it is owned by a Calgary Syndicate and that considerable development has been done. Four miles of road have been constructed and a number of cabins also have been built for the employees. The material is of high grade and there appears to be a good market. Mr. Galloway also examined the Taltapin Property on Babine Lake, which is being opened up with promising results. It is the intention of the government engineer to visit the Driftwood Creek Country where a number of claims have been staked and where the government has spent a considerable sum in trail and bridge construction. The Babine Bonanza Property also will be inspected. Operations there now are being carried on at depth.

Greenwood, B. C.

The need of added financial support has led to the re-organization of the Canadian Copper Co., what is known as the Readjustment Committee having decided on a plan which provides for the formation of a Company under the laws of the Dominion of Canada or one of its Provinces. The total authorized capital of the new Company would be 2,000,000 shares of no par value or of the par value of $5 each as the Committee may determine. This is the same number as the authorized shares of the present Company. The new Company is to acquire all the property and assets of the old Company and to assume all its liabilities. The plan also provides for the issue of 1,088,209 shares of the new company and the setting aside of 833,333 shares for conversion of first mortgage bonds, leaving 78,458 shares to be held for future corporate purposes. Under the plan the stockholders have the right to participate on the following basis: The payment of 50 cents with each share of stock deposited and surrendered to the Readjustment Committee under the plan and agreement on or before Septembr 1st, 1920, as hereinafter provided, will entitle the owner thereof to one share of stock of the new company, or in the alternative, without any payment, each three shares deposited and surrendered to the Committee under the plan and agreement on or before the 1st September, 1920, entitles the owner to a share of stock of the new company. Half of the payment was to be made on the 1st September and the other half on or before October 1 to the Readjustment Committee.

Vancouver, B. C.

The position of General Manager of the Britannia Mining Company now is occupied by A. J. Donahue, for some years its secretary-treasurer. He has been promoted to the post recently vacated by J. W. D. Moodie.

Victoria, B. C.

In order to obtain full and exact data regarding the market possibilities on the Pacific Coast for the product of Blast Furnaces. Steel Rolling Mills, etc., established in British Columbia a tour of central and western parts of the United Statese now is being made by members of what is termed the "Steel Committee" of the Provincial Department of Industries. Major D. B. Martyn, the Chairman, has gone to Chicago accompanied by James H. McVety, one of his associates. Thence they will proceed to California. There they will be joined by Nicol Thompson, another of the Committee, to whom has been assigned the special duty of investigating market conditions in respect of steel and steel products in that and other Coast States. When the Committee returns to Victoria it is expected to be in a position to submit an informative report and it is likely that on their findings will be based the policy of the Provincial Government in regard to the proposed enterprise. That British Columbia possesses the magnetite necessary, together with the needed fluxes, and that general conditions are favorable appears to be generally conceded, so that the question of the market must be determined to assure private enterprise or the government of the attractiveness of such an investment.

The Shipton Steel Smelting Co., of Vancouver, has announced its intention to instal a plant at North Vancouver. Negotiations now are in progress with the municipal authorities with respect to the fixing of the assessment on their proposed site and with a view to the securing of certain inconsiderable concessions.

THE COLLIERIES.

Litigation has developed in British Columbia the issue of which involves title to some 237 acres of coal bearing land on Vancouver Island now held by the Granby Consolidated Mining and Smelting Co., Ltd., and being a part of the area being exploited by what are known as the Cassidy Collieries.

The result of the first hearing, which took place before Mr. Justice Gregory, of the Supreme Court, was a judgment for the plaintiffs, viz., the Esquimalt and Nanaimo Ry. Co. This Company sets up the claim that the coal rights in these lands were conveyed to the railway by the Province through the Dominion at the time of the construction of the Vancouver Island Railway and by way of a bonus to those who undertook the completion of that at then considerable enterprise. In bringing this suit it is surmised that the railway company is actuated by the desire to see that no part of its alleged coal interests on the Island, which comparatively recently passed to the Canadian Collieries (D) Ltd., are lost to that Company.

The position of the defendants who are given as Messrs. Wilson and McKenzie is that, as executors of the estate of the late Joseph Ganner and Mrs. Dunlap, original holders of the land, they were granted a Provincial Crown Grant to the coal rights thereon by virtue of the Provincial Settlers' Rights Act. This provincial title they passed to the Granby Consolidated Mining and Smelting Co., and the coal rights so acquired are, as stated, a part of what that Company has been engaged in developing at Cassidy. It is well-known that the power of the British Columbia Government to enact such legislation has been questioned and that, as a matter of fact, the Dominion Government has disallowed the Settlers' Rights Acts of the local legislature. This disallowance, however, did not take place until after the Ganner and Dunlap leases were issued.

Mr. Justice Gregory having found for the Esquimalt and Railway Co. the defendants immediately applied to Mr. Justice Galliher, of the Court of Appeal, for a stay of execution which was granted, it being stipulated that they should pay into Court $75,000 as secur-

ity and should not take from the lands in question more than 100,000 tons of coal without an order obtained from the Court of Appeal.

The importance of this case becomes clear when it is explained that its outcome will affect, favorably or adversely, a considerabe section of the holdings of the Granby Consolidated Mining and Smelting Co., which has expended large sume in the development of Vancouver Island Coal Lands and has established at Cassidy Collieries so well and modernly equipped as to have won the favorable comment of all who have been privileged to visit them. The same statement applies to the town, the buildings of which, both those for the accommodation of the men and of the officers, are the last word in point of their conveniences and living comforts.

Influenced by the somewhat alarming accounts published by the newspapers in regard to the situation the officials of the Company have authorized the statement that the townsite of Cassidy is in no way affected by Mr. Justice Gregory's judgment and that "it is not anticipated that there will be any diminution of work at Cassidy pending the appeal and the judgment of the British Columbia Court will not be likely to affect operations of the Coke Plant or the Smelter at Anyox."

The coal production of Vancouver Island Collieries for the month of August was 117,194 tons as compared with 140,512 tons for July, a decline of 23,318 tons.

To the Coal Mine Operators of British Columbia the decrease in output is a serious matter. They state that, notwithstanding their desire and their efforts to see the total increase, it has been found impossible to obtain such a result. The explanation given is labor conditions. The coal is needed, in fact is imperatively required. Never was there so strong a market for the product of the coal mines of this Province.

One prominent operator described the situation as exceedingly aggravating. Just when the fuel can be placed without trouble it is found difficult to induce the miners to bend themselves to the task of getting the material above ground. Orders are being received from foreign sources in shoals but it is doubtful whether the provincial mines, especially as the winter season is approaching, will be abe to take care of much more than the local domestic and bunker trade. And never was British Columbia more advantageously placed in respect of overseas commercial possibilities because of the embargo against the export of eastern Canadian coal.

It is likely, however, that the miners will get down to serious work in the course of a few weeks. That should be the tendency at any rate with the advent of the wet weather of the Fall. Fine summer weather, it is assumed, has been too great a temptation to the underground workers to take more time off than is usual although it may be expected, as far as the miners of the Island are concerned, that many will be devoting considerable time to outdoor life during the shooting season.

In a word the problem of the coal mine operator is one of labor, which is the same as that of most of those charged with the administration of mining properties in British Columbia at present.

Figures giving the production of the leading collieries of the Province for the past three months tell the story in striking fashion. The Crow's Nest Pass Coal Co., of Fernie and Michel, produced 62,770 tons in June and 60,245 tons in July; the Canadian Western Fuel Co.'s output for June was 56,474 tons; for July, 55,399 tons; and for August, 34,381 tons; the Canadian Collieries (D) Ltd. had a production of 62,400 tons in June; 65,335 tons in July; and in August it dropped to 60,696 tons.

Detailed production of the collieries of British Columbia for July follows:

Crow's Nest Pass Field.

	Tons.
Crow's Nest Pass Coal Co. Ltd., Coal Creek	38,073
Crow's Nest Pass Coal o. Ltd., Michel	22,172
Corbin Coal and Coke Co., Corbin	15,763
	76,008

Nicola-Princeton Field.

Middlesboro Collieries, Middlesboro	6,918
Fleming Coal Co., Merritt	2,616
Coalmont Collieries, Coalmont	1,984
Princeton Coal Co., Princeton	2,114
	13,632

Vancouver Island Field.

Canadian Western Fuel Co., Nanaimo	55,399
Canadian Collieries (D) Ltd., Comox	41,098
Canadian Collieries (D) Ltd., S. Wellington	8,904
Canadian Collieries (D) Ltd., Extension	15,342
Pacific Coast Coal Mines, S. Wellington	7,680
Nanoose-Wellington Co., S. Wellington	3,079
Granby Cons. Mng., Smltg., & p, Co., Cassidy	9,019
	140,512

The statistics for the month of August as far as they are available follow:

Nicola-Princeton Field.

	Tons.
Middlesboro Collieries, Middlesboro	7,341
Coalmont Collieries, Coalmont	2,056
	9,397

Vancouver Island Field.

Canadian Western Fuel Co., Nanaimo	34,381
Canadian Collieries (D) Ltd., Comox	38,051
Canadian Collieries (D) Ltd., S. Wellington	7,943
Canadian Collieries (D) Ltd., Extension	14,732
Pacific Coast Coal Mines, S. Wellington	8,110
Nanoose-Wellington, S. Wellington	4,683
Granby Cons. Mng., Smytg., & P. Co. Cassidy	9,330
	117,194

Present Output of Alberta Coal Mines is Far Below Capacity.

Official figures recently issued dealing with the coal output of the Province of Alberta, for the first six months of the present year, indicate that compared with the production of the same period for 1919, that considerable progress is being made in speeding up the development of the coal fields of the prairie Province.

The official figures up to the end of June this year gives an output of 3,043 940 tons, compared with 2,-

068,907 last year. This is for both the bituminous and lignite product. It is doubtful, however, in the face of the paucity of orders that have been coming since the end of the period mentioned that the showing will be exceptionally good.

That is a matter over which the operators have no control; in other words, if these has been a falling off in orders the whole bonus must be thrown on the public. The operators maintain that as far as actual quantities are concerned that the fringe of the industry has as yet been but touched.

Summed up in a nutshell, operators state, however, that there has been more coal up to this time in the history of coal producing in Alberta. It should also be pointed out that more coal will be required from these mines than ever before on account of the shortage of coal from the United States.

The present prospects as far as the Winnipeg market is concerned, operators state, is most encouraging. The actual output, however, to that market, and to further eastern points will solely depend upon freight rates. If these are prohibitive, it will mean that a staggering blow will be dealt the industry.

The provincial government has recently been carrying on with some measure of success a very active propaganda in Manitoba and Saskatchewan. This has been greatly helped by the shortage of coal from the United States.

While the bituminous mines in Alberta have been working fairly to capacity, the lignite fields, owing to lack of orders have for some time now fallen far short of this; indeed, in the majority of cases their output has only been about half of what they could turn out.

It is pointed out that the coal deposits of the province ar enormous, and that 10,000,000 tons a year could be but a fraction of what could be produced. It is asserted that the tipple capacity at the present time could take care of more than the figure mentioned.

The ChuChua Mine situated near Kamloops has been placed on a shipping basis according to Glenville A. Collins, consulting engineer of Seattle. This property sovers about 5000 acres of ground, is situated in the new coal area and it is said is capable of producing a large amount of coal of an excellent quality. There are at present 20 men employed, and the output it is expected will be 2 cars a week. By November it is thought that the employees will be doubled, and the output materially increased. Fred. Jarrett of North Vancouver is the Superintendent. Since he took charge the property has been developed to its present point, and it is believed that the local market will absorb the entire output for a time. Before long, however, it is figured that Chu Chua Coal will find its way into Vancouver and other coast centres.

A new coal mine is being opened up at Coalspur, Alberta, on the mountain park branch of the Grand Trunk Pacific Railway. There are employed at present 35 men and 75 tons of coal are being produced per day. Thomas Davis, formerly of the Michel Colliery is in charge of operation.

Much is expected of the new Collieries being opened up at Coalmont, in the Nicola-Princeton field. This property has been taken over by an energetic and enterprising syndicate, at the head of which is W. J. Blake Wilson, and with whom are associated a number of prominent Vancouver business men. The property is not new as a coal producer, but under the new management, its plant is being so augmented and development so extended that it is expected to take a leading part among the coal producing properties of the interior of the Province. Initial shipment will approximate 250 tons a day, but this amount is expected to reach at least 1000 tons in the course of a few months. The greater part of this will find its way into Vancouver.

The coal is declared by experts to be superior to any mined in the province. It is an metamorphosed bituminous coal extremely rich in resin, making it valuable as a steam coal, and profitable for domestic use, burning as it does with but little ash. It is free from shale and rock, being mined from the centre of a seam averaging about ten feet in thickness. This is only one of the many rich seams in the property.

Engineers have estimated that between the lower seam in which operations are now being carried on and the surface, there is a thickness of more than 200 feet of coal in seams of unusual thickness. At one point a layer shows 28 feet of clear coal. The narrow divisions between the various seams are bands of clay which separates easily from the coal. The narmarkable feature of the coal, particularly noticeable in the workings, is the fact that it is free from dust. When powdered it does not "flower" but breaks into small distinct particles, a quality which is most desirable for industrial use where powdered coal is used as fuel. This and the formation of the coal makes it the safest coal in British Columbia to handle. It is free from dangerous gas. Analysis show it to be: Fixed carbon, 55 per cent; volatile matter, 36.5 per cent; ash, 7 per cent; moisture 1.5 per cent.

The property which is immediately behind the small town of Coalmont, 12 miles from Princeton, was first opened up by the Columbia Coal and Coke Company, a tunnel being started from above the Tulameen River. Later another tunnel was commenced from the other side of the mountain above Granite Creed, the small stream famous thirty-five years ago as the scene of a gold rush. After operating for a time the property was closed. In 1917 it was acquired by local capitalists, headed by Mr. Wilson, on the advice of Mr. Alexander Sharp, M.E., who is consulting engineer for the company. Mr. Sharp was convinced that the property had not been properly worked, and on his advice the driving of the long tunnel from the Coalmont side was abandoned.

The tunnel, which had been started on the other side of the mountain, was examined, and it was found that it had been badly planned, being driven just beneath the big coal measure. Its direction was changed, and Mr. Donald McLean, a mining expert of long experience in the Vancouver Island collieries, was installed as superintendent. Under his direction the work has advanced with such good effects that the seam was soon encountered. The tunnel was driven ahead in solid coal, and upraises were driven on the dip of the body, with new levels being started. At the present time there are about two miles of workings and all in solid rock.

Estimates of the coal body made by the Dominion Geological Department before the big seam was proved, placed the reserve at 98,000,000 tons. Other computations have suggested a higher figure without anticipating any additional seams in the ground below the present workings.

The present production is 140 tons daily, this being

all that can be taken care of by the motor trucks, which haul the coal four and a half miles down the winding mountain road to the temporary loading station at the railroad tracks. The output is absorbed by the Kettle Valley and Great Northern railroads, the engineers of which declare it to be the best steaming coal used in the West.

A big force of men are at work constructing an aerial tramway from the tunnel mouth to the big tipple now building at Coalmont while another force of mechanics are engaged in building a big power house adjacent to the tipple. As soon as the power plant, which is on the ground, is installed, a pole line will be run up the hill, the right-of-way for which has already been cleared. The power plant will develop 600 horsepower, with the machinery ready for installation. It will be added to as the requirements of the mine demand more power. It is expected that another 50 horsepower will be developed from the tramway, which operates on gravity. This tram will transport 100 tons per hour.

A special mine car has been designed for use in the tunnels and for transportation to the tipple. The box of the car unlocks from the trucks and becomes the bucket of the aerial. This is carried direct to the tipple for loading, or bunkering. By this method not only will considerable time be saved, but the breakage of coal will be reduced to a minimum. It is expected that the tramway and tipple will be in operation by October 15. As soon as this has been done the output of the mine will be increased and shipments to the Coast will commence. Work is being pushed ahead as rapidly as possible by Mr. J. T. Johnstone, outside manager, and by Superintendent McLean.

The mine is being put in readiness to double the present production almost at a day's notice. Mr. Alexander Bryden, a well known Vancouver Island mine man has recently been appointed assistant superintendent and is personally directing operations underground.

The operators of the Coalmont mine are fortunate in having an immense supply of timber close at hand for mine purposes. This is cut in the company's mill which has at present a capacity of 800 feet of lumber daily. Timbering in the different levels, of which there are four, is of a most substantial character.

A big fan is being installed and will be in operation in a few days. It is located at the mouth of a tunnel, driven for the purpose, and will distribute 38,000 cubic feet or air, at one-inch water gauge, through the workings every minute. Another fan, a Sirocco, will be installed in a few months. This will have a capacity of 100,000 cubic feet. The underground conditions are exceptional. The mine is absolutely free from gas, and is being worked with naked lights while the coal roof is exceptionally firm, the absence of the usual dust of other British Columbia pits being appreciated by the workers.

Every possible comfort is being provided for the employees of the company. A new dining hall has just been completed at the camp, while a new rooming house is also being commissioned. A boiler will be set up in a few days to serve as a central steam heating plant for the little camp. Every room in the large rooming house will be fitted with radiators, while the dining hall will be made thoroughly comfortable.

Associated with Mr. Wilson, as president of the company, are W. L. Parrish, M.L.A., Winnipeg, vice-president; A. H. Douglas, secretary-treasurer, and R. S. Lennie, J. T. Johnstone, D. Donald, J. A. Whittier and J. T. Haig, M.L.A., Winnipeg, as directors. Messrs. Lennie and Clark are solicitors.

PORT ARTHUR NOTES.

By J. J. O'Connor.

The Silver Islet Syndicate has closed down the Silver Islet mine temporarily, pending a reorganization on an extensive scale, preparatory to the prosecution of active mining operations on Silver Islet, and thoroughly prospecting the veins on the mainland of the Woods Location, comprising some ten square miles.

The Silver Islet Consolidated Mining and Lands Company, the former owners and operators of this property, carried out considerable prospecting by open cuts and shaft sinking on these veins many years ago, in which they disclosed very encouraging values. This work will be taken up and carried to a point where definite conclusions may be arrived at.

The unwatering of Silver Islet was carried down to the second level. Large bodies of high-grade "macfarlanite" were uncovered, thoroughly sampled and assayed, with such gratifying results, that the present operators have determined to prosecute an active campaign of mining on this famous old mine. Silver values were laid bare in the old workings that are far in excess of the cost of recovery.

Reorganization is not sufficiently advanced, as yet, to say whether active operations will begin this Autumn, or be deferred until the Spring of 1921.

Iron ore shipments from Lake Superior for the season of 1920, to September 1st were 35,349,874 gross tons, an increase of 5,751,826 tons, or 19.43 per cent. increase over the same date in 1919. A strenuous effort will be made to reach a shipment of 55,000,000 tons off this Lake, before the close of navigation.

It is expected that there will be a marked shortage of lake tonnage for the balance of this season, and that wild rates for iron-ore, coal and grain will be increased as a natural sequence to the shortage of boat tonnage. Owing to the great delays experienced by boats at Lake Erie ports, caused by car shortage, many transportation companies are behind in their contracts. These delays were so great as to seriously threaten the coal supply of both the Canadian and United States north-west. Coal is now coming forward more freely, with an advance of rates. Already numerous charters have commanded 75 cents per ton for coal from Lake Erie to the head of Lake Superior, and it is reported that in one special instance $1 was paid. The season rate for coal is 50 cents per ton. The season contract for iron ore is $1.10 per ton in at least one instance $1.50 per ton has been bid for wild tonnage. Wild boats in the coarse freight trade are likely to command the highest rates in any season since the development of larger sized ships, and their advent has not displaced dollar ore, or 5-cent wheat, which was confidently predicted when they made their appearance in the ore, coal and grain trade.

PERSONAL.

Mr. Carl Marsh, Chief Engineer, and Mr. W. H. Graham, Superintendent of Construction, of the Dominion Steel Corporation, have had their duties extended to cover the similar work of the Dominion Coal Company at the collieries and associated plants.

Royal Commission Reports on Wages and Working Conditions at the Collieries in Nova Scotia

The Royal Commission which for some weeks has been investigating conditions at the coal mines in Nova Scotia, and considering the request made by the United Mine Workers for increased wages and modifications of working conditions, has reported to the Minister of Labor.

Tc recommendations made may be summarised as follows : That the wage increase asked of one dollar per day for day-paid workmen, and twenty-five cents per ton on contract getting-rates, be granted, effective 1st July (the miners' demand was that the increase should be effective 1st May), subject to the adoption of a sliding scale by which the remuneration paid to workmen shall increase in proportion to any increase obtained in the per capita production of coal. A year is given to work out this sliding scale.

The Commission recommends the formation of a joint conciliation board to act as a permanent medium for the adjustment of disputes as they arise.

A summarised report of the recommendations of the Commission, given out by the Minister of Labor at Ottawa, is as follows :

1.—That the wage increases demanded (broadly $1 per day for datal men and 25 cents per ton on all tonnage rates) be granted. "The recommendation is, however, subject to the condition that it is to be distinctly understood and agreed that operators and men will agree to co-operate and bring about the adjustment referred to, and within twelve months, or say on or before the first September, 1921, adopt the partial advance and sliding scale scheme" with a view to increasing coal production.

2.—General living conditions of Nova Scotia miners, "with few exceptions, absolutely wretched," and "a menace to themselves and their families." Recommends that companies take necessary steps to remove all conditions referred to, and provide proper sanitary arrangements, men to pay increased rental per month per $100 or fraction of $100 expended in improvements, this increased rental to provide for extraordinary repairs after recommended improvements have been made.

3.—At some points both operators and men are prejudiced by inadequate equipment. In some instances, wash houses are inadequate. Recommends special attention by companies to this general question of equipment and sanitation.

4.—Recommends the more universal instalment of radial machines, in fitting places.

5.—Recommends, that where practicable, electric lights should be installed by operators, "as a means to greater efficiency and larger production."

6.—"The present," says the commission, "is not a time for increasing expenditure, but, in view of the requirements for reconstruction and repair of the damages of warfare, is rather a time for increased energy and carefully guarded thrift."

7.—Deprecates practice of men taking "vacations" and "holidays" over minor grievances and asks U.M. W. officials to condemn and discourage such practices.

8.—Points out advantage of United States coal in competitive market, due to lower cost of production, as against Nova Scotia coal, and asks miners to put forth every effort to true the balance "as a matter of self preservation."

9.—Recommends establishment of an "adjustment board" of co-operation between men and operators, "to determine all disputes which may occur during the life of this contract, such adjustment board to be regarded as "the most effective and businesslike method of settling any minor disputes that might arise."

10.—Increases are made retroactive, dating from July 1st, 1920.

Housing Conditions Bad

Regarding living conditions in the colliery districts the report has the following to say :

"That in view of the fact that the housing, domestic surroundings and sanitary conditions of the miners are, with few exceptions, absolutely wretched and that such conditions have a deterrent effect on the miners ability to produce coal and are a menace to themselves and families, and, further, that children brought up in such an environment have not the same chances of life and health as children reared under better conditions, as proven by government statistics as to infant mortality, it is therefore recommended that the companies that own the houses, put and keep them in proper repair, and that a sewerage system be devised and inaugurated whereby surface closets will be eliminated, or that installation of a modern septic sewerage system be provided where it is found that the ordinary sewerage system is not feasible. Suitable kitchens should also be provided where they do not now exist.

"In the matter of water facilities for the houses of mine workers, your commission recommends that an adequate supply be furnished and so conveniently located that the miners and their families may avail themselves of it. Pure water, which is an essential, should be supplied each family in a quantity sufficient for all purposes of domestic use.

"In making the foregoing recommendations the commission is actuated by the conviction that for humanitarian reasons, for the present and future well being of the miners and their families (it being from the miners' families of today that the miners of tomorrow will be drawn) and to assure to the industry the necessary recruits to maintain the force required to achieve the success of the industry, it is essential that such improvements be effected."

NEW YORK ADVICES ON THE ASBESTOS MARKET.

Information from the Canadian mines is that production is about twenty-five percent. below normal, with increased demand for asbestos. As a result prices for asbestos crude and fibres are very stiff. European demand is reported to be increasing as industries there return to normal functioning.

Deliveries from Canada are better because of improvement in the car situation, and orders are being filled more quickly. Users of asbestos are strongly recommended to stock up before the Winter sets in, as this will cause further falling off in production, and prices are forecasted to go much higher. A survey of conditions of supply and demand, and the recovery of overseas markets, indicates that no less stringent conditions in the asbestos trade are to be anticipated for several years, and present purchases are advised.

The Coal Situation in Canada, August 1920

A Review prepared by S. J. COOK, Chief of the Mining Division of the Dominion Bureau of Statistics, Ottawa.

Situation not Alarming.

Despite much loose talk to the contrary, the Canadian coal-supply situation does not appear alarming, although prices continue high, and no relief may be expected as yet.

United States Production.

The production of bituminous coal in the United States during the 199 working days ending August 21, 1920, and for the corresponding periods in preceding years according to figures supplied by the United States Geological Survey was as follows (in net tons) :

1917	352,011,000
1918	375,395,000
1919	287,270,000
1920	335,967,000

The year 1920, therefore, at August 21, is sixteen million tons behind 1917, and about thirty-nine and a half million tons behind 1918, but is forty-eight and two-thirds million tons ahead of 1919. In this connection it is pointed out that production during 1918 exceeded consumption and provided for a net addition to consumers stocks by the end of the year, of approximately 30,000,000 tons. In 1919, the condition was reversed; consumption exceeded production and there was a net draft on stocks of perhaps 40,000,000 tons for the year.

United States production of anthracite shows an output of 55,712,000 net tons for the calendar year up to August 21, 1920, compared with 52,786,000 for the same period during the preceding year.

Coal Imported Into Canada.

During the past five years Canada has imported from the United States, bituminous coal in quantities varying from nine million tons in 1915 to seventeen and one-quarter million tons in 1918. Anthracite imports varied during the same years from four millions to five and one-third.

Central Ontario has received, up to June 30, 1920, 99 per cent of the average amount of anthracite coal received during the same six months in the three preceding years; and 106 per cent of the amount of anthracite received during the same period in 1919. The bituminous coal supply is not as good. Receipts this year constitute only 89 per cent of the average amount for the same six months of the three-year period, but when taken against last year's receipts, 1920 shows an increase of 9 per cent over 1919. Quebec has received this year 110 per cent of the average amount of anthracite obtained during the same six months' period of three years preceding and 119 per cent of the amount brought in during the six months of 1919. Receipts of bituminous are lower, the 1920 figures being 65 per cent of the three-years' average, and 74 per cent of 1919 imports.

Total coal imports for Canada show that this year's receipts of anthracite to June 30 are 101 per cent of the three years' average, and 107 per cent of last year's receipts during the same six months. Bituminous coal imports into Canada up to June 30 have fallen this year to 80 per cent of the average for the same period during the three preceding years, but they still add up to 97 per cent of the receipts during the first six months last year.

These data will serve to inform the reader that while there is undoubtedly a shortage of coal it is not such as to cause undue alarm. There seems no reason why United States production should not continue on the same scale as at present and with the return of the United States railways to private control, transportation facilities will probably be considerably augmented so that the losses due to car shortage may be reduced, and the consequent increased distribution will make for general relief.

Canadians will never be content to be so absolutely dependent on the United States miner, and a policy looking to the better development of Canada's coal fields would be acclaimed by both miners and consumers. Coordination of effort, with the elimination of obsolete methods and unnecessary local competition in our coal mining districts would do much towards Canada's coal problem. But governments, capitalists and miners have all much progress yet to make before the necessary spirit of unity will be found pervading all.

Canadian Output.

Coal mining in Canada has been subject to many vicissitudes, and yet in spite of all, the output from Canadian mines during the first three months of the present year was nearly half a million tons in excess of the output during the same three months of 1919, and if production is maintained at the same rate during the remainder of the year, the Canadian output in 1920 will exceed that of 1913, which so far holds the record at fifteen and a half million tons.

Canadian output figures are given below for the years 1913-1919 inclusive, and for the three years 1917-18-19, the output of each coal producing province is recorded. Comparative figures for the first three months of the current year and last year are also given. All quantities are given in short tons.

Canadian Output of Coal.

1913	15,532,878
1914	13,988,743
1915	13,480,196
1916	14,815,703

	1917	1918	1919
Nova Scotia	6,345,335	5,836,370	5,790,196
New Brunswick	189,668	266,585	166,377
Saskatchewan	360,623	348,988	379,347
Alberta	4,873,637	6,126,443	4,950,310
British Columbia	2,660,834	2,879,099	2,649,516
Yukon	5,264	2,900	.....
Canada	14,435,361	15,460,385	13,935,745

	3 Months Jan.-Mar.	
	1919	1920
Nova Scotia	1,448,588	1,593,170
New Brunswick	52,813	32,444
Saskatchewan	80,837	93,563
Alberta	1,416,578	1,732,330
British Columbia	736,748	175,016 (Incomplete)
Canada	3,735,564	4,126,523

COAL SUPPLY BULLETIN

A New Service.

To meet the very evident need for data regarding output, exports, imports, and movements of coal, and in order that the general public may be kept accurately informed regarding Canada's coal supply, it is proposed to issue from the Mining, Metallurgical and Chemical Division of the Dominion Bureau of Statistics a "Coal Supply Bulletin" each month, giving all the available statistics relating to the production and disposition of Canadian coal, and the importation and distribution in Canada of coal from the United States. Owing, however, to the present extremely high costs of printing, the first number of this Bulletin, which it was proposed to publish at this time, has been postponed as changes are now being made in the multigraph equipment of the Bureau, which, when completed, will permit of the printing, promptly and at greatly reduced cost of such publications as the one proposed.

The collection of coal statistics.

During the recent administration of fuel control in Canada under Mr. C. A. Macgrath, the necessity of maintaining accurate records of all data relating to coal production in this country and imports from the United States in readily available tabular form was so emphasized that the principal records inaugurated under that regime were merged with those previously compiled in the Dominion Bureau of Statistics, and when the Mining Division of the Bureau was established last year, with the writer in charge, the collection of adequate records of coal supply was one of the first matters given attention. The whole of this work is now on a permanent basis, and the several Government Department interested are being served through the coordination of provincial and dominion effort made possible by the Bureau. This Coal Supply Bulletin, compiled each month from the wealth of data available in the Mining, Metallurgical and Chemical Division of the Bureau, will provide a new service to the public, and will enable the Bureau to keep its many correspondents on the subject of coal, promptly and fully informed on the subject. The critical surveys made from time to time will serve to review and interpret the data recorded.

Organization of work.

Output and disposition of coal figures are obtained in the Bureau through the cooperative assistance of the several Provincial Departments administering the mining laws in the coal producing provinces. This scheme, inaugurated in January 1920, provided for the collection of production data from the mine operators by Provincial officers, thus ensuring the highest degree of reliability in the data collected. Returns are obtained in duplicate, and one copy, after vise by the Provincial officers, is forwarded to Ottawa for compilation with the data from the other Provinces, by the trained staff of the Mining Division. This plan has resulted favorably, not the least of the advantage gained going to the mine operator, who now completes one form each month, knowing that he will not be required to do the same work over several times more for other Government Departments. The present arrangements are working so smoothly and well that Coal Supply Bulletin will contain output figures complete for the month preceding its date of publication.

Imports of coal into Canada, and exports therefrom, are supplied to the Bureau twice a month through the courtesy of the Department of Customs. These figures are absolutely up to date and all coal coming into Canada from the United States is shown by quantities and kinds for each port of entry. Exports of coal produced in Canada are also shown by quantities shipped through each port of exit.

These data, with the production figures obtained through the Provinces, enable the Bureau to survey the coal situation continually, and to determine with facility when a fuel famine threatens. All the information thus collected is carefully compiled and tabulated, and digests are prepared for the various administrative offices, including more particularly the Railway Commission.

A mailing list is being prepared and those who wish to have Coal Supply Bulletin forwarded to them regularly free of charge should send in their names and postal addresses at once to the Chief of the Mining, Metallurgical and Chemical Division, Dominion Bureau of Statistics, Ottawa.

TORONTO MINING STOCKS.

Silver	High	Low	Last
Adanac Silver Mines, Ltd	2	2	2
Bailey	4¾	4¾	4¾
Beaver Consolidated	41	40	41
Cobalt Provincial	45	43½	45
Crown Reserve	25	25	25
Gifford	1⅛	1⅛	1⅛
Great Northern	1⅞	1¾	1⅞
Kerr Lake	3.05	3.05	3.05
La Rose	35	33	33
McKin.-Dar.-Savage	60	60	60
Mining Corp. of Canada	1.74	1.65	1.74
Nipissing	11.00	10.75	10.75
Peterson Lake	15	15	15
Right of Way	1	1	1
Silver Leaf	1½	1½	1½
Temiskaming	35.6	34	35
Trethewey	26	24	24
Gold.			
Apex	1.6	1½	1½
Boston Creek Mines	16	16	16
Dome Extension	37½	36½	37½
Dome Lake	4¼	3¾	3¾
Dome Mines	12.75	12.25	12.50
Gold Reef	3¾	3	3
Hollinger Consolidated	5.95	5.75	5.95
Hunton Kirkland G.M.	12	12	12
Keora	16¾	15	16¾
Kirkland Lake	53	49	50
Lake Shore Mine Ltd.	1.15	1.10	1.13
McIntyre	2.08	2.00	2.05
Moneta	12	12	12
Newray Mines, Ltd.	7	6	7
Porcupine Crown	24	23½	23½
Porcupine Tisdale	1½	1½	1½
Porcupine V.N.T.	25½	24	25½
Schumacher	17½	17½	17½
Teck-Hughes	8	7	7
Thompson Krist	7¼	7	7¼
West Dome	6¾	6½	6½
West Tree Mines Ltd.	5½	5¼	5¼
Miscellaneous.			
Rockwood Oil, Gas	5	3.7	5
Vacuum G.	28½	24	28

MEETING OF NORTH COAST DIVISION OF THE CANADIAN INSTITUTE OF MINING AND METALLURGY.

Stewart, B. C.—The North Coast Division of the Canadian Mining Institute held a two-day meeting recently at Stewart and was attended by representatives of all the important mining centres of the section, including Salmon and Bear Rivers, Anyox, Princess Royal Island, and Alice Arm.

E. J. Conway, presided and among the speakers were E. E. Campbell, vice-president of the Institute, and Peter E. Peterson, both of whom are connected with the Granby Consolidated Mining and Smelting Co., at Anyox. Mr. Campbell declared that the men most needed now were miners and metallurgists who could mine for a dollar when there was but $1.25 in the ore. He reviewed some of the work being done at Anyox and asserted that the operations there were being carried on at a lower cost per ton than at any other mine in the Dominion. The Company's concentration work he characterised as unique. The latter phase was dealt with by Mr. Peterson who described the concentration methods and stated that these not only were adaptable to the treatment of the ores of the Stewart and Alice Arm zones, but ultimately would be in use at those places.

An interesting talk was given by A. C. Garde, of Prince Rupert, on milestones in the evolution of the mining industry of the Pacific Northwest, the speaker touching on the growth of operations at Anyox, the Surf Inlet Mine development, and the discovery of the Premier Mine in the Portland Canal section and the resulting opening up of that area.

Dr J. A. Bancroft's address on the value of trained geologist in practical mining was another feature. He said that the big mission of the geologist in the mining field, looking at it from a national aspect, would be the working out of the geology of districts before the coming of the prospector, thus saving a lot of useless work by indicating where mineral bodies were not to be found.

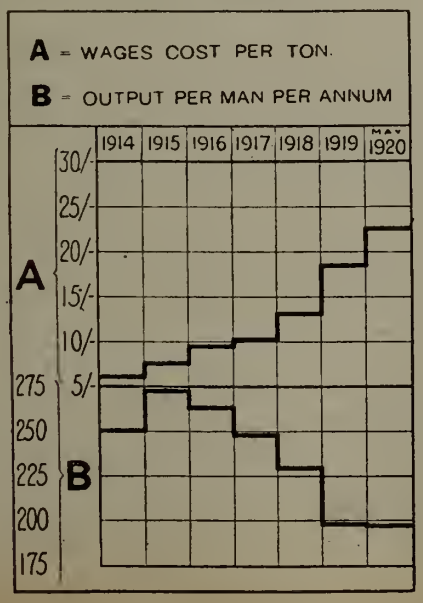
At a banquet, which closed the session, Pat Daly, the well known prospector and mining operator, referred to the closing down of the Big Missouri in the Salmon River District of Portland Canal. He said he was not inclined to accept as final the negative results of the limited amount of diamond drilling and the studies of Dr. Bancroft on which were based the decision to abandon work. Mr. Daly made reference to the history of some great mines in support of the contention that engineering mistakes were not uncommon and re-asserted his faith in the Big Missouri ridge.

Among the delegates were: E. E. Campbell, vice-president of the Canadian Mining Institute and assistant to the General Manager of the Granby Co., at Anyox; E. J. Conway, field engineer for the Granby Co.; H. M. Roscoe, secretary of the North Coast Division C. M. I.; J. Tuttle Jr., mine superintendent at Hidden Creek; P. E. Peterson, superintendent of concentration at Anyox; N. E. Nelson, field engineer; John Dillon, assistant superintendent Anyox Smelter; W. L. Wetmore, mechanical engineer; Wm. Weir, chemist; A. B. Wing, superintendent at Swamp Point, Granby Co.; A. C. Garde, consulting engineer; Dr J. A. Bancroft, professor of geology at McGill University; Dr Stuart A. Scofield, Canadian Geological Survey; and G. W. Bain, fourth year student McGill University .

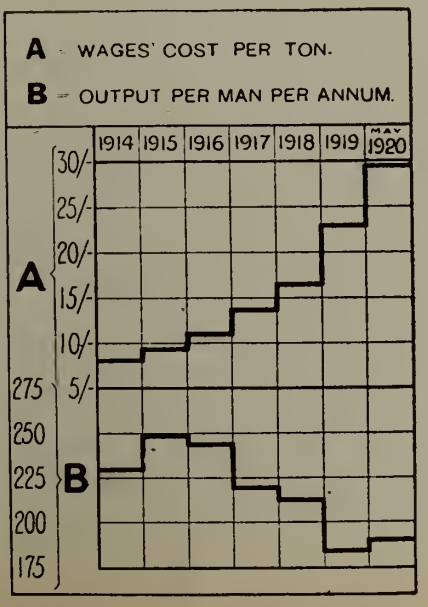
HIGHER WAGES ACCOMPANIED BY SMALLER PRODUCTION IN BRITISH COAL MINING.

In the accompanying diagrams, prepared by the statistical department of the Monmouthshire and South Wales Coal Owners' Association, graphic representations are given of the divergent tendencies of outputs and labor costs in the coal mining industry between 1914 and May 1920. The higher labor costs are due partly to the higher wages and partly to the decline in the efficiency of labor. In the United Kingdom the wages cost per ton has increased from 6s. 2.92d. to 22s. 8.75d., while the output in the United Kingdom per person employed above and below ground has fallen from 252 tons in 1914 to 194 tons. In the South Wales coal field the expansion on the wages cost per ton has been from 8s. 1.47d. to about 29s. 8.13d., whilst the output per person employed above and below ground has fallen from 230 tons to 190 tons. In other words, in the United Kingdom the output has declined by 23 per cent. and the labor cost increased by 264 per cent., while in the South Wales coal field the output has decreased 17 per cent. and the labor cost increased 265 per cent.

UNITED KINGDOM.



SOUTH WALES.



SUIT CONCERNING OWNERSHIP OF MOLYBDENUM PROPERTY AT ALICE ARM, B.C.

There is now before the Supreme Court, Victoria, B.C., an action involving title to The Molybdenum Properties of Alice Arm which, particularly while the war demand for this mineral kept its value high, were considered among the most promising mining holdings of the Province.

The suit is brought by Robert M. Stewart, manager of the Stewart Land Co., of Victoria, and the defendants are the Molybdenum Mining Co., H. A. MacLean, counsel for the latter, in his summing up of the situation explained that the purpose practically was to obtain judgment as to the ownership of the property.

Mr. MacLean, in sketching the origin and history of the litigation, which it may be said incidentally had the effect of preventing the development and operation of the property during the war when its product not only would have had a ready market but when the product was badly needed in the forwarding of the Allies' interests, stated that in 1914, Mr. Stewart agreed to sell the Conundrum Claim to Messrs. C. P. Riel and F. Teetsel and that the assessment work was not done in the following year, the result being that in June 1916 the title to the claim lapsed. Thereupon it had been restaked as two claims by Messrs. Riel and Teetzel.

Messrs. Stilwell Brothers, of Seattle, then were induced, Counsel asserted, to purchase the claims and they incorporated the Molybdenum Mining & Reduction Co., which spent about $100,000 on development. The Company has suffered through the decline in the value of the mineral since the war and in 1918 when about to obtain a certificate of improvement were met by Mr. Stewart's claim. The latter took the position that Messrs. Riel & Teetzel were only trustees of the property and that they had neither the right nor authority to negotiate a sale.

Mr. MacLean further recalled that, when the suit was started in 1918, an adjournment had been taken in order to give effect to an order of the court that the property be sold. Because, however, of the decline in the metal market this had been found impossible and, he stated, the contending parties now were before the Court in an action the object of which virtually was to decide the ownership of the property.

The case is proceeding.

Prof. J. M. Turnbull, of the B. C. University, visited the Alice Arm District and in 1916 prepared a report on various properties among them being that of the Molybdenum Mining & Reduction Co. The property consists of twenty-five claims, of which six at that time had been surveyed and Crown-granted. Of the Plant he says that the mine is connected with the Mill by a 2-bucket aerial tramway 4,075 feet long, with a drop of about 1,100 feet and a nominal capacity of 100 tons in twenty-four hours. The bunker capacity is placed at 80 tons at the upper and 200 tons at the lower end. The Mill consists of crushing and separating plants in separate buildings.

Describing the Plant he said that it consists of a jaw-crusher followed by coarse rolls, then by fine rolls, connected in series by 2-bucket elevators. The crusher and rolls are on the same level. The fine rolls operate by choke crushing in closed circuit with a set of gently sloping shaking screens, the final product being 40 mesh. A short trial run showed that the fine screen tended to bind, due to slight moisture and stieky material probably in the ore. The separating plant contains flotation machinery, but was not completed and the writer observes that the Mill appears to be more or less of an experiment and "may require some remodelling before successful operation is attained."

The main mine-workings are at an elevation of 1,200 feet, and begin in a gully, along the bed of which bare rock is exposed for over 1,200 feet, the balance of the ground being largely covered with soil and timber, with occasional rock outcrops or humps.

The formation, broadly speaking, is sedimentary, belonging in the slate or argillite area. The ore occurs as a series of quartz veins, with a general strike about north (mag.) and dips to the west varying, but mostly steep. These veins are quite irregular in width along strike and dip, and form rather a zone than a well-defined vein. Mineralization consists mostly of molybdenite in the form of thin seams parallel to the walls, but often curved and crumpled where the veins have been squeezed by pressure, in which case the seams may be 1-4 inch thick. The ore tends to break along seams, which gives specimens a deceptively solid appearance.

Paralleling the veins, and between them, are a number of dykes which make up a large percentage of the country-rock near the veins. This general dyke-vein zone continues for about 800 feet north of the mouth of the main working-tunnel at which point it is cut off by a tongue of granite rock, mostly moderately coarse feldspar and quartz, which strikes about north-east and has a width of probably several hundred feet. Vein-fissures continue into the granitic rock, but the mineralization seems to change. A 42-foot tunnel, 250 feet above the main tunnel, driven north from the contact with the granitic rock, shows a fissured zone much altered or decomposed, in which small dykes are seen. In this tunnel small lenticular shoots of ore were found, which consisted of quartz with galena, zinc-blende, and pyrite, both coarse and very fine-grained. The best showing was 3 feet wide. Six inches shows in a crosscut near the face in one place. This crosscut shows the fissure-zone to be at least 15 feet wide, and strong, with much gouge on the walls. An assay furnished by the company shows: Silver, 150 oz. a ton; lead, 55 per cent; zinc, 35 per cent, which seems to total up too much, but shows the general character of the ore. The occurrence does not suggest any important tonnage of this class of ore, though it has possibilities.

SILVER'S OBSCURE OUTLOOK.

The price of silver of late has continued to fluctuate in a most uncertain manner, and from the indications observable it is likely to continue to vary erratically. It is quite impossible in a market where the influences at work are diverse and complex to see a day ahead. The outlook is most obscure, and, therefore, it would be most hazardous for anyone, however close his experience of this market, to enter into the region of prophecy. Within the past fortnight the price has leaped to 63¾d, and after varying day by day it has been down to 57 5/8d, and has recovered to 60⅛d for spot.

This market, as already stated, is swayed by many factors. One powerful influence is the American exchange, which is unstable itself and will, so far as can be seen, continue to be unstable for some time hence. Then the attitude of the Indian bazaars, uncertain for a long time owing to the continued speculation there, remains obscure. India has been a bear of silver for some time, and this speculative selling has been one of the causes of the fall in the price of the metal. If India is greatly oversold it may prove a source of strength later on, when the speculator will have to buy back. But dealers in the market point out that it is by no means certain that this will prove a source of strength, as it is possible that a portion of the silver will be shipped from India. The Continent has likewise been a source of weakness, owing to the further offerings from that quarter.

China has been the chief mainstay of the market,

owing to the demand from the Chinese banks. But the support that has been coming from these institutions is uncertain, and therefore precarious. The banks are by no means keen buyers, and this being so the support they give is not to be greatly relied upon, especially as there is no improvement in the Chinese export trade. Taking a survey of these uncertain elements—viz., speculation in India, uncertain support from China, the American exchange, the little demand from other sources, the possibilities of further offerings from the Continent and the uncertain exports from Mexico—it will be seen that the influences at work now, and which will continue to operate, make the immediate prospect unreliable.

On the other hand, as is pointed out by Messrs. Samuel Montagu in their weekly circular, there should be little risk, of any important set-back in the world-price so long as the United States is a buyer at a dollar the ounce. But the same authorities simultaneously point out that the London quotation will be influenced by the course of the American exchange, a factor of great complexity. Opinions greatly differ in the foreign exchange market with regard to the future of the American exchange and the extent to which it has been affected by the preparations made by France towards the repayment of her portion of the Anglo-French loan, as distinct from the actual trade position between Great Britain and America.

If it is not possible to see into the immediate future, because of the complex influences that affect the silver market, it is not possible to see more distantly ahead. The price will depend upon future supplies, and Mexico is the principal key to this. There may come a time when supplies from Mexico will swamp the market, and should that time come then we may see a low price for the metal again, and a permanent low price. Much, therefore, depends upon Mexico in the years ahead of us, and in the meantime the price will continue to be swayed by unstable and arbitrary factors.—"Financier and Bullionist."

International Mine-Rescue and First-Aid Field Competitions, Ladysmith, B. C.

A Suggestion for Standardized Breathing Apparatus.

The International Mine Rescue and First Aid Field Competitions held yesterday at Ladysmith under the auspices of the Vancouver Island Mine Safety Association was a success in point of attendance and in regard to the keenness of the competitions. It also was outstanding in the class of work done by participants in both forms of contest, it being demonstrated that the coal miners of British Columbia and of the State of Washington are maintaining a high standard of efficiency in the work so necessary for the preservation and protection of the lives of underground workers and of property.

In the Mine Rescue Competition for the championship shield the Newcastle Team, Pacific Coast Coal Mining Co., Ltd., State of Washington, and the Laird Team, Canadian Western Fuel Co., Nanaimo, both made a score of 94 per cent. In the effort to decide the draw between the Newcastle team, Pacific Coast Mining Co., Ltd., Washington, and the Laird Team, Canadian Western Fuel Co., Nanaimo, B. C., for the Pacific Northwest Championship, the contestants again received an equal percentage. This time both went through the work perfectly. The judges were in a quandry in the endeavor to find a way out of the deadlock. Finally it was agreed that the cup shall remain in Nanaimo for six months and go to the other side for the remainder of the year and that each of the competitors of both teams shall receive medals. This is the first time in the recollection of British Columbia coal miners that there has been so close a struggle in Mine Rescue Competition.

There also was a tie for third pace, the Cumberland (Canadian Collieries (D) Lad.) and the Cassidy (Granby Consolidated Mining Smelting and Power Co.) have made a score of 90 per cent. The Ladysmith (C. C. D. Ltd.) and Fernie (Crow's Nest Pass Coal Co. Ltd.) teams were tied for fifth place with 88 per cent. The Carbonado Mine team (S. of W.) had a score of 83.1 while the Michel Team was disqualified. Two of the judges were Messrs. Bagley (Washington Chief Inspector of Mines) and Strachan (Inspector of Mines, Fernie District), while the third was a representative of the U. S. Bureau of Mines.

The First Aid results follow:

Department of Mines Cup: 1, Nanaimo; 2, Cumberland.

Coulson Cup: 1, Cumberland; 2, Cumberland.

Open Competition: 1, Nanaimo; 2, Cumberland.

One Man Event: 1, Wm. Jones, patient, Toman, Newcastle, Wn. 2, Barton, patient, Thompson, Nanaimo.

Two Man Event: 1, Carruthers, Neave and Wilson, Nanaimo. 2, Williams, Taylor and Franescini.

Juvenile Event, Ladysmith.

Called upon to present the prizes Hon. Wm. Sloan commented on the increase of interest in Mine Rescue Work. When he first attended the competitions of a similar nature on the Island the showing was disappointing. With the advent of International Competitions, however, the spirit and earnestness of the participants had become marked and the class of work much improved. The Meets of the past several years, as a result, had been more interesting and that of this year, it would be admitted by all who witnessed it, was gratifying in every respect.

Mine Rescue Work was important both for the safeguarding of life and of property and the high standard of efficiency displayed by the competing teams was a matter for congratulation. So long as the rescue teams were well equipped, and their members were kept in touch with the latest developments in the work, the officers and members of the Vancouver Island Mine Safety Association, as well as of similar British Columbia and Washington State organizations, could take satisfaction in the realization of the performance of an important and necessary duty. Mr. Sloan re-

ferred in congratulatory tearms to the good work of the judges of the Mine Rescue Contest as well as that of the doctors who had come, some of them a considerable distance, to judge the First-Aid Competitions.

Reverting to the Mine Rescue features of the Meet the Minister spoke of the recent improvements in the apparatus in use, referred to the progress constaintly being made in this direction, and commented on the recent accident at the Back Diamond Mine, Pacific Coast Coal Mining Co. Ltd., State of Washington, as having given the work an unfortunate set-back. The Chief Inspector of Mines for British Columbia, Mr. McGregor, had been sent to the scene of the occurrence to investigate and report. He had been courteously received by Mr. Bagley, State Inspector of Mines, and granted every facilitate for the performance of his duty. Those interested in Mine Rescue Work were familiar with Mr. McGregor's report which had been issued in pamphlet form by the Department of Mines. It showed, briefly, that the members of the Rescue Team who had perished had gone underground, and into workings exceptionally dangerous, without an adequate supply of oxygen. The result was that two members of the first team to enter the Mine, both of whom were members of last year's champion team, had succumbed and later one member of the rescuing team from Burnett had lost his life. The members of the two teams had been provided with apparatus which varied as to type and which functioned differently. The disaster was particularly unfortunate because it was absolutely uncalled for, there being no necessity for a team engaged in practice to enter into seriously dangerous surroundings.

The lesson taught by this occurrence was the need for the standardization of mine rescue equipment. Mr. Sloan stated that he had taken this matter up with the Bureau of Mines, Washington D. C. with a view to the securing of joint action towards the adoption of a uniform instrument for the use of Mine Rescue Teams in connection with coal mines on this continent. His suggestion was that there should be a Conference, held either at Washington or at Pittsburg, the latter being the point where the American Mine Rescue Work was centralized, for the discussion of this question. This gathering, no doubt, would be attended by all interested parties both of Canada and the United States and Mr. Sloan felt sure that good results would be obtained. If it were found practicable to adopt a standard apparatus for the two countries it would mean the elimination of the present variety of types, all of which possessed some special merits, and the substitution of something incorporating the best points of all with which the miners in all coal mining fields could and would become familiar. In the event of an emergency, under such circumstances, there would be no question of the knowledge of members of Mine Rescue Team. They would find an apparatus ready for their use with which they were accustomed to work and in which they had confidence.

Personally Mr. Sloan felt keen interest in Mine Rescue Work and he asserted that he had under consideration a policy which would have the effect of rendering further encouragement and stimulus to it in connection with the working mines of this Province.

TORONTO NOTES.

Le Pas Has Great Mining Promise.

Mr. B. A. C. Craig, mining engineer, who has just returned from a tour of the Le Pas country. Northern Manitoba, states that he is confident that from a mining standpoint, the entire district has great promise. "Manitoba has the same, or similar mineral formations that Ontario has," he said, "and has already a partially developed copper area that is much more extensive and much richer than any copper area so far found in Ontario." Large deposits of amber east of the Churchill are owned by Mr. Craig, and his last trip was to investigate the extent and quality of his claims. "I don't anticipate any great output of block amber", he said, "as the deposits do not show much promise in that direction. But it can probably be used for making pressed amber and high class varnish which will withstand heat." What is needed to develop the mining assets of Manitoba is first of all an accurate survey, and in the opinion of Mr. Craig this can best be done by aeroplane photography. The other requirement is technical skill and this will be attracted to the district by the large copper deposits. "When these two essentials are introduced you may look for great and rapid development in the mining industry in Northern Manitoba," said Mr. Craig. "They are sinking on the famous Flin Flon property south of the Hudson Bay Railway right now, and it is showing up enormous quantities of solid sulphite of copper. Diamond drilling has also been done, so that there would be no doubt as to the enormous size of the deposit and they have values in sight now of over $200,000,000. Labor is very scarce in the mining centres there now and every available man is taken on at good wages."

A party of geologists headed by Mr. Cyril Knight and including Messrs. Hill and Pickard of the Haileybury Mining School were in Kirkland Lake over the last week-end, visiting the various properties. The party was favorably impressed with everything in general and showed much interest in the work that is going on in the camp.

GASOLENE CONSUMPTION EXCEEDS PRODUCTION.

U. S. Bureau of Mines report on petroleum for June and six months of 1920 shows operations of 307 refineries in June with daily capacity of 1,601,295 barrels, against 292 refineries and daily capacity of 1,356,355 barrels in December, 1919. Refineries ran at 73 per cent. of rated capacity against 77 per cent. in December. June production of gasolene totalled 415,159,911 gallons while consumption totalled 427,242,862 gallons. Six months gasolene productions was approximately 13 per cent. greater than that for corresponding period of 1919, while consumption for that period totalled 1,845,775,925 gallons, or 28 per cent. greater than six months of last year.

As Herbert Hoover has recently pointed out, a national policy towards mining is a differing and a better thing than nationalization of mines. A National Policy towards coal mining, for example, is what Canada has never had. Nationalization of mines would bring about that stultification of individual effort and associated nepotism that seems inseparable from government control in a country having a popularly elected government.

Core Drilling Inside a Glacier

By A. S. WILLIAMSON *

The Lucky Four Mines, Laidlaw, British Columbia, are situated 16 miles south of the Fraser River at the headwaters of Jones Creek on the Cheam Range. The outcrop that the property was sold on is at an altitude of 5750 feet on a glacier.

I got instructions on the 1st of February, 1919, to take in a Diamond Drill and 20 tons of supplies and start operations.

First we located a trail by blazing through the timber and once above timber line we used small flags. We had two miles of trail above the timber line. Next was the hardest problem, how to make a snow trail that would stand up under horses, as we had 12 inches of snow at the Fraser River, 13 feet at Jones Lake, 2000 feet altitude, and 30 feet at the place we picked out for a camp site—5550 feet up on a ridge.

I had received all kinds of suggestions how to get in. Some said it could not be done. However, I got the trail gang to tramp solid the train in one-hundred-yard sections, then followed up with a light horse and go-devil, the go-devil made entirely of vine-maple with the runners curved towards the center in the front so that it would follow the curves of the trail without cutting into the snow on the sides. The trail was not over 18 inches wide. After two or three trips with the go-devil loaded up to 300 pounds we could load up to 700 or 800 pounds with one horse. We established camps every five miles and got in with our supplies, without any difficulty, to our camp site within one mile of the mine, which was 1000 feet or over above camp on the glacier.

We dug down through thirty feet of snow to bedrock and put down three tents—14x16—with split cedar for floors and four-foot shakes all around for sides—making a very comfortable camp indeed.

The next question was, "How were we going to get the diamond drill with its equipment onto the glacier?" This included three poles for the tripod—23 feet long, gasoline, tools, etc., including a zinc tank 5 x ½ x 3 feet to melt snow in order to get water for the drill, as there was no water on the glacier.

By this time the snow was getting very soft and I found it impossible to make a trail that would hold up horses from the camp to the mine. So we tramped the trail good, switch-backing up over the glacier, then put 14 men on a rope attached to the go-devil and took the drill up in two sections—first the drill portion and then the gasoline engine. Also the supplies and heavier portions by go-devil. The gasoline we back-packed.

While the trail was being built and supplies coming up we were digging on a ridge below the outcrop for a place to put the drill up. This was accomplished by digging out a cut across the ridge five feet wide by 35 feet deep and 50 feet long, afterwards cutting out a space 25 x 25 feet to place the drill in.

After getting the drill set up we made it as comfortable as possible by putting a large tarpaulin over the tripod and machinery, very much like an Indian tepee, heated with oil stoves, which also melted the snow in the big tank.

Work was started drilling with three shifts under fairly comfortable conditions. But after drilling one hole 700 feet we attempted to drill a hole to the right at an angle of 15 degrees to the west of the first hole, but after going 60 feet we ran into glacial ice. Repeating the performance to the east, in 35 feet we ran into ice again.

Now there was no possible place to approach the ore body except at the cost of going down the mountain several hundred feet and putting in holes, the shortest of which would have been 1000 feet. So we decided to try putting the drill into the glacier within two or three hundred feet of the ore body, and cross-cutting it.

In order to find out how deep the ice was and what the bedrock looked like, I drove a tunnel 4 x 6 feet through the ice to bedrock, a distance of 80 feet. Now knowing the thickness of the ice and the slope of the bedrock (about 30 degrees), I started an open cut four feet wide paralleling the tunnel.

After driving 80 feet, bed-rock was struck. There I cut out a place for the drill 22 x 22 feet, leveling off the bedrock in order to give a foundation for the drill. At this point there was 50 feet of solid ice above us on four sides.

Now arose the question of getting the drill up to its new position from its old setup about 400 feet below. We decided that we would make the drill pull itself up over the glacier. So we rigged up a set of blocks and tackles and put in "dead men" every 50 feet in a trench in the ice. Using the carriage on which the drill and gas engine were placed as a sleigh, inside of two hours the whole outfit, drill and engine, was standing on the dump ready to haul up a go-devil loaded with gasoline and later all the supplies from the old location. Once this was accomplished we had the drill and engine pull itself right into the face and in two days we were drilling away in good shape in the most unique location that a drill ever was in.

One of the Provincial Government Engineers, who came up one day after climbing up the glacier, and on going in to see the drill said, "Well, I have seen lots of glaciers, but this is the first time I have ever seen the guts of one."

We drilled over one hundred feet from this position with satisfactory results in drilling, using the Sullivan Class No. 3 ("S") Diamond Drill with an ordinary bit. We did not cut through any ice with our drilling; we were just prospecting. After the work was done we pulled the drill out to the surface of the glacier, greased it thoroughly, covering all with a heavy tarpaulin, where we left it in cold storage until needed elsewhere on the property.—"Iron Mine & Quarry."

* Supt. Lucky Four Mines, 322 6th St. West, North Vancouver, B. C.

TORONTO COAL PRICES.

Toronto, Sept. 15.—Local dealers look for a slight easing off in the hard coal situation owing to the calling off of the vacation strike among the hard coal people in the coal mining districts. It was stated during the week that bituminous coal shipments to Toronto were short a number of expected shipments as a result of the embargo west of Rochester and Pittsburg Railway. This line will be tied up for a few days but shipments will be continued over the other lines. It is expected that as the result of adjustments of labor difficulties in the mining areas coal shipments will be normal in another week. Hard coal is quoted at from $8.00 to $18.00 gross tons at mines, American funds: mine run $14.25 to $14.50 f. o. b. Toronto and smokeless coal $14.50 to $15.00.

NEW TYPE OF LIGHT AIR-DRILL FOR MINE AND QUARRY USE.

The development of pneumatic mining and quarrying tools has been so rapid, and their performance latterly so efficient, that it is but natural they should now be regarded as having reached such a state of perfection that radical changes or improvements are, generally speaking, no longer expected.

Any yet, notwithstanding this popular notion, The Denver Rock Drill Manufacturing Company, which has for quite a number of years been in the forefront or rock drill progress, has recently developed a new type of light mining and quarrying drill which, it is claimed, marks an advance in the progress of air drill manufacture that has seldom, if ever, been equalled by any single achievement.

This new type of drill is built in three models, known respectively as Models NA-90, NRW-93 and NRD-95; the first named being a "dry" Auger Drill, especially designed for work in coal, iron and other soft formations; the second, a combination "wet" and "dry" rock drill efficiently serviceable in all kinds of rock and under all conditions, either above or below ground; and the last named, a "dry" rock drill particularly adapted to work in wet shafts or where out-of-door conditions prevail.

Waugh "90" Drill.

All three drills are extremely light, so that they can be easily carried about, and each is operated by one man alone.

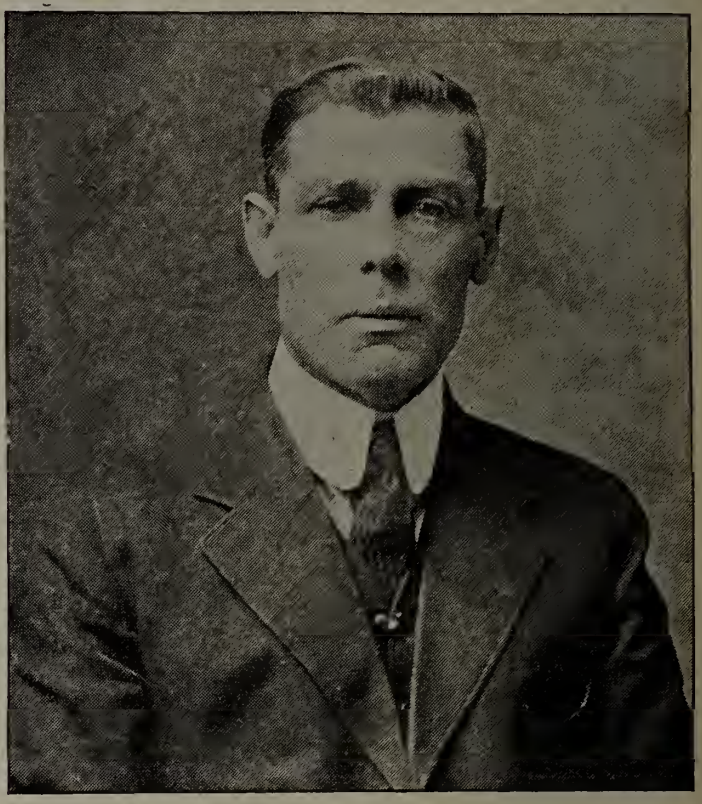
They are built throughout of the very best steels compounded and with the utmost precision.

While most Waugh Drills are of the valveless type, the "Nineties" are equipped with an entirely new type of spool valve, having a positive action, which is said to be the last word in simplicity, and in efficiency as well.

The rotation mechanism is of exceptionally strong design in which stresses in both teeth and pawls are reduced to a minimum.

Lubrication is effected by pulsations of air which gradually feed the oil from a reservoir at the side of the cylinder into all parts of the machine.

The manufacturers state that comparative tests conclusively prove these "Ninety" drills to be much superior, more powerful and more efficient, at all pressures, than other drills of their general type and weight, and express themselves as feeling gratified at being able to make such a substantial contribution to cost reduction and stimulation of production in mining and quarrying at a time when the country stands in greatest need of labor-saving improvements in machinery used in these industries.



MR. P. T. PRENDERGAST.

Assistant District Superintendent, Dominion Coal Company, Glace Bay.

Who read an informative and widely-quoted paper on "Conservation and Drawing of Mine Timber", at the May Meeting of the Mining Society of Nova Scotia.

PRECIOUS STONES IN EGYPT.

According to gossip a company may shortly be formed for the purpose of exploiting an area supposed to be the origin of the famous emeralds so frequently mentioned in Egyptian records. It would appear that in the time of the Pharaohs these stones were fairly plentiful—sufficiently so, in fact, for no specific mention being made as to where they came from. There have been from time to time numerous attempts to solve the mystery, which has been kept alive by some of the gems being occasionally found in possession of wandering Bedouin tribes, identical with the ancient jewels. In was generally supposed that somewhere in the wild desert country west of the Red Sea existed the mines from which the stones were extracted, but the efforts of several expeditions failed to discover the wanted locality. The Government of the time occasionally took a hand in the ventures, and the leading officials were not above joining in the searches, which, however, all proved unsuccessful.

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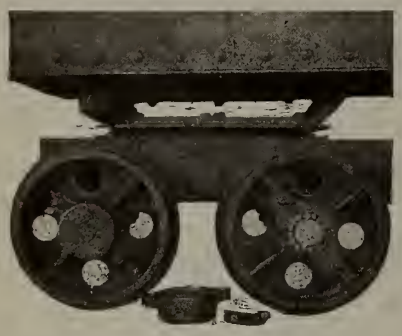

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last had to reluctantly give up the quest. Less authorative expeditions have been formed since then, but it is only within the last few months that something tangible has been reported, a British expedition having been said to have discovered the old workings. They are reported to be in a desolate mountain range, running west of, and parallel to, the Red Sea, between the 24th and 25th degrees north latitude.

The locality shows signs of having at one time been the centre of a huge population of slaves, while the sides of the mountains have been pierced by long tunnels, enlarged here and there into great mining chambers. The workings are said to be big enough to accommodate several hundred miners. To judge from the character of the work and the primitive tools which are scattered about in the vicinity the age of the mines would seem to be about 2,500 years. It is interesting that some of the workings are supported by timber props, which are reported to be still sound and serviceable, due, no doubt, to the dry atmosphere. The indications appear to point to some sudden abandonment of the work, the miners having apparently thrown down their tools and fled. The district is regarded by the scanty wandering tribes as the abode of evil spirits, which may account for the mines having been undisturbed for so many ages.

It is said that the exploring party has found quantities of the gems in a rough state, many being of large size. The stones are reported to be identical with those which have been found on mummies and in the ruins of the ancient cities of Egypt. Further news about the discoveries will be awaited with some interest. That the difficulties connected with transport should not be insurmountable is shown by the signs of a one-time large native population, which must have existed in spite of the scarcity of supplies and water, the latter appearing to have been husbanded in tanks cut in the solid rock.—W.I.L. in "Financier and Bullionist".

Demand for Gypsum Plaster in Cuba

Major H. A. Chisholm, Canadian Government Trade Commissioner in Havana, Cuba, writes as follows:—

"If Canada manufactured sufficient gypsum plaster the Cuban market could consume many times the quantity imported from Canada at the present time, which amounts to some 2,000 or 3,000 barrels a month. It appears that a good real of the building plaster imported into Cuba from the United States is manufactured from gypsum mined in Canada. I should think that Canada has a good opportunity to bnild up a new industry in the manufacture of gypsum building plaster for Latin-American countries."

There shonld be no difficulty in supplying any outside market with either crude or calcined gypsum from Canada, provided shipping facilities were convenient and reasonably priced. Of 304,532 tons of gypsum mines in Canada during 1919 there were calcined 121,499 tons. 148,394 tons of crude gypsum were were quite important imports of gypsum, crude and products were exported to the valne of $140,235. There were quite important import of gypsum, crnde and ground, and of plaster of paris. Canada's ability to produce gypsum and gypsum products of high grade is much larger than any market that has as yet been obtained, and during the cessation of building during the war period many of the gypsum quarries and calcining plants in Canada have been idle, and many are yet.

The Canadian Miners' Buying Directory.

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Canada Carbide Company, Ltd.
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Prest-O-Lite Co. of Canada, Ltd.

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Spielman Agencies, Regd.
Aluminium:

Amalgamators:
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Mine and Smelter Supply Co.
Wabi Iron Works.

Antimony:
Canada Metal Co.
Antimonial Lead:
Pennsylvania Smelting Co.
Arrester, Locomotive Spark:
Hendrick Manufacturing Co.
Arsenic White Lead:
Conlagas Reduction Co.
Assayers' and Chemists' Supplies:
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Lymans, Limited
Mine & Smelter Supply Co.
Pennsylvania Smelting Co.
Stanley, W. F. & Co., Ltd.
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Canadian Link-Belt Company
Ashes Handling Machinery:
Canadian Mead-Morrison Co., Limited
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Canada Metal Co.
Canadian Fairbanks-Morse Co., Ltd.
Hoyt Metal Co.
Ball Mill Feeders:
Fraser & Chalmers of Canada, Ltd.
Hardinge Conical Mill Co.
Hull Iron & Steel Foundries, Ltd.
Ball Mill Linings:
Hardinge Conical Mill Co.
Hull Iron & Steel Foundries, Ltd.
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Canadian Link-Belt Co., Ltd.
The Mine & Smelter Supply Co.
Northern Canada Supply Co.
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Belting:
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Hans Renold of Canada, Limited, Montreal, Que.
Jones & Glassco (Regd.)
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Belting (Elevator):
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Bluestone:
The Consolidated Mining & Smelting Co
Blowers:
Canadian Fairbanks-Morse Co., Ltd.
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Fraser & Chalmers of Canada, Ltd.
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Marsh Engineering Works
MacGovern & Co., Inc.
R. T. Gilman & Co.
Fraser & Chalmers of Canada, Ltd.
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:-: EDITORIAL :-:

Increased Gold Production in Canada a Clear Necessity

The memorandum on "The World's Monetary Problems", prepared by Professor Cassel of Stockholm for the Brussels Conference, now in session, contains matter that is of much interest to the gold mining industry of Canada.

Professor Cassel's main conclusions seem to be two in number, namely, (a) that it is to the common interest of the world to prevent gold from rising again in value, and, (b) that a greater production of gold is required from the mines of the world.

From the viewpoint of the gold miner, these conclusions will occasion some mental perplexity, as they seem irreconcileable in practice.

From the European standpoint, Professor Cassel bluntly states that it is to the interest of all other countries that the United States should not enter on any policy effectively raising the internal value of the dollar, but he thinks it is necessary that one country should take the lead in stabilizing exchanges by fixing the internal value of its money, and this country he believes should be the United States.

The present low value of gold is ascribed to a diminished demand for gold for monetary purposes, due to a general abandonment of gold circulation and the substitution of paper certificates. Withdrawal of gold from circulation, and the disappearance of all definite standards of gold-cover have seriously impaired the value of gold, and if it is to be used henceforth as a monetary standard, special measures to ensure its stabilization are required. Regarding this, Professor Cassel says:

> "Stabilization of gold involves, however, "special difficulties in connection with its pro- "duction. If we have a stabilized demand "for gold, we must have an annual produc- "tion corresponding to the general rate of "economic progress and sufficient to cover the "yearly waste of gold. Assuming the same "progress in the years before us as during "1850—1910, we should need at present an "annual production of about £100,000,000, "increasing 2.8 per cent. annually. The total "for the World in 1919 is estimated to be not "more than £75,000,000.
>
> "As necessary annual production would, "under the assumed rate, in 10 years be £132,- "000,000 and in 20 years £174,000,00, danger "of a quite insufficient supply of gold is much "more imminent than generally recognized."

The increase in the use of gold in the arts, and for articles of luxury is noted, two developments that threaten to absorb a large part of the diminished annual production. Measures to check the industrial uses of gold are suggested, and it is pointed out that the demand for gold from the Far East should be checked by developing Asia's needs for European manufactures.

The insufficiency of the future supply of new gold impresses Professor Cassel to the extent that he proposes measures "not only to prevent monetary de- "mand for gold from resuming its old dimensions", but also a regulation of the consumption of gold as currency, "with a view to reducing it gradually, as growing scarcity of the supply may require."

Most people find it difficult to form a clear idea of the influence of the gold supply upon commodity prices, and we confess to a similar inability, believing that physical shortage of commodities plays a much greater part than the available quantity of the purchasing medium, but it seems clear that economists fear a runaway demand for new gold (should the process of re-establishing the gold standard be unduly hurried) and an upsetting enhancement of the value of new gold.

In Canada, we are chiefly interested in restoring the parity of our dollar exchange with the United States. According to Professor Cassel's reasoning we shall suffer if the United States raises the internal purchasing value of its dollar. This appears to be now happening. To offset this, we have mines that can produce much more gold than they have as yet put out, provided labor is available, and, in view of the prospect that the demand for gold will become more and more insistent, it is to be hoped that our Government will assist by every possible means the augmentation of our gold output.

STANDARDIZED OXYGEN BREATHING APPARATUS.

In suggesting a conference upon the desirability of joint action to secure reliability and uniformity in self-contained oxygen breathing-aparatus, the Minister of Mines for British Columbia has expressed a very general desire among mining men both in America and in Europe. Mr. Sloan advocates the calling of a conference, either at Pittsburgh or Washington, to discuss the possibility of devising an apparatus that could be officially adopted as a standard for coal mines in North America. The United States Bureau of Mines has developed such a type of apparatus, actuated by a desire to incorporate the best ideas, and to eliminate the defects, existing in the patented devices on the market. The time would seem to be opportune for agreement upon a standardized type in the western collieries, where the interchange of international courtesies and co-operative effort in first-aid and mine-rescue movements are much more marked than is the case in the East. In Nova Scotia, it is probable that a European type of apparatus will find most favor, but the keen interest of the western men in first-aid and mine-rescue equipment does not pass unnoticed in the East. Many extraneous and irrelevant matters have been introduced into the choice of oxygen breathing apparatus, and it would be pleasing to see the discussion confined to the ability of any given type to support life in irrespirable atmospheres and to enable men to perform physical work when wearing the apparatus in question. We take it this is what Mr. Sloan desires.

THE "O.B.U." IN THE ALBERTA COAL MINES.

An intimation comes from Ottawa that a strike of coal miners in Alberta, and possibly also in British Columbia, is to be called by the O.B.U. "This is the first time," says the "Ottawa Journal,", "that the O.B.U. officials have called a strike openly, and for their own principles."

If it should be that the O.B.U. has called a strike based on political rather than on industrial questions, it will, as was the case in Britain, be foredoomed to failure from the beginning.

The O. B. U. holds that political and industrial questions are one and indivisible, as did Mr. Smillie, but they will probably be taught that strict differentiation between the use of the vote and the use of industrial combinations—whether of men or employers—is one of the main characteristics that has been developed in British ideals of citizenship by our long political evolution. The British people happen to have straightened out their "King and Governor" at a time when the descendants of those from whom some people borrow their political ideals were unlettered savages, and they also happen to have started—either at home or abroad— most of the movements that have led to political freedom.

The adoption of the "closed shop" in the western coalfields, under the direction of the Government, was a step, that, as this periodical has previously stated, may be condoned on the ground of expediency, but is quite indefensible on the ground of principle. Presumably the justification is that the O. B. U. was propagating its communistic doctrine by "boring from within." There need be little trepidation on the part of the Government as to the success which the O.B.U. will meet if it dares to put its theories to an open test by direct action.

The aim of the O.B.U. was well expounded by one of its chief missionaries in Winnipeg recently, who stated: "The O.B.U. is not a national organization. That is absurd. An organization of the working classes cannot be national". Those who regard themselves as Canadians first and foremost will conclude: "Those who are not with us are against us", and will be shy of any organization that makes its first plank the negation of nationality.

It will, at the same time, be a thousand pities if even an abortive attempt of extremists should affect the coal output of the West at this time. Alberta has once again the prospect of leading the provinces in coal production in 1920, and the prospects of permanence in the western coal trade were never so good as just now. Time and time again has Alberta been be-devilled by labor troubles in its coal-mines, which have most definitely reacted to put the Province a long way behind where it should have been in coal output at this date. As we noted in a recent issue, rarely have the government, the universities and the distributors of coal worked together with such unanimity and such prospects of reward as in Alberta, but their efforts have been deliberately annulled by the miners.

CONDITIONS AT NOVA SCOTIA COLLIERIES.

As was noted in the last issue, the Report of the Royal Commission on coal mining operations in Nova Scotia and New Brunswick was constructive in two important points, namely, the recommendation that joint conciliation boards be appointed to adjust labor questions as they arose, and that a sliding scale of increases in wages should be adopted based upon production.

It may be noted that the formation of joint conciliation boards, after the great coal strike of 1893 in Britain, enabled the peace to be kept in coal mining circles for nearly 20 years.

It is also significant that the Royal Commission anticipated the British Government by their recommendation that new wage increases should be based upon production. There seems every likelihood that a solution of the present difficulty in Britain may be found in just such a sliding scale as the Nova Scotia Royal Commission has recommended. The coincidence would indicate that the reasoning of the Nova Scotia Com-

mission was sound. It is therefore regrettable to learn that the United Mine Workers in Nova Scotia, through their locals, are voting against the acceptance of the findings of the Commission chiefly on the score of the two main recommendations above referred to. It is urged that the establishment of the "adjustment board" would limit the powers of the union leaders, and would institute compulsory arbitration, against which the unions are pledged. It is further urged that increase of production is not possible, and that further decrease of production may be anticipated, which, under a sliding scale, would result in a reduction of existing rates of wages.

It is apparent that the unions are not disposed to be helpful in the matter of increased production, and that they do not realize the fundamentally insecure position of an industry which shows simultaneously a forty percent. decrease in production and a greatly increased overhead charge. Neither do the unions appear to comprehend that by discouraging maximum production at this time, when world coal shortage has created panic values for coal, an opportunity to accumulate the capital required for future development of the coal industry is being thrown away.

There is one phase of the coal production question in Nova Scotia that the unions can assist only in part, namely, the replacement of the miners lost to the industry through causes connected with the war, but even in this respect the policy of the union is to discourage rather than to welcome the bringing in of new men from the outside, or to bring about the transference of former miners from the non-producing classes to the coal face.

We surmise that the Commission favored a sliding scale based upon production, not because they found fault with the daily per capita production of the miners employed at the coal face, but because they found the working forces were unbalanced as between producers and non-producers. The Commission doubtless also realized that successive increases to day-paid men created less and less desire among these men to return to work at the coal face, and wished to make the actual miners interested parties in bringing about the transference of men from day-paid positions where they are not wanted—to work at the coal face—where they are very badly needed. We would place the numerical shortage of coal-face workers at approximately the same percentage of the pre-war total force of employees as is borne by the present output to that of pre-war times. That is to say, the decline in coal production as compared with pre-war days is in direct proportion to the numerical shortage of face workers similarly compared.

It is evident that the capacity of the coal operators in Nova Scotia to pay increased wages would be much greater if they were at this time able to market forty percent more coal than is actually the case. The establishments of the coal companies, in every material instance, could produce, raise, handle, transport and market, forty percent more coal without adding an additional man, **if the number of face workers were increased to pre-war numbers.** In discouraging a re-establishment of the balance of working forces, the union in Nova Scotia is damaging no interest more severely than its own.

PIONEERS AND "SKY PILOTS".

Although we have been accused of indulging too freely in the foolishness of preaching, the columns of the "Canadian Mining Journal" have not often included the remarks of a Bishop with the excellences of the mining pioneer as his text.

The presence of Bishop Stringer at a Discovery Day celebration at Dawson coincident with the arrival of the first aviators to alight in the Yukon was the occasion of an eloquent tribute to the pioneer of the past, and to his worthy descendants of our own not degenerate age, that makes good reading even at a distance. Bishop Stringer fittingly said he represented "a succession of pioneers older than any other con-"tinuous institution in the country". Among the pioneers of Canadian exploration no men have made an earlier or a better mark than the missionaries of the churches, and mining camps—which as a rule mark the frontiers of civilization—have been made better and more habitable places by the labors of men of religion. The spirit that drives the pioneer outwards and northwards is not exclusively the desire of material gain. That instinct plays its part, doubtless, but the prospector and the pioneer are brothers of a craft that are lured by the "sound of the wind on the heath". The result of solitude and of living in the open spaces of the world leads to introspection, and the self-discovery that "there is a spirit in man," which perhaps explains why the pioneer finds himself in closer accord with a bishop than is the case with those who sometimes follow him.

COBALT AND NICKEL IN THE PEAK OF DERBYSHIRE.

The "Financier" of London contains an announcement from Mr. C. S. Garnett, of Sheffield University, of the discovery of manganese in the Peak of Derbyshire in sufficient quantity to be of much importance to the steel industry of Sheffield.

Mr. Garnett names six minerals he has identified in the Peak District that have not previously been known to exist there, namely Cobalt, diabantite, nephrite, cimolite, utahite (?) native sulphur and allophane.

The occurrence of cobalt is interesting, as it is associated with nickel ore. With the exception of the manganese deposit, it does not appear that any of the minerals newly noted exist in commercial quantities. From a scientific point of view, the occurrence of the minerals identified by Mr. Garnett add to the already great interest of the Peak District to the geologist.

Utilization of Ontario Iron Ores

A New Metallizing Furnace Which Gives a Hot Product Easily Finished in the Electric Furnace.

BY REGINALD E. HORE.

The recently issued report on the production of metals in Ontario in the first half of this year contains much information that is pleasing and some that is not. The Ontario Bureau of Mines has collected statistics which show that the production was larger than in the corresponding period of last year. That it was not still greater was due not to lack of ore, but rather to lack of ability to mine and treat the ore on the scale that the operators hoped. Shortage of labour prevented the producing of the amount of gold that our mines should produce. A dull market for nickel and copper kept Sudbury's great industry from making a better showing. The high price obtained for silver materially benefitted the Cobalt silver mining industry.

It is comforting to note, however, that the foundations for great industries are well laid at Sudbury and Porcupine. Splendid ore bodies have been developed and well equipped for production. The nickel and gold and silver industries will add very materially to the wealth of the Province during the coming years.

But when we read the report on production of iron ore in Ontario, we find little ground for satisfaction with what is being done now or planned for the immediate future. Of the 653,137 tons of iron ore charged to furnaces during the six month period, only 58,387 tons was of domestic origin. Over 90% of the iron used was imported.

There is known to be a large quantity of iron ore in Ontario. It is equally well known that under present conditions it is not profitable to mine much of it. Many of the deposits are small. Others are not of a grade which permits competition with ore from the Lake Superior States. To utilize our ores we must find some method of treatment that can be so advantageously used in Ontario that the shortcomings of the ore deposits may be offset.

Our fuel supply is not such as to give us any help in this problem. We have, however, water powers which might be utilized to such advantage that a real iron mining industry and a larger iron and steel manufacturing industry might result.

How can we utilize our waterpowers to make a profitable mining industry in Ontario? Obviously the mere substitution of electrically generated heat for carbon burning will not get us anywhere. We must get some better process than the ones in use. A process is needed which will more adequately take advantage of the greater facilities for controlling heat derived electrically.

This problem has attracted many investigators. Their work during recent years has been especially appreciated by those who wanted small furnaces for melting purposes. The bigger enterprise, that of making steel from the ore, is now receiving more attention. That this problem has now been solved, there seems good reason for belief. It now remains to be demonstrated.

The Canadian who has devised a process for the economical utilization of Ontario iron ores is Mr. Jas. W. Moffatt of Toronto, a metallurgist who has been carrying on investigations to this end for several years. He has worked out the process and designed the furnaces. I have obtained from him for the readers of the "Mining Journal" some description of the furnaces and the process. Later I hope he will tell the story himself and go more into the details. In the meantime this article may serve to indicate that the utilization of Ontario iron ores in the near future is not so unlikely as it has seemed. Mr. Moffatt's work gives us some substantial ground for hopes, for he seems to have devised a process and designed furnaces that will make the electric furnace a bigger factor in steel making. I write not as a steel maker, for I never made any, but as one who has learned with interest of the results of the investigator's work. It seems to me that he has accomplished something worth while and I believe readers of the "Journal" will be interested in the work, because of the impetus it may give to our iron industry.

The Process.

The process used is to reduce the iron ore in a metallizing furnace and then without contact with the air and while still hot transfer it quickly to an electric furnace and finish it there. Mr. Moffatt has designed furnaces especially for this work. The accompanying diagrams show the reducing or metallizing furnace. Here the ore is deprived of its oxygen at a relatively low temperature and without fusion. The method of operation is briefly as follows:

Pulverized ore is charged to the retort (5) through hoppers (1) fitted with air tight valves. Pulverized coal or coke for the reduction and subsequent electric furnace work is charged through hoppers (3). The rabblers (7) lift the ore particles and expose them many times to the reducing gas. The metallized product or sponge then falls down on an air-tight conveyer (21) which delivers it hot to the electric furnace.

It will in most cases be necessary to crush the ore to pass 10 mesh. If the ore is porous, however, 5 mesh may suffice. Ores of low iron content must be pulverized until the metallic particles are well separated from the gangue and grinding to pass 100 mesh screen may in some cases be advisable. Magnetic concentration will advantageously be used with some ores. Such concentrates will be ready for the furnace without sintering or briquetting.

To prevent any agglomeration taking place in the furnace and to obtain uniformity of temperature throughout the charge, the mechanical rabbling is kept up continuously from the beginning of the charging to the very end of the discharge. The whole charge is completely reduced and the proper carbon contents obtained before any is discharged.

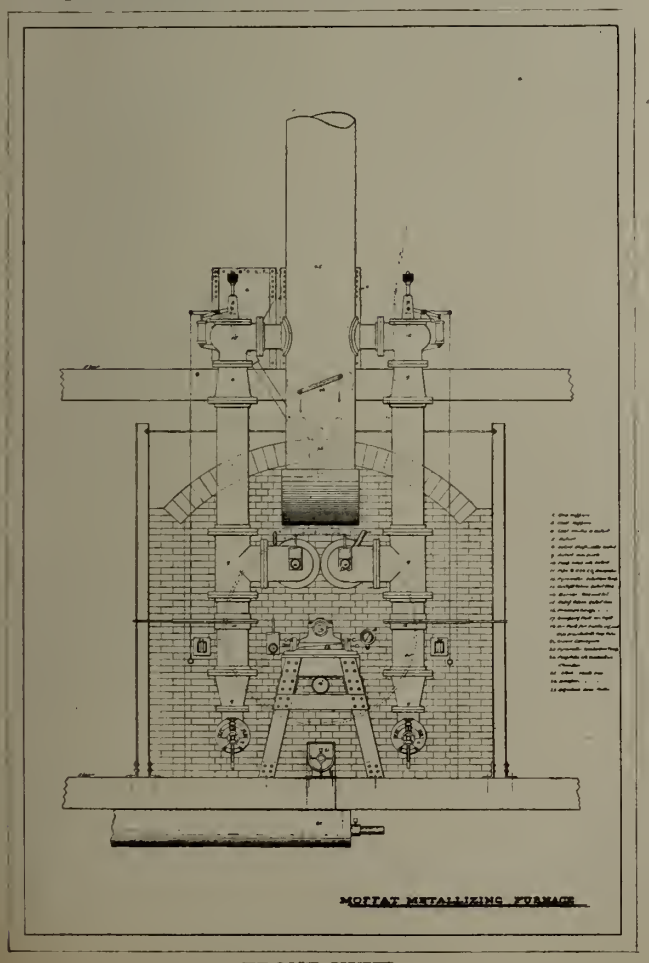
Most of the heat required is supplied by waste gases. These products are burned outside the retort. The use of much expensive electric energy is thus avoided and at the same time the desired atmosphere in the retort is obtained.

When, near the end of the reduction process the supply of waste gas from the retort runs low, other gas or fuel oil is fed into the outer combustion chamber and the temperature thus maintained. Gas, fuel oil or coal can be utilized as the source of heat at this stage of the process. It is essential that the gases used for the desired chemical reactions and for heat production should be kept apart and this is effectually accomplished.

The perfect control over the metallizing of the oxides makes possible the production of various metals and alloys from their oxides. Nickel and cobalt can be made in these furnaces and the making of nickel steel in Canada from Canadian ores is one of the interesting possibilities.

Operation of the Furnace.

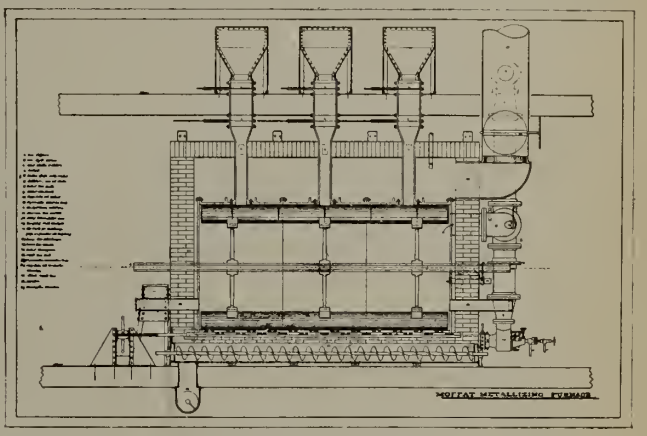
In operating the metallizing furnace there will be used an amount of carbon equal to about one third of the weight of the iron in the ore. The charge of ore is preheated in the retort to 250° or 300°C. The carbon is then added in a continuous stream with complete exclusion of air. The retort gives off some gas and the volume increases as the charge warms up. At temperatures between 400° and 500°C the gas is given off most rapidly. The excess carbon, over that required for reduction of the iron oxide, provides a flow of gas richer in carbon monoxide than would be given off otherwise. The furnace operator by reading the retort pyrometer and the gas recorder and consulting his chart is able to accurately regulate conditions in the retort. Towards the end of the operation samples of the charge are taken and analyzed and the carbon feed and temperature regulated accordingly. The thorough mixing of the charge by continuous rabbling permits accurate sampling and the operator has thus the information that will enable him to produce the desired result.



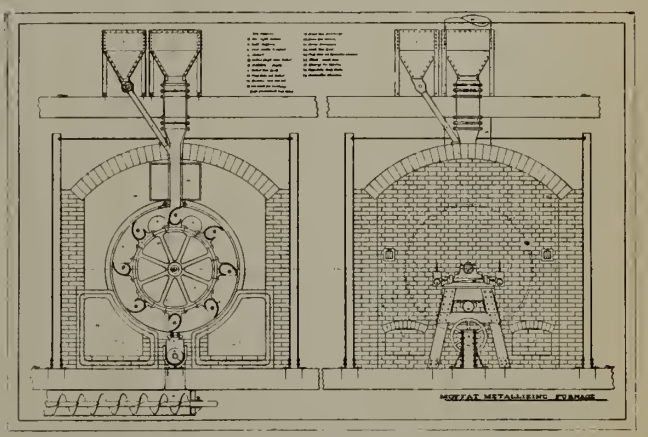
FRONT VIEW

Lime for fluxing is preheated to 250° or 300°C and charged to the metallizing furnace a short time before the sponge is finished, so that it may be heated to the same temperature as the sponge.

The furnace show in the accompanying drawings is designed to handle a charge of two tons of ore each heat; ore enough to make one ton of metal. Three such furnaces supply the charge for a three-ton electric furnace. The transfer takes only about ten minutes. The electric furnace starts work with a sponge already heated to 600° or 700°C. The time and the additional heat required in the electric furnace is very much less than for a charge of cold scrap.



LONGTIDUNAL SECTION



REAR VIEW AND END SECTION SHOWING RABBLING DEVICE

The electric furnace is thus used where it is especially advantageous — for the high temperature work. In the lower temperature work full advantage is taken of the heat to be obtained in burning the combustion gases. The complete operation of producing steel from ore is affected at low cost and in small plant-units. The cumbrous and costly blast furnace becomes unnecessary. Full use is made of instruments of precision and complete control of the charge is maintained at all stages.

The electric furnace is thus made more suitable for steel making by preparing for it a charge which it is peculiarly well qualified to handle. A reducing furnace specially suited for the making of the iron sponge has been designed. Mr. Moffatt has also designed an improved electric furnace and is working on plans for a complete plant for the production of steel from such ores as we have in Canada.

CANADA AS A PRODUCER OF IRON ORE.—THE INFLUENCE OF COAL LOCATION.

(Bulletin of the C. I. M. & M.)

Perhaps the most important topic discussed at the meeting of the Ontario Mining Association, which was held at Sudbury during the past month, was the deplorable position of Canada as a producer of iron ore, and the status of the domestic iron and steel industry generally. The consensus of expressed opinion was that Government assistance in the beneficiating of Ontario ores to smelter grade is, in principle, highly desirable, and the belief was further expressed that it is commercially practicable to use coal from Alberta in smelting these ores. The outcome of the discussion was the appointment of a committee to present the views of the mining industry of Ontario before the Government Commission now investigating the possibilities of the iron ore industry.

As to the desirability of possessing and building up a vigorous domestic iron and steel industry there is no room for argument. One has only to consider the leading nations of the world to find what a very intimate connection there is between the production of iron and steel and national growth and prosperity. Indeed, the one is practically a measure of the other. This is no less true in the case of Canada, and for years the iron and steel industry has been our leading manufacturing industry. Our position would be entirely satisfactory, were it not for two disturbing factors: practically all the iron ore, and a very large proportion of the coal, used in making our iron and steel is imported; and moreover, the production falls far short of our requirements. To put the case more concretely, iron ore and iron and steel products to the value of one hundred and eighty-six million dollars were imported into Canada during 1918. In the light of the figures there would appear to be a very good *primâ facie case* for urging the Government to give material assistance to the development of our own iron ore resources. But one must not lose sight of the fact that an iron and steel industry can not be built up on iron ore alone. A plentiful and assured supply of cheap fuel is essential. Examining the position in Ontario we find there is no coal, and, so far as is known, there are no large high-grade deposits of iron ore—practically all the ore now being raised in the province requires beneficiation. This indeed constitutes one of the reasons for urging Government assistance, in order that the domestic product may compete more favourably with imported ore. The development of the iron mining industry everywhere in Canada is most desirable. But even granting that a bounty might have the effect of encouraging the development of Ontario's iron fields to such an extent that the furnaces could be fed entirely or mainly with Ontario ore, we would still be very far from having a purely domestic and independent iron and steel industry in Ontario. The suspension or cutting off of fuel supplies would be just as serious under such conditions as it would be today.

In this connection, therefore, it is of interest to note that the Ontario Mining Association placed on record their belief that the use of Alberta coal is commercially practicable. It would be interesting to have the data on which this belief is based. If it is well founded, might it not be argued that, if only Ontario ore and Alberta coal were in question, the ore would be sent to the coal, and not *vice versa*. This at least is a fairly general economic rule, and if it applies in this case we arrive at the curious conclusion that the Ontario steel industry must either disappear, or must continue to rely, as at present, on foreign ore and foreign coal. In other words, it would indicate that, if a large tonnage of iron ore can be developed and produced in Ontario, with or without Government assistance, and if our aim is to establish and build up a really independent Canadian iron and steel industry in central or mid-western Canada, the logical centre for such an industry is in the coal fields of Alberta. However this may be, it in no way affects the general principle as to the desirability or probable effectiveness of the policy of bonusing the production of Canadian iron ores.

TORONTO NOTES.

The Challenger Gold Mining Company, Limited, has been organized and granted incorporation by the Ontario Government, the provisional directors being G. M. Webster, H. P. Rickard and Alexander Miller of Toronto. The capital stock is placed at $110.000. Another company to be granted a charter by the Ontario Government is the Canadian Casey Cobalt Company, Limited, with a capital stock of $245,000, the provisional directors being W. W. Perry, C. H. C. Leggott and Edna Fitzsimons, of Toronto.

Another incorporation is the North Country Exploration and Mining Company, Limited, with Montreal incorporators, and a capital stock of one million dollars and head office at Montreal. A company promoted in Ontario is the Ellicott Mining Company, Limited, with head office at Niagara Falls and a capital stock of $250,000.

Corroboration of the reported gradual improvement in the labor situation as well as in mining conditions throughout the camps of Northern Ontario was given this week by Mr. Frank L. Culver, President of the Beaver Consolidated and Kirkland Lake Gold Mines, on his return from Cobalt and Kirkland Lake where he spent a week on one of his regular tours of inspection. "I was very agreeably surprised upon my trip," he said, "to find a material increase in the ranks of labor, and was also informed that a large number of miners who had left the camp in the early part of the year, drifting into the automobile and shipbuilding centres, are now returning, and seem exceedingly glad to get back at their old jobs in the mines. With such an improved front mining results will soon be found to far exceed those of any time since the Fall of 1914."

Prof. Stanley N. Graham, who has been engaged in geological examinations in British Columbia during the Summer, has been appointed Professor of Mining Engineering at Queen's University, Kingston, succeeding the late Prof. Gwillim.

Mr. H. W. Welsh, former Manager in Sherbrooke, Que., for the E. & T. Fairbanks & Co. Limited, and latterly Manager of the Scale Department of the Canadian Fairbanks Morse Co. Limited, Montreal, Que., has joined the organization of the MacKinnon Steel Co. Limited, Sherbrooke, Que., as Manager, and has already assumed his duties.

NOTE ON OCCURENCE OF TETRAHEDRITE IN EAST KOOTENAY DISTRICT, BRITISH COLUMBIA

Some notes on Tetrahedrite or Grey-Copper-Ore have been published by William Thomlinson, of New Denver, B. C. They have special reference to the ores of East Kootenay and are of special interest to prospectors.

He says:

Of the various minerals which the prospectors and miners of the Kooteneys are daily coming into contact with, the mineral Tetrahedrite or Grey-Copper, appears to be, in many cases, the least understood.

Most of the men referred to are quite aware that for some reason grey-copper-ores are very variable, especially as to silver contents; but few persons appear to know that the mineral has such a variable and wide range in its composition.

Tetrahedrite, or grey-copper, being, I believe, the principal silverbearing mineral found in Kootenay ores, the following notes are given with the aim to benefit our local miners and others who may desire to have a fuller knowledge of the mineral, its varieties, variations in composition, and its usual modes of occurrence.

Sometimes is Rich in Silver.

Tetrahedrite or grey-copper, in all its varieties, is known to most prospectors and miners simply as "grey-copper," but to some persons it is still known by the old German name of Fahl-erz (grey ore), and in recent books on mineralogy the silver-rich variety, such as occurs so frequently in this district, is called by the special name of Freibergite; while a somewhat rare variety, in which arsenic supercedes antimony, is known as Tennantite.

Unlike, most minerals, which have definite or exact chemical expositions, the so-called grey-copper-ores have a wide range in their make-up, and may, I think, be considered more as mixtures of various elements than as definite minerals.

Recent authorities on the subject state that the following elements have been found, in varying amounts, in the several varieties of tetrahedrite, viz.—copper, silver, antimony, arsenic, sulphur, iron, zinc, lead and even mercury.

Apparently as a starting point, mineralogists have given to tetrahedrite proper the formula or composition of (by atomic weights), copper, 8 parts, antimony, 2 parts, and sulphur, 7 parts, omitting the silver and other elements entirely. This formula, for tetrahedrite proper, gives a composition of about, Copper, 52 per cent., antimony, 25 per cent, and sulphur, 23 per cent.

Tetrahedrite, when found of this or nearly of this composition, usually takes the form of four-sided crystals known as tetrahedrons, hence the name tetrahedrite.

Kootenay Ores are Generally Massive.

Now, having obtained a starting point, I shall try to show where some of the many variations come in; but, as a preliminary, may here state that the crystallized variety, composed entirely of copper, antimony and sulphur, is rarely, if ever, met with by the prospectors of miners of this part of British Columbia.

The grey-copper-ores found in the Kootenays are generally found massive, compact, or without any crystalline structure, and occuring as films, veinlets, bunches, masses, or as finely disseminated particles; associated with the local ores containing galena, zinc-blende, chalcopyrite, pyrite and other minerals.

In the grey-copper found associated with Kootenay ores, much of the copper content of the mineral is apparently replaced by varying but considerable amounts of silver, therefore, this variety of grey-copper may properly be classified as freibergite.

In Kootenay ores, showing grey-copper, the silver contents may range anywhere between 50 ounces and 5,000 ounces of silver a ton of ore, according to the amount of richness of the grey-copper in the ore.

According to Dana, an examination of a large number of specimens of tetrahedrite showed that the various elements composing the same ranged in amounts about as follows, viz.—

Copper from 14 to over 40 per cent; silver from a trace to over 30 per cent; zinc from none to over 7 per cent; iron from 0.05 to over 8 per cent. Sulphur varied greatly and antimony and arsenic generally replaced each other in part or altogether.

Although high percentages of copper may be found in specimens of tetrahedrite, the mineral is seldom classed as an ore of copper; it is generally more valuable as a silver-bearing mineral, especially in the ores found in the mining camps of this district.

Grey-copper alters readily when exposed to air and water or to vein solutions, forming secondary minerals such as the green and the blue carbonates of copper and the blackish powdery oxides and other mixtures found in the oxidized portions of veins.

Some miners, not understanding these secondary minerals, call the copper carbonates "bromides" and "chlorides" of silver, and the black powdery material is often referred to as the "sulphides" or "sulphates" of silver.

May be Mistaken for Other Minerals.

The compact or massive variety of grey-copper may be mistaken for arsenical iron or arsenopyrite; for copper-glance or chalcocite; or for brittle silver or stephanite.

However, arsenopyrite is much harder than tetrahedrite and it also gives strong reactions for arsenic and iron.

Chalcocite is softer than tetrahedrite and being less brittle cuts more smoothly, besides it does not give reactions for antimony, arsenic or silver.

Stephanite does not react for copper or arsenic.

Gives Guides to Recognition.

The following hints may aid in the recognition of grey-copper-ores when met with:

The crystalline variety, tetrahedrite proper, takes the form of four-sided crystals, known as tetrahedrons.

The silver-bearing varieties, frebergites, such as are found in the Kootenays, are usually compact, massive, or granular; although altered forms may be met with having a powdery or even earthy appearance.

The mineral is from 3 to 4 hardness and is somewhat brittle.

The color ranges from light grey to dark grey, and in rare cases to iron-black; the streak or powdered mineral being usually of the same color as the crude mineral, but a certain rare variety may give it a reddish-brown streak.

A test piece, before the blow-pipe, pops or breaks up but the mineral powdered and slightly roasted fuses easily, giving off fumes of arsenic, sulphur, etc., and

in most cases, gives a bead of metallic copper or copper and silver.

Simple chemical tests may be made as follows:

Powder the mineral and dissolve it in warm nitric acid. Take half of this solution ,and add some ammonia, when, in the case of a grey copper ore, you will obtain the blue color, indicating the presence of copper.

Il you put a clean knife-blade or clean iron nail into the blue solution, metallic copper will be precipated onto the blade or nail.

To the other half of the original solution add some hydrochloric acid (muriatic acid) or a little common table salt (sodium chloride) when in the case of silver-rich grey copper or freibergite, a cloudy curdy mass of whitish grey chloride of silver will be precipitated. This can be collected, washed, dried and reduced to metallic silver before the blow-pipe or otherwise.

Advises Determination by Fire Assay.

However, in conclusion, it may be well to emphasize the fact that the silver content of grey-copper-ore may vary greatly in the different mining camps or districts and vary considerably, even in the different mines of a camp; therefore before making a decision regarding the silver content of any sample or specimen of tetrahedrite or grey-copper-ore, be sure to allow a reliable assayer to first determine the amount of silver by cupellation or fire assay.

NOTES FROM THE NOVA SCOTIA COLLIERIES.

New Collieries.

Preparations are being made by a number of interests in Cape Breton to increase the capacity of the coal areas for output, and much capital expenditure is projected.

The most extensively worked coal seam in the Sydney Field is the Phalen Seam, underlying which is a seam of good quality averaging about 4 ft. 6 ins., in thickness known as the Emery Seam. This seam has been opened at three points, namely at the Dominion collieries Nos. 10 and 11, and a new colliery No. 24. The territory of Emery Seam tributary to these collieries approximates respectively to the worked out territory of the Phalen Seam above at the older collieries Nos. 5, 3 and 4 (Reserve and Caledonia areas). It is now proposed to tap the Emery underlying the Phalen workings in Nos. 1 and 2 collieries, which will eventually mean the mining of the Emery Seam under the entire land area of the Glace Bay District, and its ultimate extension to undersea areas, following the history of the three exhausted seams above, to wit, in order of occurrence, the Hub, Harbor and Phalen Seams.

The percentage of Emery Seam in the production of the Glace Bay District is now around twelve per cent, but with the new openings projected, it may be anticipated that this percentage will rapidly increase. The Emery coal is a strong coal, with a light-colored flocculent ash, and is easily washed. It has been largely used for metallurgical purposes, and is in much favor as a locomotive and bunker coal. It will give up to 14,000 b.t.u's.

The Dominion Coal Company has entered upon a programme to develop what has always been its largest and most stable coal asset, namely, the large virgin areas of coal underlying the Phalen Seam. As the seams in the Glace Bay district crop concentrically, the seams increase in content under the land area as they are tapped at lower depths, and it is important to note that under the Emery there is known to exist at least three workable seams, each having a larger land extension than the seams lying above.

A feature that favors the development of the lower seams is that the surface equipment and housing accomodation which has served the upper seam collieries is available for working the lower seams, in large part.

A similar succession of lower seams is to be found in the Waterford District, where as yet, only two upper seams have been worked to any extent.

In the Morien District, there is at least one, and probably two seams underlying the two collieries now working. The coal in this rather small field in the underlying seams is of good quality, very accessible, and capable of being worked relatively cheaply for that reason.

An unconfirmed report states that the English directors of the Cape Breton Coal Iron & Railway Co., which owns the Broughton Colliery in the Morien Basin of the Sydney Field, contemplate resumption of mining operations.

It is understood the Dominion Steel Corporation has discontinued the search for iron ore in the Loch Lomond District, Cape Breton. The ore, as found is of good quality and desirable for mixing with the Wabana ore, but diamond drilling has proved the occurrences to be discontinuous and unadapted to economical extraction in large quantities.

There is a small synclinal basin in the Loch Lomond district which contains coal seams of limited extent, but of quite good analysis. At the present time, lack of a railway, and the ability of the larger companies to mine coal more cheaply from more favorably situated areas, renders the development of this field unlikely, but it is one of those deposits that is of value as a reserve against future requirements.

The Nova Scotia Steel Company, it is understood, is undertaking the development of a small land area on the Collins Seam, with a view to seaward extension on a larger scale if market demand and other conditions should warrant this at some future time.

A large scale development of the Stubbert Seam on Boularderie Island is contemplated, and a railway some six miles in length, connecting with the Canadian National Railway will be required to connect with the site of the projected colliery.

This new colliery, together with important seaward extensions proposed by the Dominion Coal Company, depends for full realisation of all its possibilities upon the combined operation of the properties of the two companies under financial consolidation. The physical consolidation of the interests of these two companies, so far as the coal areas are concerned, is virtually consummated, to which fact some of the most hopeful developments of coal mining development in the Sydney Field are distinctly traceable.

Labor and Wages.

The various locals of the United Mine Workers are, one after the other, expressing dissatisfaction with the award of the Royal Commission, and in particular they ask for the increase in wages to be re-troactive to May 1st instead of July 1st, as recommended by the

Commission. The disbursement which will be required to make this retroactive payment from July 1st is a very large one, probably reaching for the three months ending September 30th the sum of $800,000. Under the recommendation of the Commission, this huge sum is to be paid out for work already done, covering a period when production has been most unsatisfactory, and overhead expenses altogether disproportionate to the rate of production. What is still more disturbing to the coal operators is the entire disagreement expressed by the miners with the recommendation of the Commission that a sliding scale be adopted designed to make the remuneration of the workers correspond to some extent to the rate of output.

The extra expenditure entailed upon the coal companies should the full recommendations of the Commission be followed in regard to wages and housing improvements, are not less than stupendous, and in actual pratice will certainly be found impossible of fulfillment.

Mine Illumination.

The Royal Commission makes the following recommendation with regard to Electric Lamps :

"The Commission recommends that where practicable electric lamps should be installed by the operators as a means to greater efficiency and larger production, instead of the so-called safety lamps, but the advisability of the collateral use of the safety lamps should be borne in mind for the presence of the detection of the presence of gas, that is to say, an occasional safety lamp should be available and easy of access to parties of men working in places where gas is likely to make its appearance, and that the advisability for making the tests should be kept prominently in mind."

Without any desire to speak disrespectfully of the Commission, this statement from a body of non-technical men regarding one of the most hotly contested features of mining practice, is a little too positive, and trenches upon the jurisdiction of the Coal Mines Regulation Act and those officials of the government whose duty it is to see that these Regulations are carried out. The implication that the desires of the workmen and the operators, based upon "greater efficiency and larger production" are all that is necessary to authorise a change in mine illumination was probably not intended, but some acknowledgement of the functions of the Department of Mines, and some stress upon the primary consideration of safety of life should have been made by a Commission that included no men with technical training in coal mining.

Coal Export Embargo.

Lifting of the coal export embargo is expected at the closing of St. Lawrence navigation. As the chief reason for imposing an embargo was to divert coal to St. Lawrence ports—which it has not done—there will be little reason to continue the prohibition on exports. Special consideration is being given by the Nova Scotia collieries to the requirements of Newfoundland. At the present time the coal production of Nova Scotia is not more than sufficient to fill the requirements of the coal consumption of the steel works and the domestic and manufacturing requirements of the Maritime Provinces and Newfoundland. There is a possibility, unless labor troubles intervene, that coal outputs will improve in October and continue at higher than Summer production rate until the Christmas holidays.

THE TIN DEPOSITS OF VIRGINIA, U.S.A.

BY MARSHALL HANEY. #

Tin has been known to exist on Irish Creek in Rockbridge County, Va., since 1840. Professor Armstrong, of Washington College tested the tin ore from this locality in 1846 and stated that the specimens he tested contained tin and silver. At this time only a few prospect pits had been opened.

Since 1885, a great deal of prospecting has been done along the eastern edge of Rockbridge County parallel to the Blue Ridge Mountains from a few miles north of the James River into Nelson County. The most favorable portion of the area prospected is known as the Irish Creek area located in the northeastern corner of Rockbridge County about 7 miles from Vesuvius, a station on the Norfolk and Western Railway. A company was organized in 1883 for the purpose of working the tin deposits of this section and the first work was done in 1884. The Irish Creek area is about 4 miles long and 3 miles wide.

Occurrence of the Ore

The rocks of the Irish Creek area are crystalline of granitic composition; in places the rock is porphyritic, the felspar crystals measuring an inch or more in length. The granitic rock is much decayed at the surface forming a clayey mass about 50 feet thick. Dikes of diabase cut the granite rock in all directions and are frequently associated with the veins of tin ores. The tin ore is found in well defined quartz veins which cut the granite in all direction and have steep dips. The veins are banded and carry pyrite and arsenopyrite in addition to cassiterite. Generally the veins are not over one foot thick and the tin occurs as crystals nodules and stringers. The gangue is quartz with some pyrite and mica. The location and character of the veins have been proved by many openings usually very shallow. Many of the veins are rich. Numerous nodules of pure cassiterite, the size of a hen's egg are found. The Cash Mines are the best developed prospects in the area.

Mines.

Boston capitalists obtained control of The Cash Mines in 1890 and in 1891. They erected a $50,000 mill to concentrate the ore and at the same time they had 300 tons of 3.3% ore on the dumps. They concentrated enough of this ore to get 250 pounds of concentrates which yielded 43% tin. The vein from which this ore was mined runs from 6 to 8 feet wide. The veins have been exposed in about 40 places and vary in width from a few inches to 8 feet and the ore runs from 1% to 13% metallic tin. This section offers superior advantages for profitable tin mining. The veins compare very favorably in character, extent thickness and richness in metallic tin to those of the famous Cornwall district, England.

Consulting Mining Engineer, Geer, Greene Co., Va.

The use of the word "datal" in the Nova Scotia Royal Commission's Report is quite frequent. The word is of Old Country origin, and should actually be "day-tale", the corrupted word "dataller" being applied in Britain to a man paid by the day. This use is altogether confined to mining operations. The term "day-paid" is to be preferred.

British Columbia Letter

Stewart, B. C.

That the Salmon River Section of the Portland Canal Mining Division, northern British Columbia, has gone through its boom stage and that there now is in progress much development and prospecting that promises good results are statements credited to Dr. S. J. Schofield, Ph. D., late of the Canadian Geological Survey and now Professor of Geology with the University of British Columbia, who has returned after a season at the head of a Geological Party in that region. He has been engaged in the completion of work commenced in 1919 by J. J. O'Neill, who recently severed his connection with the Geological Survey of the Dominion. The results of Dr. Schofield's researches will be contained in a report to be issued by the Canadian Department of Mines in the course of a few months. He observes, however, that it was notable that much of the ore being taken out of this new and rich silver camp is of a complex character, containing considerable lead and zinc. The Premier Mine was the only property being worked at the time of Dr. Schofield's departure and on it a Mill was being constructed to handle low grade ore. Shipments will be made during the Winter, the snow providing a comparatively easy method of transportation over the thirteen mile trail to tidewater. There were employed about 150 men. Prospectors, he said, were getting good results in the Salmon River District and considerable attention was being devoted to the Bear River area. During the season the work of the geologists was interfered with to some extent by heavy rainfalls and about the time they left snow was beginning to appear on the surrounding hills.

The New Alaska Property is expected to be opened up this winter. It is stated in the Portland Canal District. The showing on this group of claims is good and it s announced that, with the necessary capital available, development will be carried forward briskly.

A small gang of men has been working recently on the property of the Fish Creek Mining Co., located on the Alaska side of the boundary, Salmon River District, Portland Canal. A four foot vein of galena has ben uncovered, the values of which are such as to encourage the owners in the belief that the prospect will ultimately become one of the permanent shippers of the camp.

Work on the Silver Tip, Salmon River, has been closed down and there will be no permanent camp this winter. For some time a considerable force has been engaged in stripping and preliminary suface operations, the results of which are reported to have been satisfactory. Stringers of high grade silver have been disclosed and it is planned to continue development next year with a view to the establishment of greater veins with more promise of substantial returns.

Prince Rupert, B. C.

While passing through Prince Rupert a few days ago H. S. Munroe, General Manager of the Granby Consolidated Mining and Smelting Company, made the statement that his Company ships fifteen cars of copper a week and that there was no reason why this should into all pass though the Pacafic Coast Terminal of the Grand Trunk Pacific Railway. Mr. Munroe said that the Company would like to ship five or six cars a week by this route right away. The output of Anyox would be increased, it was asserted, as soon as the price of the metal went high enough to make it profitable. The low quotations of the present had resulted in a policy of manufacturing just sufficient to keep the plant in operation, the production at present being about 2,500,000 lbs. a month. With better market conditions this could be increased without difficulty to 3,500,000 lbs. a month.

Referring to the Granby Company's property, the Midas, situated near Valdez Peninsula, Alaska, Mr. Munroe said that this would be made productive as soon as there was a stronger demand for the metal. The ore was of high grade. It would be concentrated and shipped direct to the Tacoma Smelter:

In the course of a visit to Grand Forks, B. C. where the Granby Company has a smelter which has been inactive for the past several months and where, among the residents, there has been much speculation as to the Company's intentions, Mr. Munroe gave the municipal authorities the assurance that the smelter dam and lake will remain as at present at least for some time. Mr. Munroe inspected the mines at Phoenix as well as the plant there and at Grand Forks. He was reticent regarding the Company's mining policy in the Boundary, leaving the impression that not much could be expected while the copper market remained weak but that ultimately it was possible that a concentrator would be erected somewhere in that section of the Province.

Trail, B. C.

The Nettle L. Mine, of the Lardeau, and the Payne, the latter being a former large producer of the Slocan Camp, figure among the shippers to the Trail Smelter, Canadian Consolidated Mining and Smelting Co., during the week ended September 7, 1920. The total ore receipts at the Smelter for that week total 7718 tons, making the aggregate for the year up to that date 224,367 tons.

Kaslo, B. C.

While there has been comparatively little development on new properties in the Slocan Camp in recent months lessees, working on well-known mines for long inactive are getting good results in many cases. Working on No. 1 Level of the Washington Mine, near the Rambler-Cariboo lessees recently sent a carload of galena ore over the Rambler-Cariboo tramway which had been taken out in three weeks and which averaged more than 150 ounces of silver to the ton and 65 per cent. lead. The indications were such as to lead to the confident belief that another carload can be taken out in a similar period. At the same time lessees on the No. 3 Level of the Rambler-Cariboo are said to be working in rich ore. A part of the Whitewater Mine also is being worked under lease and it is authentically reported that the operators have shipped two carloads of ore from a newly uncovered body which has brought large returns. This work is close to the Wellington Mine where No. 2 tunnel level is being reopened by the Standard Silver-Lead Mining Co. Labor conditions are improving in this District, applications being received for work and a considerable number of men being granted employment.

The Payne Mine, one of the first locations in the Slocan, is under bond and lease to a Seattle Mining Syndicate. A long lower cross tunnel opens the property to a depth of 1500 feet but little exploration of the vein at that level has been attempted. Above No. 5 Level the mine has been largely worked out but below there is a large area that may be expeeted to contain ore. The mine showed an oreshoot 1200 feet long in the early days extending down to the fifth level from the surface.

Hope, B. C.

The re-opening of the Emancipation Mine, near Hope, is assured. Plant to the value of $20,000 has been installed and it is expected that the first shipment of ore will be made next month. Dr. E. T. Hodge, the manager, states that the ore is of high grade, running up to $303 a ton. The vein is from 5 to 25 feet wide and proven over the length of two claims.

Vancouver, B. C.

All phases of the mining industry of British Columbia were represented in an exhibit presented by the B. C. Chamber of Mines at the recent Vancouver Exhibition. There was copper ore from the Britannia and Granby Mines as well as specimens of the concentrates and the tailings. Ores and concentrates also were present from the Surf Inlet Mine while the Dolly Varden, of Alice Arm, was represented by fine samples of both native and ruby silver. Specimens of copper ore from Spence's Bridge section and samples of the ores of the Kootenay were shown. There also were a number of beautiful examples of British Columbia's product in rough and polished marble.

Accounts are being received regarding activities in the Mayo District, the new silver camp near Dawson, Y.T., from miners and prospectors who are coming south for the winter months. They say that Mayo City, 150 miles south-east of Dawson, on the Stewart River, bids fair to become a "city of tents" because of the rush to that point of miners intent of making locations. The Guggenheim interests, it is stated, have taken in large quantities of plant and supplies and are engaged in operations in Keno Hill, it being planned to take out 3,000 tons of ore this winter. On Lookout Mountain the Yukon Silver Lead Co. are 450 feet down on the vein with a large body of concentrating ore in sight. It is stated that the old prospectors, who went out of the country during the war, are back and are busily engaged in their work and in staking the promising mineral showings.

PROFESSOR RUSSELL'S NEW APPOINTMENT.

Mr. J. W. Russell, M.A., of the staff of Woodstock College and manager of Oxford Cobalt Mining Company has been appointed professor of geology at the Western University, London. Mr. Russell is an honor graduate of McMaster University and was a graduate student at Harvard. He taught for a couple of years in McMaster University and has also taught in a number of collegiate institutes in Ontario. For a number of years he has been engaged in mining in Cobalt. In spite of his activity in the practical field, however Professor Russell has been in constant touch with educational work. His new appointment will in no way interfere with his duties as manager of the Oxford Cobalt mine.

JOSEPH PAXON IDDINGS.

A Profound Student of Petrology.

In a recent issue of "Science" the death is announced, at the comparatively early age of 63, of Joseph Paxon Iddings, formerly professor of petrology in the University of Chicago and at one time a geologist of the U. S. Geological Survey. Mr. Iddings became a member of the staff in Chicago in 1892, at the time of the organization of that geological department which has had such a great influence on the science through its students and the writings and research work of the members of the staff. The work of Chamberlin, Salisbury, Penrose and Iddings, all original members of the staff, has done, at least, as much, it is safe to say, to advance the science during the last thirty years as that of any other four men throughout the world.

During the closing decades of the last century, petrology, or as it was more commonly called petrography, was probably the most popular branch of geology among post-graduate students. The microscopic study of rocks in thin sections was really founded by an Englishman, Sorby, but like certain other sciences was developed in Germany. Heidelberg and Leipzig attracted practically all students of petrography from North America until G. H. Williams began his distingnished career as teacher and investigator on the staff of Johns Hopkins University, ending with his untimely death in 1894. Iddings' professorial work in Chicago continued until 1908. Through their teaching Williams and Iddings exerted a profound influence on petrography. After they took up professorial work it was no longer necessary to leave North America for the best instruction obtainable in this specialized subject.

Iddings' epoch-making work on the rocks of the Yellowstone National Park and his books on Rock Minerals and on Igneous Rocks will serve as lasting memorials to his too brief career. The passing of his contemporaries at early ages, George H. Williams, J. Francis Williams and, more recently, L. V. Pirsson, deprived petrography of profound students and investigators.

The Quantitative Classification of Igneous Rocks, the joint production of Cross, Iddings, Pirsson and Washington, has done much to make petrography a more exact science.

The igneous rocks have come to be recognized as the most important factors in the genesis of metalliferous deposits. Much of the research work of men like Iddings might appear to be of an abstract or academic nature, but, as in the case of other sciences, the study of the pure science has had a far reaching effect on the applied.—W. G. M.

Toronto, September 23rd.

The Nova Scotia miners request of the companies that when two men are compelled to do the work of three men that they receive time and a half. The operators reply "two men cannot do the work of three men". Nevertheless it has been done. Conversely it may be noted that when enlistments took away the younger men around the mines, it often took two men to do a boy's work, and this does not reflect on the men. Agility and youth are requisites in some phases of mine employment.

Northern Ontario Letter

THE SILVER MINES.

The Cobalt Field.

A quite serious shortage of labor exists in the mines of Cobalt, especially among the unskilled workers. Muckers are decidedly scarce, and working forces in some instances are more than ten per cent below requirements. Added to this adverse factor is the recent increase in freight rates, the two combining to create a situation which is believed will surely reflect upon the cost of producing silver.

Offsetting the adverse factors is the continued high price of silver, quotations ranging around 94 cents an ounce in New York funds, and thus working out at about $1.04 an ounce in Canadian currency. This leaves all the leading mines with a safe margin of net profit.

The Nipissing, Coniagas and Kerr Lake are believed to be holding costs down to less than 50 cents an ounce, while at such mines as the McKinley-Darragh cost is understood to have risen to about 80 cents, with an even higher cost at the La Rose.

While these costs are very high as compared with earlier years, yet the price of silver is actually about 50 cents an ounce higher than at the time the low costs ruled. This removes any cause for alarm in this respect.

On October 31st, the Coniagas mine will close another favorable fiscal year. An average of about 500 tons of ore is being treated daily, about 100 tons of which is being treated by cyanide process in the leased equipment in the Buffalo mill. Mill heads are understood to average between 8 and 10 ounces of silver to the ton, as compared with 13.07 during the previous year, and this is believed to indicate an increase in costs to not far under 50 cents an ounce as compared with between 42 and 43 last year. As regards the next fiscal year, the mine will be equipped to handle an extra 100 tons of ore daily, and in this way the output is expected to be well maintained.

A meeting of the shareholders of the Temiskaming Mining Company has been called for October 7th, for the purpose of considering a proposal to join the McIntyre-Porcupine Mines in carrying out the purchase of coal lands in Alberta. The Blue Diamond Coal Mines, Ltd., of Brule, Alta., is capitalized at $1,500,000, while the Canadian Coal Fields, Ltd., is capitalized at 10,000,000. The deal in which the Temiskaming shareholders are asked to participate involves both properties.

During the work of excavating for a foundation for the installation of a crusher at the dumps of the Kerr Lake mine, a narrow vein has been opened up in which native silver occurs. The vein is one which is believed to have been cut underground at a depth of 90 feet, but at this point it did not contain silver. Despite the over-burden of about eight feet of sand and gravel, the vein will be further opened up at surface.

Action has been dismissed in connection with the application of a shareholder of the Bailey Mine to order the company to make reasonable provision for transfer of shares to beneficial owners thereof, and for their registration as shareholders prior to the general meeting of shareholders to be called pursuant to order of 28th June, last.

The McKinley-Darragh is experiencing difficulty to earn its dividend requirements at the rate of 3 p.c. quarterly. However, with net profits not far below requirements of a little over $67,000 quarterly, and with a surplus at the beginning of the year amounting to over $365,000, it is generally believed the surplus will be drawn upon to the extent necessary to pay the present rate for considerable time. Drawing on this surplus to the extent of one full quarter for each year, it would last five years.

Two carloads of medium-grade ore have been shipped from the old Ruby Silver mine situated in the south-eastern part of the township of Bucke. The property is being worked by the McDonald Syndicate, of which the following local men are members: Kenneth McDonald and E. J. McMillen, Haileybury; Chas. Johns and E. Lapointe, North Cobalt, and C. H. Moore and J. J. Anderson of Cobalt.

The vein recently encountered at the 350-ft. level of the Keeley Silver Mines in South Lorrain is said to be that known as No. 9. It is about 14 inches in width and contains from 200 to 400 ounces of silver to the ton at the point where cut. The cross-cut at this level has about 35 feet to go before reaching the point where the "Beaver Lake" vein is expected to be encountered. On an upper level of the last mentioned vein, an ore about 170 feet in length has been opened up in which high milling values, said to average over 40 ounces to the ton, occur over a width of from three to four feet. The 20-stamp mill is expected to be ready for operation on the Keeley by the end of November.

Because of the success on the Keeley, English interests are paying considerable attention to mining prospects in South Lorrain, and the opinion is expressed that aggressive work may lead to the development of profitable mines in that area.

Elk Lake Area.

A summary of mining news from Elk Lake is as follows :

Silver has been encountered on the recently opened Regent Mines, in the township of James. The property is being equipped with camps and with a steam-driven mining plant.

Members of a Cleveland Syndicate are engaged in examining various properties in this area with a view to obtaining working options, and two or three such deals are pending.

The seizure of ore of the Reeves-Dobie mine in course of shipment, as reported previously in these columns, consisted of 213 bags of concentrates, said to be valued at about $100 a bag, and followed a judgment against the company for wages and an assignment.

Encouraging gold assays have been obtained from a vein discovered in the township of Bryce, and Elk Lake prospectors have staked a number of claims in that district. Mr. Burrows, Ontario Government geologist, has concluded a visit to that area.

Ore Statement.

Following is a statement of ore shipments over the T. & N. O. Ry, for the month ending Augst 31st. In tons of 2,000 lbs.

SILVER ORE.

Cobalt Proper	Tons.
1. Coniagas	66.10
2. Dominion Reduction	33.00
3. Hudson Bay	30.13
4. LaRose	85.18
5. McKinley-Darragh	210.19

6. Nipissing	898.99
7. Northern Customs	32.30
8. O'Brien	64.08
	1,419.97

The above shipments were made to the following Companies :

Canada	
Deloro Smelting & Reduction Co. Deloro	
Marmora	1,207.62
Coniagas Reduction Co., Thorold	32.50
United States.	
American Smelting & Refining Co., Pueblo	96.03
American Smelting & Refining, Perth Amboy	85.82
	1,419.97

Price of Silver.

August, 20th. Highest	101.750
August, 4th. Lowest	92.750
Average	96.168

THE GOLD MINES.

The Porcupine District.

After having been harassed by an inadequate supply of labor, with pleas for higher wages, as well as steadily mounting costs of material and supplies, the gold mining industry of Northern Ontario seems about to reap the benefit of a favorable change in conditions. News despatches which at this date carry the information that substantial reductions are being made in the cost of such articles as automobiles, cotton, leather, corn, etc., are pointed to as marking the commencement of a re-adjustment. These same despatches tell about large numbers of men being laid off, and in this direction lies the hope that an abundant supply of labor will be available at the mines before the coming winter passes.

A full labor supply in the Porcupine field would add greatly to the production of gold. Milling equipment lying idle, and ore blocked out and ready to mine leaves it only necessary to procure the desired number of men in order to add about fifty per cent to the current production.

Ore being drawn from stopes on the Dome Mines is running higher than the earlier estimates showed. Some of this ore had previously been estimated to contain only a little over $4 to the ton, while actual recovery now shows a gold content of over $6 to the ton. The mill continues to treat about 1,000 tons of ore daily.

Among the most interesting features in connection with the annual statement of the McIntyre-Porcupine mine may be noted an increase of over 72,000 tons in the amount of broken ore, as well as the increase of about $1,000,000 in ore reserves and the tendency of the gold content to increase at depth. Perhaps the most important statement made by the general manager R. J. Ennis is that having to do with the discovery of the eastern continuation of No. 84 orebody of the Hollinger, in which Mr. Ennis says:

"Drill hole 180 put out S. 20 degrees W. at an angle of 15 degrees from the 1500-ft level intersected an ore body 530 feet from the main shaft at a depth of 1610 feet from surface. 35 feet of core assayed $11.10. Hole 184 was then drill from the 1375-ft level, at an angle of 5 degrees, bearing S.20 degrees E. At 480 feet this hole intersected the same ore body at a depth of 1385 feet from the surface — 26 feet of the core assayed $14.10.

"Cross-cuts are being driven south from the 1375 and 1500-ft levels to open up this ore body and it is our opinion that the values and widths shown by the drill holes will be confirmed. From the very favorable location of the ore body, it is expected to develop a large tonnage of high-grade milling-ore."

There is some promise of a resumption of activity in the western part of the township of Deloro and the eastern part of Odgen. The leading property in that section of the Porcupine area is the Hayden-Porcupine Mines, where a mining plant was installed some years ago, and several hundred feet of underground work driven with promising results. Negotiations now involve property in this section and indicate the possibility of American capital becoming interested.

The Kirkland Lake Field.

Properties in the township of Lebel, lying to the east of the producing teritory continue to stand up well under aggressive work. The number of discoveries made during recent months in this area exceeds any other gold-bearing district in the North during this period and it only remains to be seen how important these finds are. Very favorable reports are coming from the Wood-Kirkland property where gold occurs in a vein measuring about ten feet in width.

The annual meeting of the Orr Gold Mines has been called for Sept. 30th. Business to be brought before the meeting includes the question of proceeding with negotiations in connection with a proposed merger between the Kirkland Lake and the Teck-Hughes Gold Mines. As regards the status of the Orr, president Conrad E. Wettlaufer says: "Since my election on "July 15th, 1920, money has been procured and the "judgment against, and the debts of the Company "have been paid, and an engineer, Mr. J. C. Houston, "has been employed. He with his staff have de-water-"ed the mine, have done considerable exploration "work, and have extended the cross-cut and cut a "vein supposed to be No 1. vein of the Lake Shore "mine. This vein is about five feet wide and well "mineralized and promises well for future develop-"ment."

As regards the issue of 800,000 treasury shares of the Orr Gold Mines to Hamilton B. Wills, the Toronto broker, nothing is said in the notice of annual meeting. However, the minority interests of the Orr are taking the necessary legal steps and are endeavoring to prevent the issue.

The affairs of the Tough-Oakes are still uncertain. Since early last Spring, officials have been expecting matters to be adjusted in so as permit resumption of work, but unforeseen delays have occurred from time to time, and the date of opening now is generally regarded locally as a "guess" at best. In view of the extremely high cost of heating the scattered mine buildings of the Tough-Oakes and the probable difficulty to be encountered in gathering a force of men, one of these guesses is that work may not be undertaken in a general way until next Spring.

Surveyors are at work at Indian Chutes on the Montreal River, near Fort Matachewan, completing a survey of the water power. Provided conditions are favorable, it is reported work may be undertaken so as to have a plant installed by one year from now.

NORTHERN ONTARIO URGES DEVELOPMENT OF WATER POWER.

The approach of winter in Northern Ontario, the high price of coal, and the great difficulty to procure this necessity at any price has given rise again to serious discussion of devising some scheme that would make it possible to utilize the vast amount of potent heat and power going to waste in the many great waterfalls throughout these northern regions.

A serious obstacle at this time is the exceedingly high cost of material required in connection with installing power plants. The obstacle is a formidable one on account of the largest item to be charged against hydro-electric plants, once they are erected, being interest on the capital invested.

After discussing the problem with a great many experts, and after making inquiry regarding local opinion, it is obvious that any movement calculated to utilize this great natural resource would meet with general approval. And singularly enough, the Temiskaming and Northern Ontario Railway Commission is pointed to as the logical body to launch the project and to place Northern Ontario hydro development under the management of a thoroughly competent expert.

Mention of the T. & N. O. Ry. in this connection is based upon two reasons, one of which is the fact that the electrification of the 300 miles or so of this Government owned railway is considered reasonably certain within the next few years, and the other is the desirability of valuable co-operation between the railway which serves the district and the organization which will direct the hydro-electric developments.

The development of high-tension electric transmission has made hydro-electric energy the most efficient form of power yet devised. The statistics which show American railways are employing one-third of their rolling stock in hauling coal is pointed to as a lesson for Canadians, and offers fair warning in this country where the rigors of a northern climate are bound to cause a repetition of the American experience and where the wide stretches over which no coal deposits occur convey the threat of even more dire consequence.

Although no coal deposits occur in the province of Ontario, the estimated potential power running to waste in the rivers of the province is approximately 7,000,000 h.p., of which only 985,000 h.p. has so far been developed. These facts all promise to be brought into more or less prominence owing to the discussion now developing in Northern Ontario.

USES IN THE UNITED STATES FOR CANADIAN FELSPAR.

By KIRBY THOMAS, New York.

The resumption of activities in the American plants, engaged in the production of clay products in the form of pottery, crockery, sanitary enamel ware and surfaced tile for building, has led to increased demand for felspar, which is used as a flux in the glaze. This increased demand is being supplied in large part from Ontario, where a number of old mines have been reopened and new ones developed recently. The Canadian product, which is imported without duty, is in competition with the domestic supply, which now comes largely from the southern Appalachian region. The chief consuming centers for the product are in the Ohio valley district, and therefore the imported felspar has about an even break as to freight rates with the domestic product. Many of the Canadian properties are American owned and operated. There is increased activity in the demand and development for felspar properties in the south, particularly in the Carolina region accessible to cheap railroad transport to northern points. A part of the supply for eastern plants comes from New York state and Maine. The quoted prices of crude felspar range from $8 to $18 per gross ton at points of production f.o.b., depending upon the grade and quality, particularly the potash content of the product. Most of the Canadian product is imported crude, but the domestic production is quite largely ground at the mines and brings a correspondingly higher price.

The attempts to utilize felspar as a source of potash which were made during the war when potash was at a high price, owing to the exclusion of the German supply, have quite generally been abandoned, having been a failure from a commercial standpoint. This has left the chief market for felspar as before the War in the field of accessories to the varied clay operations, and as flux. Some felspar is used in glass making.

There are no imports of this material regularly from other countries than Canada.

A SINKING RECORD.

Thirty-five days for the complete sinking and timbering a 263 ft. shaft, is a recent achievement of the Johnson City Coal Co., at its No. 2 mine at Johnson City, Illinois. The shaft is 10 ft. 6 in. by 15 ft. 6 in. inside and is divided into two compartments. Of these the manway is 4 ft. wide and the air shaft proper is 11 ft. wide. A 6 in. wall is placed between these compartments. A concrete lining extends down the shaft for a distance of 22 ft. from the surface and rests upon solid rock. This lining is 12 in. thick and is reinforced vertically with 1-2 in. rods on 12 in. centres and horizontally on 8 in. centres. The foot of the shaft also is concrete lined for a distance of 30 ft. upward from the top of the coal bed. Footing is made upon the limestone underlying the coal. The lining here also is 12 in. thick and is reinforced in exactly the same way as the lining at the top. The shaft timbers are 6 in. by 6 in. long leaf yellow pine treated with carbolineum. Bearing sets are 12 in. by 12 in. yellow pine resting on a 5 in. ledge of rock throughout their entire length and set into the rock for 2 ft. at their ends. The partition between the manway and air shaft is of 4 in. yellow pine extending between 4 in. by 6 in. wall plates. The shaft walls between top and bottom concrete linings are covered with expanded metal lath upon which has been placed 2 in. of gunite.

On August 16, 1919, shaft sinking was commenced and three shifts per day were kept at work continuously thereafter. Work was also begun from underground in driving the shaft upward, a few men being kept steadily at this work. This upward driving finally attained a height of 60 ft. On September 17, the two portions of the shaft (upper and lower) were joined by sump shots in the upper section. On September 20 the two places were completely connected and timbered. The total distance sunk was 263 ft., and the time consumed was 35 days.

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TORONTO MINING STOCKS.

Closing Quotations on Standard Stock Exchange, September 28th.

Silver.	Asked	Bid
Adanac	3¼	3
Bailey	4¾	4½
Beaver	43	42
Chambers-Ferland	7	5
Cobalt	46	44
Coniagas	—	2.50
Crown Reserve	28	—
Foster	3⅛	2½
Gifford	2⅛	2
Hargraves	2⅞	2½
Kerr Lake	3.40	3.25
La Rose	—	32½
Lorrain	6	—
Mc. Kinley-Darragh	58	—
Mining Corporation	1.65	1.60
Nipissing	10.75	10.60
Ophir	3¼	2¾
Peterson Lake	15¾	15¼
Right of Way	3¼	1¾
Silver Leaf	3	2
Timiskaming	36½	36
Trethewey	29	28
Gold.		
Apex	2¾	2
Atlas	15	11
Boston Creek	—	15
Dome Extension	41	39
Dome Lake	6	5
Dome Mine	12.25	11.75
Gold Reef	4⅛	4
Hollinger	5.75	5.70
Hunton	12	11
Keora	19½	18
Kirkland Lake	50	49½
Lake Shore	1.12	1.09
Mc. Intyre	2.07	2.06
Moneta	12	11½
Newray	7½	7
Porcupine Crown	30	27
Porcupine V.N.T.	27	26½
Preston	3½	3
Schumacher	22	21
Teck-Hughes	8¼	8
Thompson-Krist	9½	8¾
W. Dome	7½	7
Westree	5½	5⅛
Wasapika	15	9
Miscellaneous:		
Rockwood	4¾	4¼
Vac. Gas	26	25

METAL QUOTATIONS.

Fair prices for Ingot Metals in Montreal Sept. 30th 1920. (In less than carload lots).

	Cents per lb.
Copper, electro	23
Copper casting	22½
Tin	52
Lead	8¾
Zinc	9¾
Aluminum	35
Antimony	8¾

ASBESTOS PRICES.

Prices Current—August 1920. (From "Asbestos").

Average market prices paid by consumers for average quantity, quality and freight haul from producer, were about as follows:

Asbestos Air Cell Covering, 4 Ply	35% to 40% off
" Air Cell Paper in rolls	$10.00 to $12.00
" Air Cell Paper	
" Cement	$1.75 to $3.00 cwt.
" Cloths, 10s Commercial	$1.50 to $2.00 lb.
" Listings and Tapes	$1.75 to $1.90 lb.
" Millboard	$12.00 to $18.00 cwt.
" Packing, Steam, High Pressure	$1.25 to $2.00 lb.
" Packing Sheet	$1.00 to $1.50 lb.
" Wick and Rope	.65 to $1.00 lb.
" Paper, Commercial	$12.00 to $18.00 cwt.
" Paper and Millboard Special	$17.00 to $35.00 cwt.
" Yarns, 10s Commercial	$1.35 to $1.90 lb.
" Yarn and Cloth, Special	$2,00 to $6.00 lb.

The foregoing authority also notes there is offered for sale 15 tons of Jacobs No. 1 crude, pre-war grade, at a price of $2,300 per ton f.o.b. point of shipment, terms 2-10-30 or $2,200 per ton. Material is in the United States.

Production at Canadian mines is below demand, and prices are likely to advance rather than to decline for crude asbestos. Asbestos handlers lay much stress on amount of low-grade cloths needed for renewal of brake linings on freight cars.

TORONTO COAL QUOTATIONS.

Toronto, Sept. 30.—Coal is not moving any more freely and the shortage continues. The market is quiet and last week's shortage of cars affected shipments to this point. Hard coal is quoted at from $8.00 to $16.00 gross tons at the mines. American funds: mine run $14.00 to $15.00 f.o.b. Toronto and smokeless coal $14.50 to $16.00.

GRANBY CONSOLIDATED.

Making About $60,000 Profit a Month.

It is understood that Granby Consolidated Mining, Smelting and Power Co., has been making a net profit of $60,000 a month after all charges, bond interest and extraordinary items.

Copper costs at Anyox have been running close to 10½ cents a pound during the past few months. The increased freight rate, effective since August 26, will be an added burden to the company, as its smelter product traverses the full width of the continent and must pay a higher toll both in Canada and the United States.

Until the metal market improves, the copper producers must pay the higher freight charges, but eventually the producers anticipate a sufficient advance in copper to offset fully the new levy.

Few, if any, copper companies have a longer haul than Granby from smelter to refinery, and the increased freight rates are heavier in proportion to its production than any other properties on the American continent.—"Boston News Bureau".

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"ANCHADURA". A MODERN SECONDARY SOLUTION CONCENTRATE.

An interesting mineral phenomenon is mentioned in the recent report by Mr. Frank B. Powell on the property of the Colombian Mining and Exploration Company. According to Mr. Powell, the mine has been worked for over 100 years nearly continuously, and he goes on to describe the much-talked-of "anchadura". "This is a product", he writes, "which deposits in, and fills in, most of the old stopes throughout the mine. In some instances the whole stope for 20 ft. wide is filled. Its occurrence in such great quantities as are apparent in this mine is hard to account for, but the fact remains that, in practically every old stope that has been worked out and left without a circulation of air, this anchadura is deposited.

"In every instance where sampled it showed values ranging from 8s to 48s, the lower values being in the newly-deposited product. About 30 p.c. of the values are in free gold, the balance in pyrites. The free gold is all crystalline and of secondary occurrence. There are approximately 300,000 tons of this material in the old stopes of the mine, which is worth about 24s per ton." The only really remarkable thing about this "anchadura" is the quantity. It is very evidently a secondary formation, brought about by the pressure of the surrounding rocks squeezing out siliceous matter in conjunction with water.

There are two ways in which mineralised matter is generally deposited, either by its being held in solution in water descending or in liquid ascending. If the two bodies meet the contact of cold and hot temperatures usually brings about a sedimentation of the mineral matter which may be held in solution in either of the waters, and naturally such sediment would be carried forward in the direction in which the water can escape. The fact that the newer deposits of anchadura are less valuable than the older deposits tends to show that the values are deposited by water, which evaporates or escapes, and, of course, the longer the siliceous or disintegrated matter has been subjected to the influence of such water, which apparently carries gold in solution, the richer it would become.

The existence of what is commonly called secondary formations is not uncommon in any mine, where the plane of the rocks favours the squeezing out either by pressure or water action of disintegrated material. In the Rand the formation of such secondary formations is, I am informed, not by any means an uncommon occurrence, although it is rare that such formation carries payable values.

Here we have a very ancient mine, where the process has been going on for the greater part of a century, and where there is evidently a water saturation, carrying gold in solution, which finds an outlet in the old workings, carrying with it sand, pulverised rock, etc., in which it leaves the gold as it evaporates or is gradually drained away. As I have mentioned, the quantity is remarkable; that is all.—W. I. L.
In "Financier and Bullionist."

PIONEERS OF THE YUKON.

An Address by the Right Rev. Bishop Stringer.

This year's celebration of the twenty-fourth anniversary of the discovery of gold in the Klondyke, held at Dawson City under the auspices of the Yukon Order of Pioneers, was especially notable because there arrived at that historic centre on the same day the aviators engaged in a flight from New York to Nome, Alaska, and return and by reason of an exceptionally able address by Right Reverend Bishop I. O. Stringer, who is well-known and highly respected among Yukon pioneers.

Bishop Stringer's speech so thoroughly sketches the history of the north country and so interprets the spirit of the present residents of that territory that it is well worth publication in extenso.

He said :

WORK OF PIONEERS.

"For many years I had hoped to be present at a Discovery Day celebration, but this is the first time that my duties allowed me to be in Dawson on the seventeenth of August. It seems, therefore, strange that I should be asked to give an address of welcome on this occasion, and I know many of you who are present could more appropriately perform the task. However, it may be said truthfully that I represent a succession of pioneers older than any other continuous institution in the country. And most gladly do I respond to the kind invitation of the president and other officers of the Y. O. O. P., and only hope that the few poor remarks I shall make may be taken to show, even in an inadequate manner, my intense interest in all that concerns the people of this great northern land, and especially in the pioneers who blazed the trails and whose memories we shall always revere. The majority of those present are as much at home here as I am, and need no words of welcome. To those who may be strangers or visitors I extend to them, on behalf of the Y. O. O. P., the heartiest kind of welcome that human beings can give. We wish all to feel at home: we wish all to learn of our short history and to identify themselves with the town and the country and to stay as long as possible with us. And we have a great history also.

HISTORIC POINTS.

"I have recently visited Fort Yukon and the Porcupine River, down which J. Bell made his first journey, coming from the Mackenzie River side in 1846. The next year Murray established a post at Fort Yukon. In 1843 Campbell had come down the Pelly to the river which he named Lewes and in 1848 he established a post which he named Fort Selkirk. Thus within a year of each other these two trading posts were established on the same river 550 miles apart by the same Hudson's Bay Company, and no one then knew that they were on the same water course.

"Only in 1850, when Campbell descended the river from Fort Selkirk to Fort Yukon, did anyone know that the river was one and the same. This explains why the river above Selkirk was named Lewes, after the chief factor of the Hudson's Bay Company, while the river from Fort Selkirk to St. Michael retained the Indian Name, "Yukon" which explained the old name "Kwikpak" (Eskimo for big river), by which the river was known by the old Russian traders. Campbell, however, spoke of the Pelly as continuing to Fort Yukon. In one respect it may be said that the history of this part of the country began in 1850 so far as the white man is concerned. In that year Campbell came down the river, being the first white man, so far as we know, who passed the mouth of the Klondyke or Thohndik.

EARLY GOLD DISCOVERY.

"The sacking and looting of Fort Selkirk by the Chilkat Indians in 1852 broke the connection for the time being between Fort Selkirk and Fort Yukon. For the following twenty or thirty years any information regarding the interior was obtained chiefly through the post at Fort Yukon. In the early sixties gold was known to exist in the Yukon valley.

"The other day I met a miner who was taking out gold on the tributary of Birch Creek where Archdeacon McDonald found some nuggets in 1863, just fifty-seven years ago.

"In the late sixties and seventies a few men began to prospect in various parts of the country. These were men who for the most part were traders and trappers first and prospectors afterwards. Then in the 'eighties pioneers came into the Yukon valley by various routes, chiefly over the Chilcoot and White Passes and by way of the Hootalinqua. The Fortymile and Circle Camps were established.

And then we all know the story of 1896, when, on the seventeenth of August, just twenty-four years ago today, the discovery of gold on the Bonanza opened up a new era in the history of this country. Within a year thousands of gold seekers were on their way to this hitherto unknown and unnoticed region. Many difficulties were encountered and much suffering endured in that great rush to the North. In spite of all obstacles many found their way to this land which was then considered very remote, and many of the early pioneers are wih us yet. Some have come and gone, and some have made the last march along the trail in this life and are laid to their long rest in this land. Others have remained on and are living witnesses of the attractions and allurements of this northern country.

TEST OF HUMAN CAPACITY.

"All honor to the pioneer. We feel a thrill of pride at the thought of the perseverance and endurance and optimism of the trail blazers of bygone days. The experience of the war proves that the present generation shows no deterioration. That men and women are capable of doing great things now as in past ages. It needs only the occasion and demand to bring out the greatest attributes of mankind. So also the qualities that go to make up the pioneer are not extinct. We have men and women in his country who are as capable and resourceful as the pioneers of older days. The occasion only is needed to prove what they can do. The true pioneer will be prepared to take his place when there is some special call on his energies and resources. But also he has a duty to perform in everyday life.

"This is the second Discovery Day celebration since the conclusion of the war. As time goes on we are apt to lose sight of its lessons. This time of peace is a day of opportunity. The future is before us. We possess a land full of resources and boundless possibilities. Who would have thought in the days when the Harpers and McQuestens and Ladues and Mayos, and, later, the O'Briens, and many others whom we could name, wandered over this virgin land, seeking for gold, that the time would come as it did when within eight years, 1898-1905, a hundred millions in gold would have been taken from the tributaries of the Klondyke, mostly by pri-

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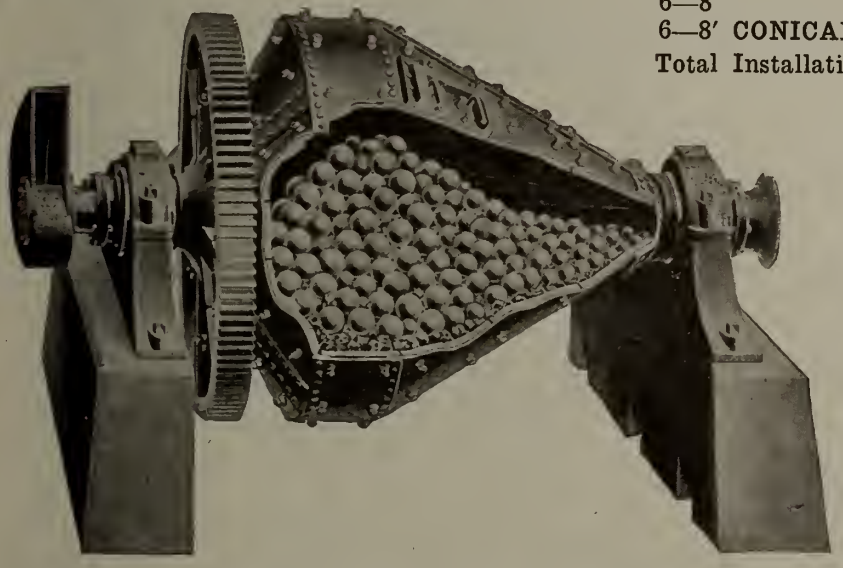

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mitive methods. When we shall have another Klondike no one can tell, but the possibilities are enormous.

MORE THAN GOLD.

With gold and other metals scattered all over this country it is altogether all over this country probable and reasonable to expect that other great strikes should be made. Just where the next great camp may be we do not know. We hope it will be Mayo, but, wherever it is, I believe it will be only the forerunner of other discoveries in days to come. Then we have the other resources, the fur and the products of the forests and streams and the land. In giving lectures to the soldiers in Belgium and France on Canadian citizenship, whenever I noticed the instant and earnest attention by telling of the resources of our great country, and especially by dwelling on the possibilities of the North. We take it as a matter of course that this district can produce potatoes and other vegetables successfully and that certain grains can be ripened, but many people outside are still astonished to hear this and some will scarcely credit it. Yet I believe we are only at the beginning of things agricultural.

"I took forward also to the time when the great barren lands of the North will teem with reindeer and other animals suited to the conditions of the country and climate. Whatever success this country may encounter in the future it will be largely due to the pioneers who led the way and who will still carry on in spite of all obstacles. Some, also, have passed away in the midst of the struggle, but their example is an inspiration to others. May every pioneer who is with us today have the desire of his heart fulfilled and may peace and prosperity be his to the end.

A PROPHECY.

"How appropriate it is that at this celebration of pioneers we should now be about to welcome the pioneers of air who alight in our midst for the first time. This feat is prophetic of the time when we shall no longer be isolated from what we call the outside world, when the difficulties of navigation in air will be overcome and when the words "outside" and "inside" will have lost their meaning and when we shall be connected with the world generally by steel on land and by wings through the air. It is an epochal day for Yukon and for the North generally. All honor to the birdmen. May success crown their efforts. We look backward with pride and satisfaction in contemplation of the accomplishments of the pioneer and we look forward with hope and courage and then we endeavor to perform the task of today with the desire of doing our duty to ourselves, our fellowmen, our country and our Maker.

"I referred just now to the lessons of the war which should not be forgotten. We think of the terrible sacrifice during the war—the suffering, the misery incalculable continuing to the present, and we ask, "Will this be in vain?" We think of friends whose bodies are lying in Flanders and France. We know there are many and difficult problems to be solved in the world. We need the spirit of true pioneers if we would take out part in everything relating to the upbuilding of our community and country and in the betterment of the affairs of the world. And as we march along the trail of life let us keep the final camp in view, taking our stand for all that is right, and thus help to make our home, our country and the world the better for our presence and our influence—pioneers —leaders in all that is good and noble in life."

The Royal Commission on Coal Mining Operations in Nova Scotia and New Brunswick states: "The Commission has noted that the output per man per day in the United States is greatly in excess of that produced in the Nova Scotia coalfields, and have also noted that the cost of production per ton is much less in the United States than Nova Scotia. Under these circumstances it takes occasion to remark that in a competitive market the U. S. coal operators have an advantage over the N. S. operators."

It would have been interesting had the Commission noted the reasons for this difference in productive ability. It is much less a matter of individual manual productivity, than of physical conditions and statutory mine supervision, nor would an exhaustive analysis be unfavorable either to the Nova Scotian miner or the Nova Scotian mining engineer.

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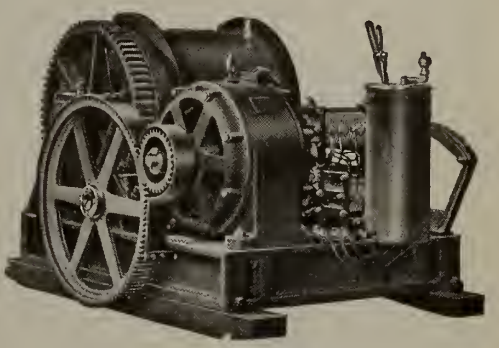

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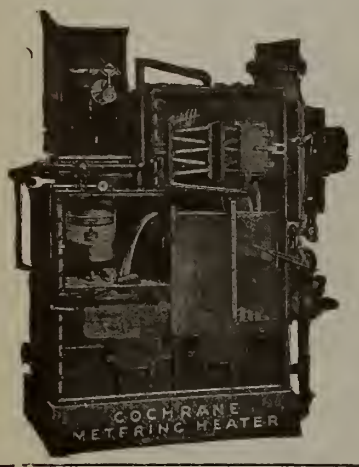

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:-: EDITORIAL :-:

INDUSTRIAL LEADERSHIP AND THE MANAGER.

The "Atlantic Monthly" for October contains an unusual essay by Mr. Sam A. Lewisohn, a well-known figure in the mining industry of the United States, which is interesting to members of the Canadian Institute of Mining and Metallurgy because of the approving quotation of portions of the notable paper which Mr. C. V. Corless read at the last Montreal meeting of the Institute. Mr. Corless's remarks are quoted as being "rather exceptional".

Mr. Lewisohn and Mr. Corless are at one in pointing out that the severe technical studies and undivided consideration of the material sciences which the technical graduate experiences in the course of his training tend to dehumanize him, and serve to unfit him for handling human relations unless there has been brought to bear some neutralizing influence.

It is pointed out that industrial leadership is more and more developing upon technical graduates, who as the managers of works, forming possibly one link in the chain of operations of a vast corporation, come into contact with men, as well as things, and in these days tend to supersede the former owner-manager. The change is not altogether for the worse, even in the matter of human relations, because as Mr. Lewisohn points out, the owner-manager, while possibly a man of the world, often was a person of dogmatic and biased viewpoint, whereas "the scientific approach of the engineer is unfriendly to intolerance." Therefore it is concluded that "engineer-managers who have combined with their knowledge of the material sciences a scientific study of human relations are usually superior to other industrial managers in their approach".

Mr. Lewisohn concludes by stating that the works manager is the person who is in the position of continuous administrative responsibility, and to him we must look primarily for constructive development in the everyday problems of our industrial life. "Whether he be engineer or layman, he should be properly trained to assume the leadership that is rightfully his." Herein is matter for much cogitation on the part of technical educationalists, for broadly considered, as Mr. Corless pointed out, and as the Committee of the Institute that was appointed to consider Mr. Corless's paper soon discovered when they sat down aronnd a table, it cuts right to the root of training for citizenship.

There is the further consideration that, apart from scholastic training, the type of mind that excells in weighing and measuring material things often instinctively revolts against the study of mankind. Also, it has been fairly well demonstrated that it is much easier to find men with scientific and financial acumen, than to find men with a native capacity for leadership.

Mr. Lewisohn neatly sums up the disadvantage which the technical works-manager is up against when compared with the labor leader. The last-named has an experience which is largely political and forensic. The first-named has had a training which was confined "to studying the reactions of dead matter". Naturally when the question at issue is that of human relations, and what Mr. Corless calls "imponderables", the gentlemen with political and forensic ability possesses the advantage.

This is a sign of our times that was plainly visible at the last Industrial Conference at Ottawa.

THE SEARCH FOR PETROLEUM IN THE UNITED KINGDOM.

The Petroleum Department of the United Kingdom has issued a statement reporting the depth and showings of ten boreholes that are being drilled by the Government in search of petroleum.

Seven holes are located in Derbyshire. At Hardstoft, production by natural overflow continues steadily at about seven barrels daily. The amount of oil in stock to 28th August has reached 3,696 barrels, or 478 tons. This is the only well that has given an actual flow of petroleum.

The other six holes are down to depths varying from 2,900 feet to 4,006 feet. Three of the wells, at depths of about 3,700 feet are in the Carboniferous Limestone, and in one case, a sand 7 feet thick was encountered which gave indications of oil.

In North Staffordshire two wells are being drilled. Lost tools have delayed this work, and in one case the hole has been abandoned and a new one is being sunk.

In Scotland, one drill-hole is down 3,844 feet at West Calder, which met a slight show of oil at 3,705 feet. Drilling is being continued in shales containing occasional beds of ash. At D'Arcy the drill is down 724 feet where a strong flow of natural gas was encountered.

The search for petroleum in Britain has been carried on against the advice of most of the British geologists, who hold that the geological conditions are unfavorable, but, if the only objection that can be urged is that of expenditure, it can be well replied that much more useless expenditures have been made in the world during the past six years, and, at any rate, the presence of petroleum has been proved at Hardstoft. In regard to a matter of such national importance as the presence of oil within the United Kingdom, even negative evidence is a desirable thing to have, and it is to be hoped that the British Government will continue the search for petroleum until it is definitely proved that it does or does not exist in commercially valuable quantities.

The existence of valuable beds of oil-bearing shales in the South of England seems to be definitely proven, and, now that the Kent Coalfield is producing large tonnages of good coal from ample reserves, there seems reason to expect a territorial readjustment of industrial activities in England of a nature that could not have been remotely guessed at fifty years ago.

The connection of the Kent Coalfield along the course of the Thames Valley with the Coalfield of the Forest of Dean is a possibility seriously discussed. Should workable deposits of coal be ever reached in this part of England it will still further postpone Britain's descent to the home of the everlasting bow-bows, monotonously forecasted as her speedy destination from time immemorial.

NEWFOUNDLAND.

In this issue will be found a full and fair account of the status of the mineral industry in Newfoundland, given by Mr. D. James Davies, the Government Analyst, before the Imperial Mineral Resources Bureau. Mr. Davies correctly states that Newfoundland is a country "which is on the whole practically undeveloped". He has also to admit that for many years no geological work has been done by the Newfoundland Government, and, while it mentioned that the Natural Resources Department of the Reid Newfoundland Company has done excellent work in geological investigations, private enterprise in what is in every other country considered a national affair, does not excuse the omission of the Newfoundland Government. It is this very lack of the functions of a Geological Survey, to wit, investigation and publication to the outside world of the result of investigation, that accounts for the paucity of information regarding Newfoundland in encyclopaedias and geography manuals that Mr. Davies complained of in London. References in current literature cannot be made unless there is a source for the references. We had occasion recently in reviewing Dr. F. H. Hatch's little manual on Mineralogy to note the omission of any reference to the Wabana ore deposit. We might note that the Germans were extremely well informed about Wabana in the days before the War, but they did not get their information through government reports.

DAYLIGHT SAVING IS COAL SAVING.

The "Electrical News" states that in a paper read before the Illuminating Engineers Society of the United States, Mr. Preston S. Millar discusses the advantages and disadvantages of daylight saving. Statistics are given showing the estimated saving in coal consumption and expenditure for artificial light in that part of the United States lying north of the Potomac and Ohio Rivers and east of the Mississippi River.

Mr. Millar estimates the reduced output of electric light and gas stations to have been as follows :

Reduced electricity output, total systems,
during seven summer months .. .. 3 per cent.
Ditto — residential loads only .. .. .. 8 per cent.
Ditto — gas station, total output .. .. 3 per cent.

Estimates of the approximate saving in coal and light expenditures throughout the United States during seven summer months under daylight saving are as follows :

	Annual Saving in Coal tons	Annual Saving in Expenditure for Electric Light
Electricity ,(central stations)	300,000	$14,000,000
Gas	195,000	5,250,000
	495,000	$19,250,000

Mr. Millar's conclusions are that daylight saving has disadvantages that exceed the undoubted advantages, but it has been generally overlooked that the primary reason for adopting daylight saving during the war years was to save coal and light expenditures, and, insofar as this has been achieved, the adoption has been convincingly justified.

In Europe, where the necessity to economise in coal and every other form of motive power, is infinitely greater than it has ever been on this side of the water, the justification of daylight saving on the economic score is still more complete, and "Summer Time" is probably an established institution in Europe for this generation.

Long before the daylight saving idea was brought to public attention by the exigencies of the war, it had been the custom in mining camps situated at points remote from a railway, to put the clock forward by degrees in the Spring, the idea being to gain extra hours of daylight for outdoor operations, and to save on power consumption for artificial light.

The discussion on daylight saving in North America has unfortunately degenerated into a phase of that deplorable hostility that has come to exist between the town and the country, and it is well to remember

that the questions of suburban gardening, hours of labor and morning dews had nothing to do with the action of governments in their original adoption of daylight saving legislation. It was adopted to save coal, and that it certainly has done.

EN PASSANT.

One result of the Press Conference that will be very pleasing to Canadian readers is the announcement made by the Managing Director of Reuter's Agency that a news service for Canada is being arranged that will "relieve the Canadian press from the innocent and unconscious, but none the less harmful, coloring of American news." This is prettily put.

If we could also have London cables that were free from political coloring the Canadian reader might have a chance to form independent opinions on European situations without having to wait for the arrival of European newspapers. How it is that no person appears able to transmit news from Europe without seeking to stamp it with some bias intended to form public opinion in Canada? It is news we require, not interpretations.

A conflict for priority between shipments of coal and shipments of wheat eastward from Alberta is causing criticism of the Canadian National Railway in the West. The Regina "Morning Leader" states: "the consumption of western coal in Manitoba, and even in the East, has become permanent. But the farmers ought not to be obliged to pay the penalty for that condition, or for the failure of other interests to make use of the railways at the proper season."

Any appropriations made for the enlargement and renewal of rolling-stock on the railways ought to take into consideration adequate provision for the carriage of coal eastwards. The export of coal from Alberta is going to require a large number of freight cars designed to carry coal for long distances in heavy individual loads with protection against the weather, and the railway that sees first the opportunity that coal carriage affords is going to reap a deserved reward.

The Toronto "Globe" quotes the assertion of the Railway Association of Canada that "antiquated, overloaded and wasteful systems of distributing goods are much more properly a subject for public anxiety" than railway charges. This statement also asserts that "serious additions to cost by the distributing trades will be found in relation to almost every article of common household use." The "Globe" considers this statement to be in the nature of a challenge to Boards of Trade, demanding an answer.

In the matter of coal distribution, the Railway Association's statement is exactly descriptive of the facts and corroborates a conclusion several times urged in these columns, namely, that the coal operator, in self-defence, should wherever possible, control the distribution of coal to the point of the ultimate consumers' yard or cellar.

A Toronto newspaper falls into a curious error in discussing the abortive O.B.U. strike in Alberta. It states the "alleged cause of the trouble in Alberta is "the refusal of the mine operators to abolish the "'check-off', a long standing system for recording "the miner's output." The "check-off" of course is only another name for the "closed-shop", and it is the regulation which was enforced by the Government which permits only members of the United Mine Workers in good standing to work in the coal mines which is the ostensible reason for the strike call of the O.B.U. If this were all the O.B.U. stood for, that organization would have a fair case, but their aims only need to be expounded in order to meet defeat in Canada. Nevertheless, in objecting to the "check-off" the O.B.U. has demonstrated the boomerang action of violating a principle for reasons of expediency.

The latest indication of the changing nature of trade routes in North America is the announcement that the Granby Consolidated Mining & Smelting Company is arranging to send its smelter product to the refineries in New England by steamer from Vancouver via the Panama Canal. A similar announcement is made regarding the smelter product of the Anaconda Copper Company, shipments being made in this case from Seattle. There is somewhere west of the Great Lakes a "watershed" of rail traffic not as yet clearly defined, but becoming so. Along this line will be the division between eastward-bound rail traffic and westward-bound, and we believe the line of departure lies well east of the Rockies.

INTEREST IN FIRST-AID AND MINE-RESCUE TRAINING AT NANAIMO, B.C.

The presentation of medals and trophies to the winners in the first-aid and mine-rescue competitions held at Ladysmith, B.C., on Labor Day was made the occasion of a social gathering at Nanaimo recently.

The presentation of prizes was made by John Thompson, who congratulated the teams on the splendid work done during the past year both in Mine Rescue and First Aid work. Mr. Laird responded on behalf of the Rescue Team, and hoped to see more of the young men in this year for rescue work. D. H. Simpson's team won the Novices' Shield presented by the Canadian Western Fuel Co., and also the Mines Department Cup with gold medals and the Team event against all comers at Ladysmith, and the Niven Cup.

BORING FOR OIL AT DAUPHIN, MANITOBA.

The Manitoba Government is testing the presence of oil in the Dauphin District at a point six miles north of Winnipegosis by drilling. Boring has been commenced.

"THE TIN DEPOSITS OF VIRGINIA, U.S.A."

By Alex. Gray, Montreal

Under that caption the "Canadian Mining Journal" last week published a brief article from the pen of Mr. Marshall Haney.

The description of the tin occurrences of Virginia and North Carolina hardly is complete, however, without more details as to the experiences of those who gave their attention to those convenient fields.

Whether the cassiterite occurs in quartz veins—or pegmatites—is not material. As one of those who devoted some time and money to these veins, or dykes, fifteen years ago, it may not be inopportune to state that they emphasize the sagacity of the "Cousin Jack" tenet: "Where it is; there it is". Having found cassiterites very elusive throughout the Cornish mines—the crystals being insufficient to yield other than a small percentage of the turnover of ore, the "Cousin Jack" arrived at the conclusion that tin would not be so precious if it was more plentiful. This, notwithstanding the Cornish mines have been worked off and on, more or less continuously, since the Phoenicians paddled or sailed thence.

Tin mining, even in Cornwall became precarious, so much so that were it not for the Straits Settlement supplies the world long since would have been without its standard dinner pail. In later years Tasmania contributed a quantity of cassiterite, and more recently, Bolivia, and South Africa. Of the latter, those of us who felt that the earliest Cornish "carbonas" were going to be dwarfed by the South African deposits, had reason to take the "Cousin Jack" view that cassiterite in bulk couldn't be where it wasn't. The greisen was all it ought to be but, as one sage asserted: "There were not enough fish in the stream", lateral and vertical continuity of the "pockets", the local enrichments, was lacking.

In a sense, the same is true of the Virginia and North Carolina occurrences. They have every operating advantage, are close to transportation and supplies. Labor is accessible, but the percent of cassiterite content made of the openings and shafts spoken of by Mr. Henry so many graveyards. The average yield in cassiterite was too low, regardless of the advantageous working facilities.

About the only benefit resulting to one or two of us from that adventure in the section dealt with by Mr. Haney was, that it made us familiar with Appalachian features informative as to Porcupine when it was revealed. Gold, bearing rocks of Virginia had not been subjected to denudation, the ore was practically free, milling at outcrop. Denudation had taken place in the Ontario North Country, hence the difference between what existed there at outcrop and the outcropping characteristics of the Virginia country.

That has nothing to do with the Virginia-North Carolina tin areas, of course, but the experience as recorded will serve to negative the roseate presentation of Mr. Haney. There is cassiterite down there, not enough of it to "do the needful."

OBITUARY.

The death is announced of Major Francis C. Connery, late the Assistant Sales Manager of the Canada Wire & Cable Co., of Toronto, on September 18th.

BOOK REVIEW

Modern Tunneling. With Special Reference to Mine and Water-supply Tunnels. By David W. Brunton and John A. Davis. Linen Cloth Boards. 6 by 9 by 1¼ inches. 450 pages with Bibliography and Index. John Wiley & Sons. New York, $4.50.

This is a comprehensive treatise on the art of tunneling, more particularly as practised in connection with the extraction of minerals and in the drainage of mine workings. The authors are well known as experts on tunneling, and write from personal knowledge of many of the tunneling operations they describe. The section on "Tunneling" in Peele's mining engineers' handbook was prepared by them also.

The history of tunneling is concisely, but very interestingly dealt with, particularly in the recital of the achievements of the ancients in rock excavation with the aid of primitive appliances. Mention is made of the stupendous undertakings for mine drainage before the invention of the steam pump, the drainage depth secured being, to modern ideas, very disproportionate to the labor involved. A complete resume of modern tunnels, giving all essential particulars in each case, makes a valuable chapter.

The choice of power for tunnel work is considered from many angles, and much attention is given to all phases of air-compression in relation to tunneling. Ventilation, rock-drilling machines, haulage, and incidental surface and underground equipment are each discussed with numerous illustrations. The methods employed in drilling, blasting, removal of material and timbering are described and criticised. A large chapter is given to means of securing safety in tunneling work. Very detailed figures are given on the cost of individual tunnels, which include the Coronado, Gunnison, Laramie-Poudre, Lucania, Marshall-Russell, Mission, Newhouse, Rawley, Roosevelt, Stilwell, and Strawberry tunnels, and the Los Angeles Aqueduct.

A bibliography of sixty pages is appended giving the references to literature arranged under the sequence of subjects used in the chapters of the book.

The work is unusually well bound, and is printed on good quality paper. It contains information of value to the mining engineer having charge of underground excavations.

The authors state they have "endeavored to lay stress upon safe, efficient and economical methods, and upon good points of equipment, while bad practice and obsolete machinery is ignored, except, as examples of the inadvisable, or as they have some bearing historically."

PERSONAL.

Mr. E. L. Bruce has been appointed Professor of Mineralogy at Queen's University, Kingston, and has taken up his duties.

The plain man, who takes his politics seriously enough when occasion needs, is not overly enthused over the present tariff discussion, as he has a sneaking belief—probably not clearly defined in his own mind—that if those who are so vociferously advocating abolition of tariffs were in a position to put the machinery into motion to bring this about, they would, like so many before them, not dare the experiment for fear of the consequences.

The Design of Chutes and Ore Bins

By JOHN S. WATTS, New Glasgow.

The functions to be performed by a chute, appear at first sight, to be so simple, as to often lead to failure to produce a satisfactory design, from a lack of appreciation of the vital points to be considered. Literature on this subject, is very meagre, so that the designer has practically nothing to guide him, but his own probably limited experience.

The minimum slope, which will cause the material to slide down the chute is variable for different materials, and even for the same material, under different climatic conditions, and also varies with the sizes and quantity of lumps and fines. The manner of delivery into the chute has also some effect.

Below is given a table for some of the more common materials met with, showing the slope or gradient at which they will slide under fair average conditions. That is with the material reasonably dry, with only a small percentage of fines, and the bottom of the chute, being made of smooth flat steel plates, without projecting rivet or bolt heads.

Coal in lump size, 18½° from the horizontal.
Coal in small sizes, 27° from the horizontal.
Iron ore, 38° from the horizontal.
Gravel, 40° from the horizontal.
Sand, 38° from the horizontal.

These gradients are stated in degrees from the horizontal and should be considered the absolute minimum. Whenever possible the angles should be determined by actual experiment on the material to be handled.

It should be noted, that when the material is held in the bin or chute, by closing a gate, and the material allowed to settle, the above gradients will need to be increased, by two or more degrees, depending upon its nature, to overcome the increased friction of the material when at rest.

In designing bins, the bottom should be shaped and graded in all directions, leading to the gate, at the inclination required to start the material sliding, after being allowed to settle to rest.

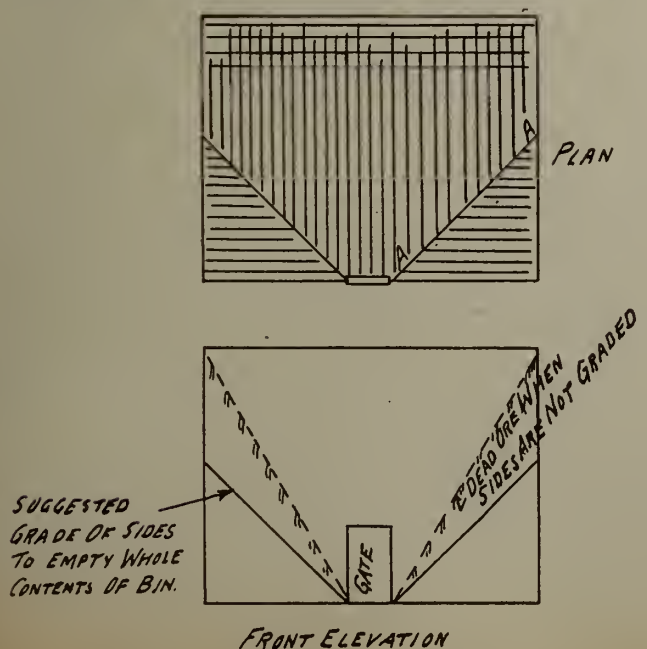

Fig. 1.

The effective storage capacity of a bin which will completely empty itself, is much greater than that of one of equal total capacity, which cannot be completely emptied, by gravity alone, because, that part of a bin, where the bottom layer of material refuses to move, becomes filled up and is no longer available. The angle of repose, of the material in the dead part of the bin, may be sixty degrees or more, whereas by grading the bottom of the bin, to that angle required to keep the material moving, which will not usually be more than forty-five degrees, we gain for effective use the space enclosed between the angles of forty-five and sixty degrees.

This may be more clearly understood, by referring to Figure 1, and it must be noted that the inclination to the horizontal of the two inclined surfaces, must be sufficient to make the inclination along the valley, line AA, that which is necessary to start the material sliding under the worst conditions.

It is sometimes necessary to use a twin chute, such as is shown in Figure 2, to take the material from two receiving points to one common delivery point. Obviously, the inclination along line BB, is less than the angle B, and therefore the angle O, must be made such that the angle of inclination, from the horizontal, along line BB, will be that required to cause the material to slide.

When a long chute is used, delivering on to a rubber belt, and the material is mixed lumps and fines, it will be found that the grade which is right for the fines, will be too steep for the lumps, and that the larger pieces will gather so much velocity, that they will cut the belt, and probably bounce off it.

The remedy for this, is to have the chute made in two decks, the upper deck being fitted with a screen,

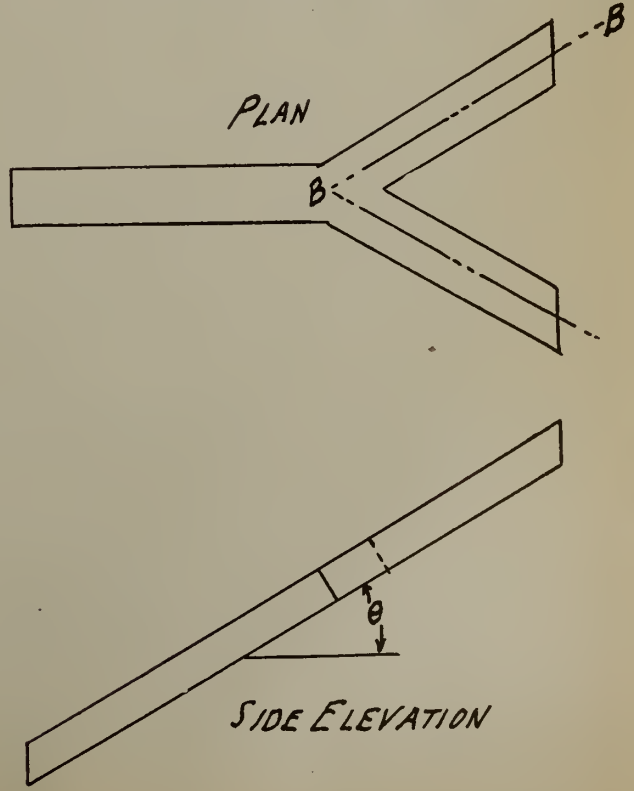

Fig. 2.

to take out the fines, which will fall into the lower deck. The upper and lower decks can then be arranged to have different inclinations, to suit the different sizes, and should preferably be hung, separately, on eye-bolts fitted with turnbuckles; so that the inclinations can be adjusted to suit, and if necessary, altered to take care of the varying velocities, due to variable climatic conditions.

When an extra long chute is required, the grade required to keep the material moving at the top, will cause it to attain a high velocity when the ore reaches the bottom. If the ore is hard, this high speed will cause the lumps to cut and abrade the belt. This can be cured by making the chute as outlined in Figure 3, the curved part of which, at the lower end, can be set so as to reduce the velocity of the material to that of the belt, and so prevent any damage to the belt at the loading point.

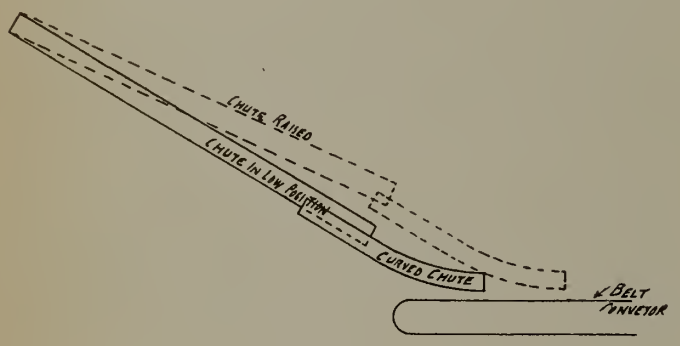

Fig. 3

By making the chute in two sections, as shown, hung on adjustable hangers, as suggested before, the grade of each chute can be adjusted independently, so as to get just the right velocity, and, at the same time keep the delivery end of the chute, just high enough to clear the belt, and avoid dropping the material on to the belt and so cutting the surface.

If, in addition, the chute is made a double decked one, as described above, the fines will be fed into the belt first, and give a perfect protection to the belt against damage by the larger pieces, making an ideal arrangement under all the varying conditions.

When the delivery chute, is at right angles to the belt, and the belt is to be used as a picking table; in which case, the material has to be spread over the width of the belt, in a thin even stream, to enable the impurities to be seen and removed, an effort is sometimes made to get this spreading effect, by cutting off the end of the chute at an angle of 45°.

In the plan view, Figure 4, this idea looks allright, but a study of the elevation will show that the point C, is much too high above the picking table, and the material dropping from this point will be detrimental either to the belt or to the material.

This damage can be averted, by making the line, CD, level, when the chute will appear as shown by the dotted lines in the elevation, but this gives a steeper grade along the side C, then along the side D, and destroys the even spreading of the material, by inducing the bulk of the ore to run to the point C, and leaving the rest of the chute bare.

If the material is uniform in size, and delivered to the chute in small quantities at a time, it can be prevented from travelling across the chute, by fitting

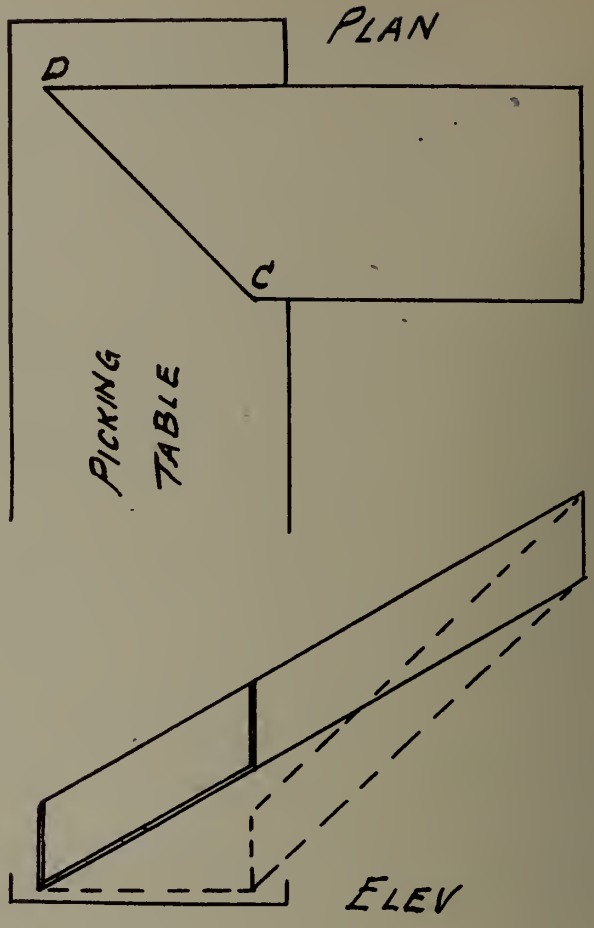

Fig. 4.

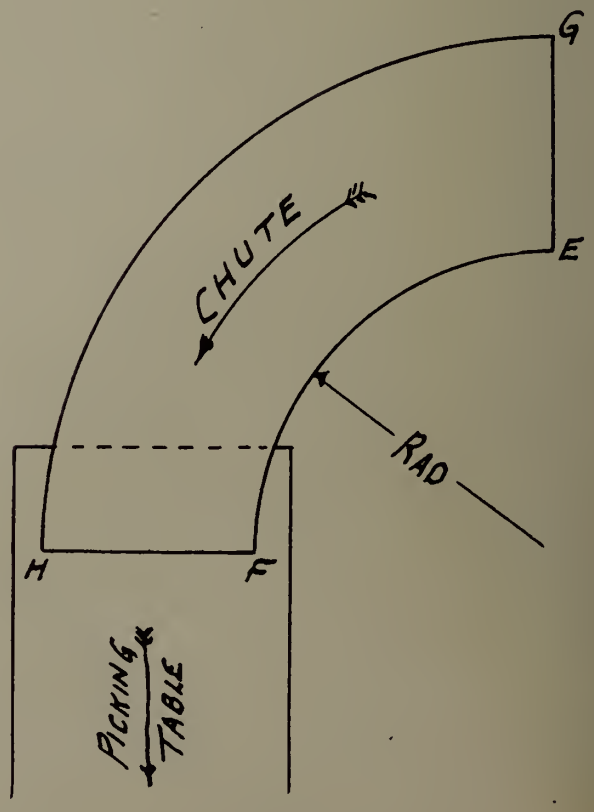

Fig. 5.

angle or the bars longitudinally along the bottom of the chute, and so forming channels compelling the material to travel parallel to the chute sides.

The neatest way however, is to fit a helical chute as shown in Figure 5. This type takes more head room, and is more expensive to make, but will accomplish the purpose more successfully, if properly designed and made, than any other type of chute.

In this helical chute, we have, as in the last one, a steeper grade along line E.F., than along line GH, but the centrifugal force acts against the tendency to fall towards point F, and if the radius of the chute, is not made too small, will give an evenly spread delivery on to the picking table. The smaller this radius, the greater will be the difference between the grades along the two sides.

Another case, that requires consideration to evolve a satisfactory chute, is that shown in Figure 6. In this case, the chute is a twin one, having one receiving end, and two delivery points, to two picking tables. The conditions to be met, are, that the grades must follow

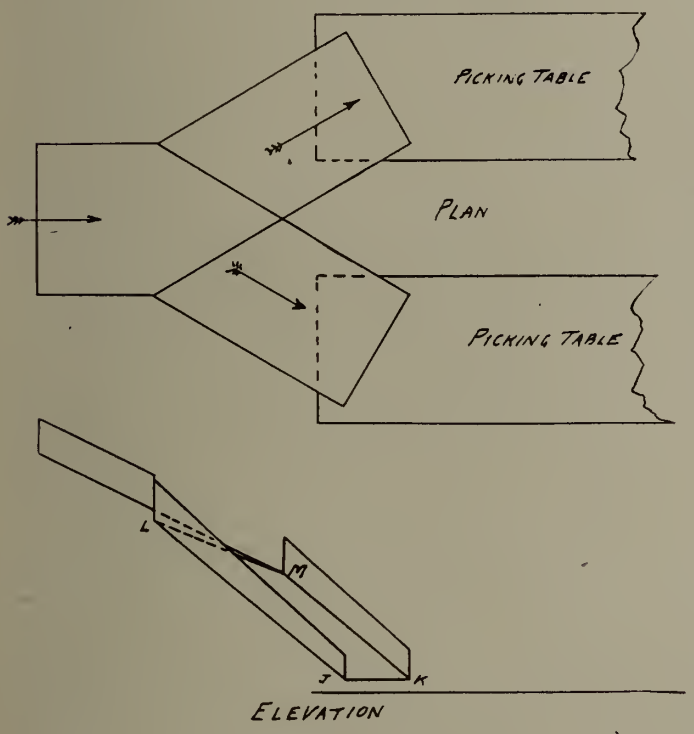

Fig. 6.

the arrow heads, shown on the plan, in order that the stream may be of even thickness across the width of the two parts of the chute.

To arrange this, it is obvious that lines LJ, and MK must be parallel, and in the same plane, and this will usually involve having a slight drop at the point L, taping off to nothing at point M. By a judicious arrangement of the respective grades in the single and in the twin parts of the chute, the drop at point L can be kept to a minimum, and sometimes eliminated. This depends upon the conditions as to centers of picking tables, length and height available, and can only be determined by laying out to scale on the drawing board.

CONSOLIDATED MINING & SMELTING COMPANY ASK INCREASED TARIFF PROTECTION ON LEAD AND COPPER-WIRE RODS

Mr. Warren, the General Manager of the Consolidated Mining & Smelting Company, presented the position of the products of the Trail Smelter during the recent visit of the Tariff Enquiry Board to the West. A readjustment of the tariff protection now given was suggested as necessary by Mr. Warren to meet changing conditions in exchange with European countries, particularly the German mark. Pending consultations between the Consolidated Company and representatives of the lead-metal trade on the advisability of a graded schedule of tariff increases designed to meet the exchange situation, and with representatives of Canadian copper-wire mills, Mr. Warren suggested tentative consideration of a specific duty of two cents per pound on pig lead, and 1 1-2 cents per lb. on copper-wire rods, a bounty on zinc exports, a temporary embargo on zinc imports and $1.50 a ton duty on fluorspar.

Some of the statements made by Mr. Warren were as follows :

Lead

The trial plant could produce 100 tons of refined pig lead daily, just about the normal consumption in Canada, though it had not been doing so lately because of mining strikes. There is now a specific duty of one cent a pound on pig lead imposed in 1919, when the 15 per cent. duty and war tax of 7 1-2 per cent. were removed on the ground that some protection was needed because of the large surplus quantities of Mexican pig lead then held in Great Britain and France ; that Mexican lead was still available for the Canadian market, and in addition Spanish, German and Belgian lead could get into Canada under the British preference by reason of being "touched up" in England before coming to Canada.

British Preference Unfair

Mr. Warren said the British preference was unfair and without justification. They produce only 7,000 tons of lead in England a year and yet they send this lead from Germany or Spain to us under the preference at three-quarter cent a pound duty. The witness pointed out that at the average price of pig lead on the United States market for the last six months of eight cents a pound, the United States duty of 25 per cent amounted to two cents pound. Even with that protection the price in the last month of pig lead had dropped from $8.75 to $7.45 a cwt., and their own price was $7.80 to Montreal and $7.75 to New York, to meet British competition with the cheap leads obtained from Mexico, Spain, Germany and Belgium. In spite of the two cents duty in the United States the United States price had been forced down to $7.75 by the Mexican and European leads.

Asks 2c per lb. on pig Lead

He claimed the Canadian pig lead should have at least an equal protection of two cents a pound. The real difficulty in meeting this competition, however, was that just now the English pound sterling is worth about $3.90 in Canadian funds and the German mark depreciated to a still greater extent. The exchange situation negatives the protection on a wide variety of Canadian products besides lead.

"With the German mark where it is we cannot

compete with any German product", he said. "As soon as they can make all they need for their own purposes we will have a merry time competing with them and so far as lead is concerned there is grave danger that the producer cannot complete at least until the exchange situation is normal, unless additional protection be granted or an embargo be placed against their import."

Copper

With respect to copper, Mr. Warren's proposal was that the 1 1-2 cents a pound duty on copper ingots should be extended to include copper wire rods, which are now free when drawn into wire in Canadian plants. While the war duty of 7 1-2 per cent. was on the company began to build a wire rod mill so that it might supply the 12,000 tons of copper rods consumed by the five Canadian wire concerns in making telegraph wires, transmission wires, cables, etc. In addition to the wire rod consumption the normal Canadian consumption was only 6,000 tons in the form of ingots. The ingot demand could be filled with the company's copper refinery established during the war at the request of the British Government, with a capacity of 20 tons daily. To supply the Canadian consumer at a reasonable price it was necessary to increase the capacity of the copper plant 60 or 70 tons a day. That could be done only by building a rod mill so that the increased copper output could be made into wire rods, enabling the company to fill the whole domestic demand. This also necessitated arrangements being made to secure a supply of copper ore or concentrates sufficient to supply the enlarged plant.

$4,000,000 expended to enlarge copper production

Contracts had been entered into with the Canada Copper Corporation under which a $2,000,000 railway branch line had been built from Princeton to the large copper deposit it controlled nearby. The power line of the subsidiary company, The West Kootenay Power & Light Company, Ltd., had been extended 100 miles from Greenwood to the mines at a cost of $1,250,000, and extensions had been made to the smelter costing $750,000, including $250,000 on the wire rod mill.

Smelter paying 1 1-2c. over New York prices

Hitherto the wire rod consumption in Canada, had either been produced in the United States or made in the United States from copper matte or blister copper exported from Canada. To get ores from the Canada Copper Corporation and to induce it to make the huge expenditures mentioned, the smelter had agreed to pay one-half cent a pound over the New York price. As there was no duty on copper going into the United States, all these provisions had to be made in order to keep the ores in Canada. There was no market for copper in the West either in the United States or Canada, and in shipping East, the Anaconda Smelter, which dominated the interior on the United States side, and the Trial Smelter in Canada, had to meet New York prices based on metals obtained by water from such sources as Chili.

Toronto, Montreal and Hamilton formed the Canadian market for copper ingots and wire rods. The freight rates for that market were therefore lower from New York, being 47 1-2 cents a cwt. to Toronto and 46 cents to Montreal, as against the new freight rates of 95 1-2 cents a cwt. from Trail to Toronto and $1.10 to Montreal.

The cost of conversion of the copper into wire rods was two cents a pound, double the pre-war cost. Fifteen per cent, of the copper ores came from the company's own mines and the rest were custom ores from independent mines. The New York price on copper rods was 20 cents a pound plus the freight. The duty of 1 1-2 cents asked for would absorb the difference in freight, the half a cent extra paid for the ores, and leave a small balance as protection.

Zinc

The zinc situation is entirely different. The Canadian consumption normally is 10,000 tons annually, and the company's zinc plant capacity exceeds 25,000 tons, developed primarily to provide high-grade zinc for munition purposes. In disposing of its surplus it competes in European markets with Germany, Belgium and the United States, and in the Orient with Australia, as well as with factories and mines in consuming countries. The company's zinc, being produced electrolytically, is superior to most zinc made by a distillation process. In war times that was a great advantage, but in peace time for most purposes the purer zinc would get the preference only when quoted at the same price.

Company Propose Roll Zinc Sheets

As large part of the world consumption was in the form of sheets, the company proposed to put in a zinc rolling mill, and it felt, it should have a bounty on foreign business in order that it might supply the British market. Until foreign exchange righted itself further protection also was needed. Five hundred tons of German zinc were offered in Eastern Canada last month. Australia's example in protecting its electrolytic zinc industry by a temporary general embargo against the importation of zinc, he thought, should be followed partially in Canada by making a limited embargo against all but Great Britain and the United States.

As world-selling prices on metals cannot be increased by Canadian duties, Mr. Warren protested against the freight rate increase in constituting a "direct contribution from the company to the railways." The company had always been handicapped by the long freight haul, and a 35 per cent. increase on its greater rate obviously made the burden heavier than it did to their competitors in New York on copper and lead, and in St. Louis on lead and zinc, with their shorter hauls, and, consequently, lower rates.

Formerly the difference had only been equal to one-third cent a pound, but now it was one-half cent a pound. In considering the duties he asked that this should be taken into account.

Besides the lead, copper and zinc, the company produces refined gold, refined silver, bluestone, fluorspar, and both sulphuric and hydro-fluo silicate acids. With respect to fluospar needed by the company to produce hydro-fluo silicate acid for refining lead, and sent to Canadian steel firms in its raw state, Mr. Warren wanted $1.50 a ton duty, the same as the United States duty.

While the war duty of 7 1-2 per cent. was in force the company secured a large deposit of rock near Grand Forks, B. C., spending $250,000 in developing and equipping it, with a concentrating mill. The company's product went no farther east than the Soo, the Eastern iron plants being supplied from a deposit of the rock near Madoc, Ont. He feared that in the course of time Great Britain and the United States would resume their pre-war trade.

The Mineral Resources of Newfoundland

An Address by D. James Davies, Government Analyst, Newfoundland, given before the Imperial Mineral Resources Bureau, June 4th.

I have to express my warmest thanks to Lord Morris, your Vice-Chairman, for this opportunity of addressing you on the mineral possibilities of Britain's oldest Colony, — Newfoundland. The making up of this address has been rather uphill work, partly because most of the data necessary are in my office in St. John's and partly because most of our mineral areas and prospects at the present time are in the possibility stage, but if we can obtain the sympathy and co-operation of this Bureau, we hope that many of our prospects will be promoted in a short time from the possibility to the probability class.

Newfoundland has been rather ill-used by the Mother Country in the past and she has had to sit tight for decades listening to and reading about the glories and great resources of her big younger sisters —Canada, Australia and South Africa. She has had to be satisfied with only a column or so in the various popular encyclopaedias describing her fogs and fish. The geography books devote only a paragraph or two to this Island, which formed the foundation of our great Empire. I suppose the official and academic classes of the Mother Country have regarded Newfoundland for centuries as a fish shop far beneath their notice.

We are in the unfortunate position of being a badly advertised country situated quite closely to Canada and the United States, the best advertisers in the world today. We hope to get this defect remedied very shortly. We have today a few live men, chief among them is Lord Morris, who are bent on placing Newfoundland on the map, men who are bent on advertising her big iron ore and copper ore deposits, and in a few years time, we hope, when we visit this country that we will not have to tell otherwise well informed people, that we are not Canadians and that we are not fighting for a bare existence among the Esquimaux in the Arctic Circle.

Geological Survey of Newfoundland Required.

I am sorry to have to state that the geology of Newfoundland has not been determined in detail. A good deal of geological work was accomplished by Mr. Andrew Murray, our first geological surveyor, and after the death of Mr. Murray the work was carried on by the late Mr. Howley. For many years no geological work has been done by the Government, but, during the past two years some excellent work has been accomplished by the Reid Newfoundland Natural Resources Department — this Department employs many good geologists, who have served their apprenticeship with the United States and Canadian Geological Surveys.

The predominant formation in Newfoundland is the Precambrian which is subdivided into Huronian, Laureutian, and Avalonion. Avalonian is a local term applied to some of the Pre-Cambrian rocks of the Peninsula of Avalon because it has not been determined, as yet, to which sub-division of the Pre-Cambrian these rocks rightly belong.

I am told that the Newfoundland Pre-Cambrian resembles, in many respects, the Canadian Pre-Cambrian — the greatest mineral-bearing formation in North America—the rocks in which occur the great mineral-bearing bands of Sudbury and other North American districts. In Newfoundland we have the geological formation which is known to contain large mineral deposits in Canada and I know from my experience covering many years as Government Analyst for the Dominion, that we have a great variety of metalliferous and non-metalliferous ores occurring in the Island.

Even though the geological work done has not been by any means thorough and the prospecting work has been patchy and confined, more or less, to the coast, we might lay claim already to being a mining country. We possess in Bell Island one of the greatest iron ore deposits in the world. The geology of the Bell Island district has been worked very thoroughly by professors and students from Princeton University. A few particulars and figures concerning this mine, though they are widely known, might not be out of place in this address.

The Wabana Iron Ore Deposit.

The red rocks of Bell Island were used by sailors for anchors and ballast before the actual economic value of the rocks were realised—when the nature of the ore was recognized the property was taken up by Messrs. Butler and Topsail and sold by them to the Nova Scotia Steel and Coal Company in 1893. The first development work was carried out immediately and in 1895 preparations were made for large shipments of ore. In 1899 a portion of the areas was sold to the Dominion Iron and Steel Company. This Company acquired the lower ore bed, the Nova Scotia Company reserving for themselves the upper bed, which was superior to any of the other seams. The sale included a submarine area of 3 square miles adjoining the shore. Additional submarine areas were acquired from time to time as the work on the ore beds progressed and at the present time the Nova Scotia Company own about 83½ square miles and the Dominion Iron and Steel Company about 5½ square miles.

Many geologists have estimated the available commercial ore in these beds; Howley's estimate reached a total of 3,635,343,360 tons.

H. Kilburn Scott, of London, in 1909 estimated the ore on the Scotia property alone to total 652,500,000 tons and total recoverable ore, deducting that lost in pillars, faults and pier zones to total 395,525,000 tons.

Edwin E. Ellis, of Birmingham, Alabana, at one time with the United States Geological Survey, said that claims had been taken as far as 12 miles out from the shore and that it is planned to operate workings of that length—allowing for workings five miles long he estimated the ore at 3,250,000,000 tons.

Edwin C. Echel testified that in Newfoundland there were 3,500,000,000 tons of economically available ore within a radius of five miles of Bell Island—besides this there are billions of tons which are not economically available at this time. In one deposit alone in the Newfoundland district, he said, that the ore runs thirty feet thick and contains about 90,000,000 tons to the square mile.

During the year 1919 a pair of slopes were completed at Bell Island, the construction of which means to the Nova Scotia Steel and Coal Company a permanent supply of iron ore of enormous extent. They are now producing 1,200 tons of ore per day—with improved labour conditions this quantity can be much increased. These workings are over two miles to the dip from the outcrop of the bed and the slopes are among the longest known, yet, the ore extends below their deepest point.

During the past twenty-four years the blast furnaces of the Nova Scotia & Dominion Companies in Sydney Harbour have been supplied and several millions of tons exported in addition from an area of about two square miles of the ore field. The submarine holdings of the Scotia Company cover an area of 83½ square miles and of the Dominion Company 5½ square miles—a total of 89 square miles and the same geological conditions are believed to extend over the greater part of these areas.

Years	Nova Scotia Company	Dom. Iron & Steel Co.
	Tons	
1917	60,735	653,600
1918	76,767	639,300
1919	219,410	478,134

Total: 1917, 713,975 tons. 1918, 716,067 tons. 1919, 691,944 tons,

practically an average of 700,000 tons per year.

On the Mainland immediately adjacent to Bell Island, on the shores of Conception Bay and Bay de Verde district, one can hardly dig a foot or two below the surface soil without coming in contact with lumps of rich haematite ore. These districts apparently, simply require the necessary capital and expert supervision to make them busy mining centres and incidentally to bring Newfoundland to the very front rank as an exporter of iron ore. Besides these haematite deposits, we have very big deposits of titaniferous magnetites on the West Coast and sooner or later it may become necessary for the smelters to adapt their furnaces for the smelting of such ores.

Copper Ores.

In Newfoundland copper ores rank next in importance to iron ores both from the point of view of development and probable existence on a large scale.

The locality of greatest development in copper mining is Notre Dame Bay on the East Coast. The map in this Bay is black with fee simple properties which were taken up and partly developed during the copper boom in the seventies and eighties—a time when it was necessary to ship eight and ten per cent hand-dressed ores in order to make a profit—a time when the present cheap concentration methods for sulphide ores were not available. Thousands upon thousands of tons of copper ore have been shipped from the various mines in this area in past years, but most, if not all the mines, were closed down about the same time on account of a slump in the price of copper, and in some cases on account of poor mine management. I have here a few brief particulars of the more important mining locations in this Bay.

Tilt Cove or the Union Mine

Operations, which were started in 1864, have been continued, more or less, spasmodically almost up to the present time. The total shipment from the mine to dat as far as can be ascertained from available returns, have been 1,491,136 tons of ore, 78,015 tons of regulus, 5,418 tons of copper ingots. I am told on reliable authority that there are at least one million tons of commercial copper ore in sight at Tilt Cove at the present time.

Betts Cove.

This mine was opened in 1875 and it was worked with great activity for ten years during which period 130,-682 tons of ore and regulus were shipped, besides 2,450 tons or iron pyrites. Work was suspended on this mine in 1885 owing to the caving in of the mine bluff. It is thought the ore was far from being exhausted when the mine was closed down. The other localities which gave the most promise in this Bay were Barton's Pond, the Colchester Mine, S. W. Arm, Shoal Arm, Little Bay, Whales Back, Hall's Bay, Sanday Cove Island, Rabbitt's Arm, Thimble Tickle, Seal Bay. According to Mr. Howley's reports, the most celebrated of all the fore-going was the Little Bay mine. Operations were begun in August 1878, yet before the end of the season (presumably early in December) some 10,000 tons of ore were raised and shipped to Swansea. Between 1880 and 1885 61,796 tons were shipped from the mine. From 1885 to 1892 over 40,000 tons of ore, regulus and igots of copper are given in the Customs returns. This mine was closed down about the same time as the others, but now extensive development work is being done at Little Bay and great things are expected of it in the very near future.

Between the years 1880 and 1882 the South West Arm Mine yielded 490 tons of ore, Halls Bay 240 tons, while Rabbitt's Arm Mine which was worked for only one year, yielded 1,260 tons of ore averaging twenty-eight per cent of copper. There is a highly mineralized section around Gull Pond, a few miles inland from the shores of Notre Dame Bay and a local development company, with local capital, are operating in that locality at the present time.

Quite a deposit of native copper is found in Oderin Island, Placentia Bay. Some development work has been done and the opinion of mining engineers, who have visited the Island from time to time, is that it is well worthy of investigation. Another prospect which I believe is now being investigated is situated on the Island of Presque, Placentia Bay.

So far I have only touched on these areas where successful mining has already been caried on. We have many other areas which may not hold forth at this time very much inducement to capitalists, but at the same time they are decidedly worthy of investigation by the Government or some other body who is desirous of tapping new resources for our Empire.

Manganese Ores.

Around the shores of Conception Bay we have a very big deposit of manganese ores partly carbonate and partly oxide. These beds are of lower Cambrian age and according to Dr. Dale, formerly of Princeton, the original area of this manganese was approximately from 200 to 300 square miles. Very little work has been done on this deposit. Surface samples have been analysed at the Government Laboratory from time to time. Those from Topsail and Manuels are, as a rule, very low grade, containing from 25 to 28 per cent total manganese. One sample from a ten inch vein at Manuels gave 37 per cent total manganese and one from Hopewell, about six miles west of Kelligrews, gave 38 per cent.

Some development work was done at Topsail some years ago. The manganese at this place is found in

several beds, one of which measuring 1.4 feet appears, according to Dr. Dale, to have been of sufficient importance to have warranted prospecting work being done. The most promising of all the manganese prospects in Conception Bay, is that which is situated at Brigus Head, South Point. Some mining work has already been accomplished at this place and two schooners loads (about 400 tons) were shipped abroad in the summer of 1917. I sampled these cargoes and the average manganese content obtained was about 36 per cent. I took a few chuncks from a vein at Brigns Head the same year and I obtained 44.5 per cent of total manganese.

Mr. A. C. Hayes, of Princeton, visited Brigus Head in 1912 and he says that the best manganese measured 4.5 feet thick in a zone fifteen feet, and that manganese is found in the oxidised state in several beds at the water's edge. Bog manganese and bog iron ore are accumulating in the marsh lands on Conception Bay and black powdery manganese ores can be dredged from some of the lake bottoms.

Chrome Asbestos and Molybdenite.

The serpentine of the West Coast contain chrome ores and asbestos, and nearly 800 tons of chrome ore containing fifty five percent chromic oxide have been exported from the Bluff Head district. We have a most likely looking molybdenite prospect in the mica schists of Fleur-de-Lys. On the East Coast and on the South Coast around Placentia Bay we have segregations of argentiferous galenas, some of which have been mined in past years.

Coal, Petroleum and Oil Shale.

Our coal areas are being examined and developed and the reports, so far, are very favourable. Crude petroleum is being pumped at Parson's Pond on the West Coast. The operations are being conducted by Mr. J. D. Henry. I believe that a small refining plant has been in operation there for some time and it supplies illuminating and fuel oils to the fishermen of the North and West Coasts. Besides crude petroleum we have a tremendous tonnage of oil shale which may or may not be of commercial value. Most of the reports that I have read of this shale deposit are favourable but no actual distillation on a commercial scale has been done up to the present time. We have big deposits of gypsum, marble, limestone and slates. We have already shipped some barytes to the foreign markets and we have great indication of good commercial mica occurring around the coast of Newfoundland Labrador. We have a country within less than two thousand miles of Liverpool which is on the whole practically undeveloped. It possesses the formation which is known to be highly mineralised in North America and any development company would, I am sure, receive every consideration and help from the members of our Government who are keenly interested in the development of what we are proud to call "Our Island Home."

I have lived in Newfoundland for the past nine years and I have been all the time intimately associated with the minerals of the country. I have had long talks at my office in St. John's with almost every mining engineer and mining prospector that has visited our shores, and the opinion of most, if not all of them, is that we have an island with great possibilities,—an island that may develop into a land of husky miners to the extent that it is today the land of sturdy fishermen.

THE STEEL TRADE AND THE TARIFF ENQUIRY.

(From "Iron & Steel of Canada")

The iron and steel industry in Canada, with all its long train of antecedent and precedent interests, will shortly be made the subject of attack by advocates of tariff abolition, and will be required during the successive sessions of the Tariff Enquiry Board that are planned between now and the opening of the Houses at Ottawa, to give reasons for its existence and for the continuance of protection by import tariff.

Canada is not singular in its possession of convinced adherents of the free trade heresy, nor in the belief among certain non-industrial groups that a fiscal policy devised to suit the temporary requirements of a small and geographically central island, is suitable for any conditions under which the desceudants of emigrants from that Island may reside.

A determined attack on protective tariff in aid of the steel industry in Australia is now in progress. The conditions, geographical, economic and social, of Great Britain, Canada and Australia, could scarcely be more dissimilar, yet there are those who believe, and would force others to believe, that free trade is a sovereign and inherently righteous policy applicable to all three countries.

There is no part of the British Empire, however, that is so unsuited for application of free trade principles as Canada, in its present stage of development. Canada is a continental area, only partially known, and containing only one-twelfth of its ultimate population. It lies alongside a friendly country that is opulent, powerful and enterprising beyond all previous historical precedent, with exchanges of industrial products facilitated also beyond all prior parallel by a hitherto unattained perfection in transportation facilities, and international financial combinations.

No advocate of free trade in Canada has ever explained how the industrial advantages possessed by the United States on the American Continent can be offset except by protection of home industries through eqnalising protective import duties. It has not been shown that the principle of free trade was applicable to Canada, nor have any of the political parties that from time to time have coquetted with the idea, ever dared to apply the principle of free trade in practice, because they knew the inevitable result.

We would distinguish between the incurable free-trader and the advocate of lower duties. The first named is not a reasoning being, and time is wasted in discussing the Canadian situation with him. The advocate of lower tariff is one who accepts the necessity for protection, but thinks the tariff is open to modification. It is the last named that the steel companies will have chiefly to combat, and we would review some of the reasons that suggest the tariff in connection with the steel industry shonld not be lowered

at this time. We believe the abolition of the protective duties will not be seriously urged by any seriously-minded person.

Adverse Exchange and Import Tariffs Have Not Checked Imports of Iron & Steel.

The tariff as a deterrent of importations has been for some time relegated to a second place by the discount on the Canadian dollar. The operation of economic law has — without the intervention of legislation — placed our dollar at a discount, a process that will, by restriction of imports, gradually restore our dollar to exchange parity. A reduction of import duties under these circumstances would be an entirely gratuitous and foolish proceeding, and would indicate that Canada was neither anxious to encourage home industry, or to support her foreign exchange rates.

The value of imports of iron and steel into Canada have averaged during successive five yearly periods since 1898 to 1919 inclusive, as follows:

	In Millions of Dollars
1896 to 1900	17
1901 to 1905	37½
1906 to 1910	51
1911 to 1915	99
1916 to 1919	169

The iron and steel industry in Canada may be said to have commenced in the period between 1901 to 1905. Since 1901 the value of imports of iron and steel has risen from 25 million dollars to 182 million dollars in 1919, or by six times.

From which it would appear that if a check on imports of iron and steel goods had been desired it has not been notably successful, nor can it be said that the import tariff imposed by Canada has been of a character to stifle outside competition.

Production of Iron & Steel in Canada.

Production of iron and steel in Canada is best measured by the annual output of ingots and steel castings. This, apart from an annual production that had not exceeded 30,000 tons, commenced with 200,000 tons from the Sydney Plant in 1902, reaching a pre-war peak in 1913 with 1,169,000 tons. In 1918, under the spur of war, steel ingots and castings to the extent of 1,873,000 tons were produced, falling in 1919 to 1,030,000 tons. It may be said, therefore, that but for the unusual and imperative demand occasioned by the war, the steel output of Canada has remained stationary for about eight years, or from 1912.

It is therefore fair to say that the import duties have not been too heavy, if judgment is based either on the volume of imports, or on the volume of domestic production. They have not been remarkably successful in stimulating the basic part of the iron and steel trade in Canada.

The General Iron & Steel Trade in Canada.

The statistics gathered by the Government in 1917 ascribe to iron and steel products the following extent and importance, namely :

Number of establishments	1,049
Capital	$307,407,980
Employees on Wages	70,071
Wages paid	$ 68,947,610
Cost of Materials	$204,732,121
Value of products	$400,385,086

The number of works in Canada making the basic products of iron and steel, (on which protection by tariff is given) does not exceed nine, if blast-furnaces are counted, and is not in excess of say one hundred, if electric furnaces, small open-hearth furnaces and similar equipment is considered. It is apparent from a study of the foregoing figures that the great bulk of the iron and steel industries of Canada exist by fabricating and making into manufactured articles the partially finished steel and iron goods that are imported into this country, to the extent of almost 200 million dollars worth annually.

It is most evident that the existing tariff has not operated to restrict the growth of the general iron and steel trade in Canada.

The Influx of United States Iron & Steel Trades into Canada in Recent Years.

One of the outstanding features of trade in Canada during the past few years has been the large and unremitting increase in the number of United States concerns engaged in the metal trades that have set up establishments in Canada. The lists of incorporations and the trade notices contain a preponderance of items of this nature. The extension of United States concerns into Canadian markets is rather more notable than the formation of new enterprises backed by Canadian men and money.

The cumulative evidence of the increase of imports of iron and steel, before mentioned, taken together with the notable increase in establishments of United State's origin within our borders, indicates that while the tariff has not hindered to any appreciable extent the imports of iron and steel into Canada from outside, it does make it desirable, from the viewpoint of United States interests, to come into Canada and set up establishments.

This we take it, was one of the objects of those who framed the tariff—so far as iron and steel is concerned—and it has been attained.

A Washington Opinion.

All of the foregoing gives point to the opinion of the Washington correspondent of "Iron Age," who may be taken as accurately representing the viewpoint of our not disinterested friends in the United States.

"Iron Age" in the issue of 26th August, states :

"Plans for the revision of the Canadian tariff laws "have a particular interest to the United States's iron "and steel industry. No other section of the Cana- "dian tariff statutes is so comprehensive as the one

" which covers importation of iron and steel. More " than one hundred individual paragraphs are devoted " to this industry. The law, as it stands, was care- " fully written to protect Canadian industries. If " Canada produced the article in question, it was " pretty sure to put that article under a protective " tariff. If Canada did not, the duty was low, or was " removed entirely."

This is a fair statement from a representative quarter, and accurately portrays the viewpoint of the United States iron and steel producer, who, while not disinterested in the matter, yet looks to Canada for such a comparatively small portion of his business, that he can take an unbiased critical attitude regarding the tariff policies of this country.

The existing Canadian tariff was, as "Iron Age" states, very carefully prepared, and has not, as we have attempted to show, worked decidedly to the advantage of the Canadian producer, nor decidedly to the disadvantage of the United States importer. Much has happened, however, since the tariff was written, and new branches of the metal working industries have come into Canada, such as factories for automobile manufactures of various kinds, the manufacture of alloy steels and special tool steels, the manufacture of ship-plates, of black and tin-plate, steel shipbuilding on a large scale, and other important accretions to the industry. The tariff requires to be enlarged so as to foster these new industries, and it is very desirable that clear statements shall be presented to the Tariff Enquiry Board at its sessions.

The interests of Canadian iron and steel producers are diversified, and may conceivably clash, because of the extent of our country, and the relative nearness of certain portions of it to the United States, as opposed to the remoteness of certain other sections from any large centres of population or industrial activity.

So far as the eastern steel companies are concerned, they are most vitally interested in the preservation, and if possible, in the increase of the duties on import coal. In the present state of the coal market the existing duty on coal is entirely a negligible factor, if restriction of imports and encouragement of home production is desired. When coal costs $12 at the pitmouth, a protective duty of 56 cents is neither here nor there.

On the other hand, the steel trades in central Canada desire coal as cheaply as possible, and may not favor even the retention of present duties.

There are other points of apparent divergence in the interests of the iron and steel trades taken as a whole in the Dominion, but there are far more numerous points of common interest, and much need for common action in arranging that the position of the industry shall be presented to the Tariff Board fairly and accurately.

THE TOMMY-KNOCKERS *

*The tommy-knocker is the gnome of the underground. He is often heard tapping the rock in mines, and superstitious miners do not like to work alone for fear of meeting him.

When I die (said the mining engineer) do not bury me at all;
Cache me on the bottom level, with a pick beside my pall;
Leave a candlestick and matches, then cave the stopes and drifts,
And I'll be a tommy-knocker for a hundred thousand shifts.
Yes, a jolly tommy-knock, always starting for a walk;
Always pounding on the rock, scaring honest Hunkies with my little tap, tap, tap—
Always listening for the blast 'till the pumps are pulled at last,
And the bloody surface tenderfoots are routed from their nap;
Then the depths of earth will be lighted and we can see right through,
And all the lost bonanzas will be nuts for me and you.
Then we'll dig, dig, dig. (If we've been good engineers)
Ore shot with chunks of metal, through all the happy years.
We'll have angels for muckers, who'll never ask for pay,
And the ore will stope itself, over—under—anyway—
Anyway you say!
Oh, boy! Don't wake me up
And say the men are striking and the tax-collector's here,
And the bottom of the metal market's gone,
And how you've lost the ore-shot, and all the other grief;
Jest let me snooze 'till Gabriel blows his hawn!

SAMUEL B. ELLIS,

"Engineering and Mining Journal."

GRANBY CONSOLIDATED TO SHIP SMELTER PRODUCT TO REFINERY VIA VANCOUVER.

Through arrangements made with the Robert Dollar Steamship Co. the Granby Consolidated Mining, Smelting & Power Co. will hereafter ship its smelter product to the refinery by an all-water route. This will eliminate the necessity of paying the high cross-country rail tariff which would otherwise prevail on the company's copper.

On its Far Eastern-New York service the Dollar Co. makes Vancouver its last port of call en-route to the Atlantic port and Granby will transfer its product to the company's vessels at that point. The copper will be lightered from the Brooklyn docks to the Laurel Hill refinery of the Nichols Copper Co.

It is understood that the copper company was able to make arrangements for shipment through the Panama Canal at a rate sufficiently attractive to decide upon the all-water transportation avenue. It will take something less than a month for the trip whereas during the height of the railroad congestion Granby's copper was sometimes 90 days in making the journey across the continent from smelter to refinery.—"Boston News Bureau."

SOME RECENT OBSERVATIONS AT THE GOLD & SILVER MINES IN NORTHERN ONTARIO.

By R. E. HORE, Consulting Editor.

Progress at Porcupine.

The possibilities of the Porcupine gold mines are becoming greater as development proceeds. A statistical review of gold mining in Ontario during the past decade would show remarkable increases in production. It would not, however, indicate with any approach to exactness what the mines are capable of yielding. It has been fairly well demonstrated by the production record that the Hollinger, McIntyre and Dome are great mines, but there is not yet recognition of the fact that they may be very much greater mines in the near future and that their possibilities are as yet only to a slight extent determined. The development work so far done has revealed quantities and quality of ore that assure profitable operation under normal conditions for many years. If men were available the output could be greatly increased almost immediately and the further development would probably shown even the increased output to be much smaller than the ore deposits warrant.

Those who visited the Porcupine district, eleven years ago and compare conditions then with the present, are forced to recognize that the development of gold deposits in Ontario is an enterprise worthy of the best attention of our people and one to be encouraged by our governments. Where now there are great mining and milling plants and hundreds of residences and places of business, there was in the fall of 1909, a forest-covered wilderness where a few mine operators and prospectors were endeavoring to find out whether some outcrops of gold quartz were of sufficient size and richness to permit of mining. To reach the camp at that time from the railroad thirty miles away, was a trying trip for the traveller and the source of much worry for operators who had to take in supplies for development work. There were promising outcrops then at the Hollinger, McIntyre and Dome and around those outcrops, and the exploration shafts were anxious men who wondered whether they were warranted in spending the money necessary to secure the properties and develop them. There are many pople who assume that the development of a mine like the Hollinger is a constant source of delight to the owners; but if the men who bought the Hollinger did not worry about the outcome in those early days, I am greatly mistaken. They had visions doubtless of the great mine that the Hollinger is today and they had courage to go ahead when payments had to be made, but they doubtless had visions too of an abandoned shaft and a pile of quartz with too little gold in it and a tidy bunch of check stubs to show for their venture. The making of mines is largely in the hands of such men, men who know they are venturing where there is no certainty of success.

Since those days there have been many problems to meet and overcome at the Hollinger; but the one most essentially factor to success, the ore deposit, has given no cause for disappointment. The work done has shown that the deposits are even better than they appeared to be in the early days. Ore faces, at which men may be put to work, are not difficult to find in the Hollinger mine. The problem now is to find the men.

It seems now that conditions are changing in favor of gold mining and it is hoped that before many months the mines will again be fully manned. It will then be found that the operators have not been idle and that preparations have been made to fully utilize the labor as it becomes available.

Promising Outlook for Gold Mining.

The past few years have been trying ones for gold mine operators, and the present tendency toward lower prices is consequenty being hailed with delight. It has been generally known that during the past few months the public has been administering slow poison to the profiteers. Merchants and manufacturers have found it no longer possible to advance prices and continue to do business. They have then attempted to dispose of large stocks of high priced goods without lowering prices. This also has failed and they are now making concessions in order to unload. Actuated by common interest they have maintained prices for some months after it was realized that crash must come if the buying public realized their position. Cost of production of most articles still remains high, but the pawcity or orders has made necessary reductions in selling prices. Merchants doing business in this falling market are naturally displaying nervousness in buying. Those who are not willing to believe that price are going lower, base their judgment largely on the fact that costs are still high. The public seems, however, to have concluded that prices are too high regardless of cost of production, and by refusal to buy, are bringing matters to an issue. It is apparent that both profits and costs must come down and possibly some who made unduly large profits in the rising market. may have to take losses in the falling. Someone must take the losses. Our bankers have been fixing things during the summer so that they will not be the goats. The uneasiness in the bnsiness world is largely due to the endeavor of each group to make someone else the victim, a normal endeavor when the belief is general that we have entered on a period of falling values.

Whether these views are correct or not remains to be seen. They are not the views of an economist and they are not here supported by arguments. They are views expressed by one who has no unusual advantages for obtaining information concerning the progress of events. They are little more than a statement of street gossip. The reason for expressing the views here is that the writer sees in all this something of vital importance to the gold mining industry, for if the view is a clear one, it can have but one meaning for the gold producer,—a bright prospect for the future of gold mining, where the product is one of fixed value and unlimited market.

Foreign Labor in the Mining Industry.

To a large degree the great growth of the mining industry in recent decades, has been made possible by the utilization of foreign labor. Comparatively few Canadians or Americans have shown a desire to work in the mines. If mine operators were not able to draw on Europeans, for a large part of the labor needed, it would be impossible to get the work done. It is fundamental to the success of mining enterprises in this country that no obstacles should be placed in the way of men who would come to this country and do work that our own people do not want to do.

When the copper mines of Michigan were opened and the operators looked for experienced miners, they found few American miners available. Miners were

brought out from England and for years the Cornish miners were a very important factor in the development of Michigan's copper industry. As the industry grew, a certain number of Americans were attracted to it, but no large number has ever been available. As the mines developed the operators found it necessary to depend to a large extent on immigrants from Europe. Finlanders, Austrians, Italians and Croatians have furnished much of the labor in recent years. English speaking miners and mine laborers are preferred; but not enough of them can be found.

When the first big mining enterprise in Ontario, the nickel-mining industry of Sudbury, became established, miners of the same nationalities as those in Michigan, came to do the work. Later, at Cobalt and Porcupine, labor was furnished largely by the same countries. In each case a few Canadians were attracted to the work, but the number is quite inadequate for the work.

In order that mining operations may be carried on profitably in Ontario, it is essential that we have men and money. When the money to develop and equip properties is found, the mines and mills should be worked at full capacity. It is in the interest of the laborer as well as of the shareholder that enough men be found to do the work and operate the plants efficiently. To operate at half capacity profitably is in some cases possible; but much greater profits can be made when operating at full capacity, for then the work of each man is more profitable. The miner, as well as the men who supply the money, knows that it is to his advantage that the industry should prosper.

It is the proper function of government to assist in the development of natural resources. Our people want prosperous industries here. It is well known that the mining industry will make better progress if we find more foreigners to work in the mines. To attract such men might reasonably be expected as a proper function of our governmental departments.

Yet there is a growing belief that our immigration authorities are averse to encouraging the incoming of foreign miners at this time.

Davidson Gold Mine.

A plan designed to provide the necessary money to operate the Davidson gold mine on a large scale has been placed before the company's shareholders. The English interests, who propose to furnish the money, ask for options on enough of the outstanding stock to give them control at a reasonable price after they have put the enterprise on its feet. The arrangement made with the English capitalists is the result of several months' work by Mr. H. H. Sutherland. He is satisfied that the bargain is a good one and that it should appeal to Davidson shareholders. There seems good reason for this opinion and it will be surprising if the shareholders do not accept the offer.

There have appeared since the offer was made, the usual criticisms in regard to the tying up of stock under option. If we ignore some of the criticism which is founded on improper presentation by the critics of the terms of the option, we find no great grounds for complaint as to the terms, though objection may well be raised to the method adopted in carrying them out.

The Davidson company have what is believed to be a valuable property, but no money to operate it. Mr. Sutherland has found men ready to put up the necessary money. The shareholders can fairly be expected to sacrifice something in favor of those who supply money to make the mine a producer. They are not asked to make any great sacrifice and they will do well to accept the offer and permit vigorous development of their property, to proceed without delay.

NOTES FROM THE NOVA SCOTIA COLLIERIES

Dominion Coal Company's Output

The September outputs from the Glace Bay collieries totalled 264,733 tons, compared with 260,736 in August, and 242,628 tons in September 1919.

The individual colliery outputs were as follows :

No. 1	29,613
No. 2	42,313
No. 4	27,786
No. 5	8,383
No. 6	21,793
No. 9	21,008
No. 10	9,704
No. 11	14,433
No. 12	8,162
No. 14	18,169
No. 15	9,030
No. 16	14,578
No. 17	2,738
No. 21	15,049
No. 22	17,439
No. 24	4,444
Totals	264,712

The features of interest in the foregoing figures are the continued increase in the percentage of Emery Seam coal, and the very satisfactory production from the Birch Grove collieries, Nos. 21 and 22, which are up to best pre-war performances, or approximately so. The average daily output during September was 10,500 tons, or slightly better than the summer rate. For the first several days in October it has averaged over 12,000 tons, and as October is traditionally a month of maximum outputs, production should improve in the period between now and Christmas.

The Cause of Reduced Outputs

Mr. F. A. Carman, in the Montreal "Star" gives, without comment, a recapitulation of the causes of reduced output at the Nova Scotia collieries as given to him by representatives of the coal miners and of colliery companies. The statements repeated by Mr. Carman appear conflicting, but actually they are not so much conflicting as partial and incomplete.

The following figures are quoted as being the average daily outpnt per man employed at the collieries of one company for the years mentioned, namely :

Year	Average Tons Per Man Per Day. All Classes
1910	2.4
1911	2.54
1912	2.5
1913	2.51
1914	2.7
1915	2.73
1916	2.59
1917	2.42
1918	2.23
1919	2.06
1920 (July)	1.95

It is stated that the miners union, by its rule of "one man, one job" has raised the number of workers who handle the coal, as distinguished from those who do the actual cutting. The coal is cut by contract, while the handling is paid for by day wages, the result of the union's policy being that a larger force of day workers is necessary to do the work. This statement, if it is supplemented by one other, will explain the reduced rate of production per capita. There is a definite shortage of men employed in digging coal.

The following statement shows approximately what may be taken as a typical arrangement of the working forces at Nova Scotia Collieries before the heavy enlistments for war service and at this time:

	Preceding Enlistment P.C. of Employ.	Tons per Man	Present Time P.C. of Employ.	Tons per Man
Surface Labour	12%	20.4	18%	10.3
Underground Labour..	41%	6.2	47%	4.0
Mining Coal	47%	5.4	35%	5.4
	100%	2.5	100%	1.9

Inspection of these figures will disclose that there is now a total of 65 per cent of non-productive labor employed at the collieries, compared with the total of 53 per cent in the previous period. The average daily production of the mining coal class has not decreased, nor could it very well, seeing that these men's earnings are dependent on the amount of coal they dig, but there are too few men in the mining coal class, and too many in the non-productive class. There has been a reduction of 40 per cent in the numbers of the men mining coal, and there has been a reduction of 40 per cent in the production of coal. A replacement of the shortage of men in the mining coal class would necessarily cause an increase in output proportional to the number of men so replaced, and if they were all replaced the output would be restored to the former figure.

The reduction in coal production in Nova Scotia dates from the heavy enlistment of 1916. Between 1915 and 1916 alone the Dominion Coal Company lost by enlistment the labor of 1,300 unmarried men between the ages of 19 and 35, or 30 percent of this class, and lost also 50 percent of the boys under 19 year of age. Ninety-five percent of the enlistments were from amongst the underground workers. It is this gap that has never been filled.

The re-alignment of working forces and the new sub-division of work amongst those who remained behind has, unfortunately, come to be regarded as a permanent arrangement, and the chief blame for the continued small rate of coal production should be laid, not upon the individual coal producer, but upon that policy of the union which is opposed to any importations of new men, or to any policy that is designed to transfer men from the non-productive class where they are now found, to the productive class, where they were formerly employed.

"Will you tell us how to get some more revenue ?", was a question put to the General Manager of the Trail Plant by Sir Henry Drayton at a Tariff Enquiry session. "Tax the farmer" suggested Mr. Warren, "especially the 'smoke farmer'". Not at all a bad idea.

British Columbia Letter

THE METAL MINES.

Stewart, B. C.

It is reported from the Alaska side of the Salmon river section, Portland Canal, that considerable interest now is being taken in the development of mining properties in this locality. It is likely that at least three properties will be working all winter. The New Alaska is to be opened up and a diamond drill is being used in exploration work on the property of the Fitzgerald brothers. This property is located on Fish Creek. On another group of mineral claims, controlled by the Fish Creek Mining Company, a promising vein of ore has been encountered, and it is hoped that it will be possible to ship ore this winter. There also are properties on Texas Creek of which much is expected.

Trail, B. C.

Ore receipts at the Trail smelter during the week ending September 14th totalled 8,869 tons, bringing the total for the year to date to 230,181 tons. The Ruth and the Redress of Sandon, and the Silver Glance of Geigerich, added their names to the limit of Slocan shippers, while the Voight of Similkameen also was a contributor.

Nelson, B. C.

A galena property has been located at Nakusp on the Arrow lakes. The claim is known as the Luck Rose and is especially interesting for the reason that this section has not hitherto been considered as possessing mineral possibilities. Already a lead has been uncovered for 300 feet and the assays are reported to give returns of from 49.1 ounces in silver, and $1.80 in gold.

Kaslo, B. C.

Hon. John Keen, speaker for the Provincial Legislature, has just returned after a trip through the Lardeau district. He visited the Lardo, Trout lake, Ferguson and other points. Mining he says is rather quiet. The Triune, True Fissure and other claims look well, while the leasers on the Silver Cup and Nettie L have made good progress and have ore ready to ship. The Gold Cure and other claims are promising.

Speaker Keen observed that Trout lake mining was not as brisk as it might be, but that operators there are looking forward to the future optimistically.

As to the labor situation he said that it was showing marked improvements, men were going back to the camps seeking employment and the indications were that in a short time the trouble which has been experienced during the past several months would be settled.

Greenwood, B. C.

The Lightning Peak mining section is being opened up by the construction of a trail, under the terms of the "Mineral Survey and Development Act." The Provincial Government has been busy on this for a large part of the past season, and the work now is reported to be practically completed. Lightning Peak has an elevation of about 7,500 feet. In that locality are situated a number of mining properties which give promise of developing into im-

portance. Among these is the Waterloo Mine in which Greenwood people are interested. With the completion of the trail it will be possible to make the trip with pack horses from Greenwood to the peak in four days.

The Rampallo group of mineral claims located near Edgewood is being opened up by a considerable force of men. When in about 40 feet from the mouth of the tunnel a ledge about one foot wide was cut. It carried gold and silver. To reach the main ledge there is still a distance of 250 feet to go. This main ledge shows an average of $10.00 in gold and 250 ounces in silver at a depth of about 20 feet.

Ore is being shipped from the Waterloo mineral claims and there are about 800 sacks of high grade ore ready to bring out.

On the Killarney a new tunnel is being driven, and the ledge has been struck at about 75 feet. This ledge is about six feet wide.

Victoria, B. C.

A small force of men has been employed since last March on the Gabbro Copper Mines, Ltd., situated at Jordan River, Vancouver Island. Several large open cuts have been made with a view to ascertaining the grade and continuity of the ore bodies. Some good ore has been taken from a tunnel driven on Sinn Fein Creek, but the most promising showings were found on the Sunlock Cave Zone where it crosses the Jordan River into the Gabbro group. The open cuts referred to have established a width of from 5 to 25 feet of mineralized material having a length of between 300 and 400 feet. The grade of the ore is exceptionally good, there being considerable body averaging 3 per cent or better, which is the best surface showing as yet found in the Jordan River Section. The zones on the Gabbro group are in basalts of Eocene age, which have been intruded by a stock of gabbro. There has been much shearing of the basalts, due probably in part to the shrinkage of the gabbro mass when cooling, and also to regional stresses.

There has also been some shearing and ore deposition in the gabbro. Continuity of the ore at depth in these shear zones is shown by the tunnels on the adjoining Sunlock property, which give a vertical depth of over 500 feet. The Sunlock is one of the very few mines in this province that has had no serious set back since the beginning of mining operations on it in 1917.

The Collieries.

The report that the fuel control system was to be re-introduced was apparently incorrect, but in such an event it is unlikely to affect British Columbia. This Province is a little differently placed, as is recognized by the fact that the embargo against the exportation of coal from other sections of Canada is not made to apply to it. It would seem from this that the Canadian authorities realize that the collieries of the Province may be depended to look after the domestic necessities before undertaking to meet outside demands for fuel. If therefore it is considering that British Columbia is able to look after herself in this respect, it surely will not be thought necessary to introduce legislation covering the distribution of coal within the Provincial borders.

While the British Columbia collieries are working to capacity, or rather to as near capacity as the available labor renders, there are reports of pending labor troubles from a number of coal fields. One of the most imminent of these appears to be threatening the coal mines of Washington State. There the miners threatened to walk out to enforce demands that a recently established wage scale be made retroactive to August 16th. The operators have announced that in the event of this happening the mines will be kept open for the employment of all men who wish to remain at work. This promised strike was set to occur a day or two after the time of writing, and as it is said to have had the sanction of the United Mine Workers of America, it no doubt has since developed. All but two mines in the States are affected and 3,000 coal miners approximately will leave their work. In an effort to provide against the coal shortage anticipated considerable orders are being placed in British Columbia by consumers in the State of Washington.

New workings are to be opened up on Vancouver Island by the Granby Mining and Smelting Company. This company's operations on the island have been somewhat interfered with by a recent rule of the Supreme Court which decided that rights in two leases of coal lands being exploited by the Company really were owned by the E. and N. Railway Co. Pending an appeal, however, the Granby Company is permitted to mine up to 100,000 tons of coal. While this latitude is permitted the operating company no doubt feels its restrictions, and proposes to proceed with the development of other of its coal lands over which there is no dispute.

In the course of a few weeks the British Columbians will decide through a plebiscite whether they are in favor of a wet or a dry condition as to the liquor traffic. An interesting sidelight on the attitude that the residents of at least one of the coal mining centres of this Province may be expected to take on this question is furnished by a vote which was taken at Cassidy a few days ago. Cassidy is the island mining town of the Granby Company Mining and Smelting Company. There was a general meeting at which arguments pro and con regarding prohibition were advanced. A vote followed and a large majority enthusiastically endorsed government control in preference to the present Prohibition Act.

August Coal Output in British Columbia.

The coal output of the collieries of British Columbia for the month of August was as follows:

Vancouver Island Field.

	Tons.
Canadian Western Fuel Co., Nanaimo	34,381
Canadian Collieries (D) Ltd., Comox	38,015
Canadian Collieries (D) Ltd., S. Wellington	7,943
Canadian Collieries (D) Ltd., Extension	14,732
Pacific Coast Coal Mines	8,110
Nanoose-Wellington Collieries, Nanoose	4,683
Granby Consolidated Mng. Smeltg., & P. Co., Cassidy	9,330
Total	117,194

Nicola-Princeton Field.

Middlesboro Collieries, Middlesboro	7,341
Fleming Coal Co., Merritt	2,197
Coalmont Coal Co., Coalmont	2,056

Princeton Coal Co., Princeton	1,633
Total	13,227

Crow's Nest Pass Field.

Crow's Nest Pass Coal Co., Coal Creek	37,628
Crow's Nest Pass Coal Co., Michel	23,355
Corbin Coal and Coke Co., Corbin	15,342
Total	76,325
GRAND TOTAL	206,746

TORONTO MINING STOCKS.

Closing Quotations on Standard Stock Exchange, October 6th.

Silver	*Asked*	*Bid*
Adanac	3	
Bailey	5	4½
Beaver	40½	39
Chambers-Ferland	7	5½
Cobalt	47¾	46½
Coniagas		2.50
Crown Reserve		27½
Foster		2½
Gifford		1¼
Hargraves	2½	2½
Kerr Lake	3.40	3.25
La Rose		32
Lorrain	5	
Mc Kinley-Darragh	55	
Mining Corporation	1.63	1.61
Nipissing	9.50	9.25
Ophir	3	
Peterson Lake	15	14
Right of Way	2	
Silver Leaf	3	
Timiskaming		34
Trethewey	25½	25
Gold.		
Apex	2	1⅞
Atlas	15	11
Boston Creek		15
Dome Extension	40	38½
Dome Lake	5	4½
Dome Mine	12.50	12
Gold Reef	3⅞	3½
Hollinger	5.75	5.70
Hunton	12	
Keora	18	17½
Kirkland Lake	48	46½
Lake Shore	1.12	1.09
McIntyre	2.06	2.05
Moneta	12½	11
Newray	8	7
Porcupine Crown	26	24
Porcupine V.N.T.	25	24
Preston	2½	1
Schumacher	21¼	21
Teck-Hughes	10	
Thompson-Krist	10	
W. Dome	7	6½
Westree	5½	5
Wasapika		9
Miscellaneous.		
Rockwood	4½	2½
Vac. Gas	26	25

METAL QUOTATIONS

Fair prices for Ingot Metals in Montreal, Oct. 6th, 1920. (In less than carload lots).

	Cents per lb.
Copper, electro	23
Copper casting	22½
Tin	52
Lead	8½
Zinc	9½
Aluminum	35
Antimony	8½

INTERNATIONAL MAGNESITE CO. OF QUEBEC ON SIX PER CENT DIVIDEND BASIS.

The International Magnesite Company, Limited, has declared a further dividend of one and a half per cent. payable October 1, for the quarter ending September 30 last. This is the second declaration for the year of a like amount.

The stock of this company has been placed on a six per cent. basis—earnings for the current year being satisfactory and future prospects bright.

The company operates in Argenteuil County in the Province of Quebec, about fifteen miles north of Grenville, where their extensive quarries and plants are located.

Officers of the company are: E. W. Whiting, president; J. R. Colby, vice president; C. F. Gamble, general manager,, and R. Thouret, secretary-treasurer. The sales manager is H. Percival Ross.

PRICE OF LEAD AGAIN REDUCED.

American Smelting & Refining Co. reduction in its New York price for lead from 8 to 7¾ cents is the third in 16 days, and is due to considerable importations from Europe. Sept. 13 the company reduced from 9 to 8½ cents and on Sept. 23 from 8½ to 8 cents. Weakness of exchange is encouraging importation in spite of 25% ad valorem duty upon lead, and with continued weakness in exchange a further decline in the domestic price can be expected. At present the price is the same as it was Jan. 1, 1920.

For the last six months United States consumption of lead has been much larger than production and a considerable importation has been necessary to meet demand. The main cause of the expansion in our lead requirements, and of the rise in lead, has been demand for metallic lead as well as lead oxide for storage battery use. Pigment consumption has also increased, as we are today not only supplying our own market but exporting much lead-paint to South America and the Orient, taking much of the business formerly done by Germany and England. A certain amount of lead must therefore be expected to come in for many months. Domestic price, however, must be such as not to encourage too great importation.

One mining man called attention to efforts of American Smelting & Refining Co. to stabilize lead consumption by keeping the price at proper level. In this aim, it follows a policy similar to that of United States Steel in the steel industry. "Boston News Bureau."

By error, the statement was made on page 808 of the "Journal" in the last issue, that there was a demand for low-grade asbestos cloth for renewal of brake linings on "freight cars". This, of course should have read "motor cars."

Northern Ontario Letter

THE SILVER MINES

The Cobalt Area

What appears to be one of the most important surface discoveries made in recent years had been made on the Kerr Lake mine, where a series of three veins have been opened up. The "Journal" reported the discovery of the first of these veins last week, at which time no great importance was attached to the find. Later on, however, when blasted into, this vein was found to contain considerable high grade ore, $2,000 being taken out in two rounds of holes. As stated last week, the first vein was found during the course of excavating for a foundation for the installation of a crusher with which to prepare dump-ore for shipment.

The second high-grade vein on the Kerr Lake was found while extending the excavation work so as to make room for a conveyor, while the third was found while clearing off a place for a foundation for a motor which is to drive the conveyor and crusher.

All three veins occur within a few feet of each other, and are in conglomerate formation which at this point is about 100 feet thick. The strike of the veins is south-east straight into the Kerr Lake, and North-west toward the Crown Reserve, the boundary of the latter property being only ninety feet from the point where the find has been made.

On the strength of the probability of being able to pick up these veins, the Crown Reserve is driving a cross-cut into that part of its property lying close to the Kerr Lake and in line of the strike of the veins. It seems highly probable that these veins will be picked up, although the question as to what values they will contain at that point will be left for the actual work to determine.

The Mining Corporation is re-treating from 300 to 350 tons of tailings daily from the bed of Cobalt Lake. This is somewhat lower than earlier estimates, and with well over 300,000 tons still remaining, about 2½ or 3 years would be required to handle them at the present rate. As regards the silver content, no official announcement has been made, but it is believed the output from this source may reach upwards of 40,000 ounces monthly.

The Peterson Lake is shipping low grade ore at the rate of about 20 tons daily. Also, this company is receiving a moderate amount of revenue from the re-treatment of the large tailings pile. The income is believed to be sufficient to cover the cost of the underground exploration work now being done. Opinion seems to be that the hope of realizing any very large amount of profit rests with the development work underground, and certain interests connected with the Peterson Lake are confident that this old property may still contain some favorable surprises.

Labor is still scarce in the Cobalt district. The chief cause of the present shortage appears to be the high wages being paid by the large pulp mills under construction in various part of the north. It is believed this shortage will be only temporary, and that within the next sixty days the situation may adjust itself. In the meantime, production is not hampered to any serious extent.

The price of dressed cobalt-metal has recently increased to about $6 a pound. In the rough it is quoted at from $3 to $4 a pound. The added revenue to the silver-producing companies which turn out cobalt as a by-product is quite considerable, it not being uncommon for the cobalt content to increase a single car of ore some $1,200 or more in value. The smelters pay the mines for cobalt when the content of a shipment amounts to over 4 p. c. For example, a shipment containing 5 p. c. cobalt is paid for at the rate of 2 cents per unit, or 10 cents a pound, and adds $10 a ton to the value of the shipment. For shipments containing a higher percentage the per unit price is graded up to as much as 4 cents. However, as a further example, and dealing with shipments containing 10 p.c. cobalt, the price per pound at 2 cents per unit would be 20 cents and would amount to $40 extra for each ton, thus placing a value of about $400 per ton on a full ton of cobalt. As compared with this, the smelters after separating the cobalt are in line to receive from $3 to $4 a pound for it or actually from $6,000 to $8,000 a ton.

Information from the Cane township section of the Lake district would indicate that about three tons of ore has been bagged from open cuts on the Cane Silver Mines, and that a small shipment will be made before the end of the year. Among the interests involved in the proposition are J. Houston of Haileybury, and R. S. Potter, of Matheson. It was reported some time ago that interests indentified with the Abitibi Power and Paper Company were involved in the operation, but this appears to have been erroneous and to have arisen as a result of Mr. Potter's name having been used in a wrong connection, and by an official of the Cane Silver Mines.

The O'Brien mine of Cobalt has had a scout in the field, inquiring into the possibilities of properties lying in the vicinity of the Cane group.

From information available in connection with the property at Gowganda, the question of installing a small mill may be considered before the end of the coming winter. Underground work continues to be encouraging, although not spectacular as many early reports would tend to indicate.

Tenders are being called for continuing the main shaft of the Silver Bullion property at Leroy Lake, from its present depth of 45 feet to a depth of 145 feet, at which point it is planned to carry out about 200 feet of lateral work. The property has recently been equipped with a steam-driven mining plant consisting of a 100-h. p. boiler, together with a 5-drill compressor and other corresponding equipment. A few bags of high grade ore have been sorted out from the small dump at the 45-ft shaft.

A deal is being negotiated for the Haileybury Frontier property in South Lorrain, and plans are to be made to carry on work at an early date.

The analysis of gas found at Paradis Bay a few mile south from Haileybury on the west shore of Lake Temiskaming has been found to show a fairly high percentage of methane, and is believed to indicate an oil deposit. Leases have been secured from land owners, and arrangements will be made to commence boring as soon as rigging can be secured.

THE GOLD MINES

The Porcupine Field

Relief in the way of labor supply has not yet materialized in the gold mining districts of Northern Ontario. The gold mining companies are obviously determined not to enter into competition with the

companies which are constructing pulp mills in various parts of the country, and will undoubtedly bide their time, content to operate at the present rate of about two-thirds capacity until such time as labor shall be attracted by present wage scales at the mines.

On account of the great depth to which developments are being carried on by the Hollinger Consolidated at the McIntyre-Porcupine, the attention of mining men is gradually being attracted with greater interest to adjacent properties upon which these deposits may reasonably extend, and the belief is expressed that as in the case of the Moneta property as well as the Inspiration, both of which lie immediately west and south-west of the Hollinger it would not come as a surprise were one large concern to make a bid for an opportunity to gain their control and undertake operations on a big scale. In this connection, it was reported last spring that the Hollinger would consider the Moneta control at the rate of 25 cents a share, and the stock which was then quoted at around 8 cents a share moved quickly up to close to 20 cents a share. It has since declined to around 11 at the time of writing, although bids at this price fail to bring out any stock.

As regard the Inspiration, the "Journal" secured an interview with an official and was informed that the leading interests are content to await events, believing the property will steadily take on increased potential value as a result of work on the adjoining mines. This official declared the company was completely out of debt, and was in the happy position of having about 800,000 shares of stock in its treasury with which future work could be financed. He also pointed out that as a result of previous diamond-drill work, the formation was found to be favorable and that one vein was cut in which very encouraging gold values occurs.

The McIntyre-Porcupine is making good progress in the operation of the Blue Diamond coal mine which was recently acquired in Alberta. About 150 men are employed on the property, and the enterprise is said to be on a profit-earning basis. The question of whether the Temikaming Mining Company is to join the McIntyre in the venture is to be determined at a meeting of the shareholders of that company to be held on October 7th. In the meantime, every effort appears to be exerted to make as favorable a showing as possible before that date.

Although the Hollinger and the Dome mines each conducted exhaustive tests with low-grade cyanide secured from the American Cyanamid Company at Niagara Falls it is significant to note these companies continue to use the high-grade article secured from the Cassel Cyanide Company, of Glasgow, Scotland. No official announcement has so far been made as to the measure of encouragement met with as a result of the tests and experiments with the low grade article.

The Porcupine V. N. T. is gradually getting a staff together, among the latest additions being Wm. Gowans, as mine captain, as well as Mr. J. B. McArthur, who is connected with the Associated Gold Mines of Western Australia and has arrived here. He will act in a consulting capacity with Major J. McIntosh Bell, the manager.

The Kirkland Lake Field.

Sinking operations have commenced on the Granby-Kirkland property, on a vein ranging from 4 to 5 feet in width, assays of which range from $1 to $15 a ton over the width of the vein. Five highly mineralized veins have been trenched on surface, and parallel each other. It is planned to cross-cut these veins at a depth of about 200 feet.

Work has been resumed on the Mofatt-Hall property. In addition to carrying on underground work, arrangements are being made to employ a diamond drill to make a deep test of formation and veins.

The assessment work on the Crystal Lake property has been completed and an endeavor is now being made to secure finances with which to launch out into an aggressive exploration campaign.

According to the regular monthly report of manager R. C. Coffey to the President and directors, the Lake Shore mine of Kirkland Lake treated 1,281 tons of ore during August and recovered $35,261.27, as compared with over 1,800 tons and $52,424.45 produced in July. The lower tonnage was caused by delays due to breaking a ball-mill clutch and relining the mill.

One feature in connection with the statement is that the Lake Shore mine has now past its first million dollar mark in point of production, the total up to the end of August amounting to $1,011,580. Another feature is that while during the early months after opening its mill on March 8th, 1918, the average recovery was about $24 to the ton and considered by outsiders to be too high to last, the reports for recent months actually show a higher average, that for the month just closed being $27.52, while for July the average amounted to over $28 to the ton.

A leading feature in connection with development is contained in the official statement as of August 31st, that station timbering has been completed at the 400-feet level, as well as a bin for waste rock provided, and a hoist has been installed and the work of deepening the shaft was under way, being then down 17½ feet below that level. The objective is a depth of 800 feet, with main levels to be opened up at the 600 and 800-ft levels.

About 60 men are employed at the Argonaut Gold Mines at Beaverhouse Lake, and the results achieved continue to be highly encouraging.

Work has been suspended on the Nelson group of claims at Fort Matachewan, known as the Thesaurus Gold Mines. Arrangements are being made to take advantage of the better transportation after the freeze-up, and to then resume operations.

Within the next week or two, a crew of miners will leave for the Lightning River district to commence work on the Lightning River Gold Mines. More extended reference will be made to this property in the next issue.

Personals.

Mr. P. B. McArthur, of London, is visiting the Porcupine gold district.

Mr. A. A. Cole is back at his office at Cobalt.

Mr. D. Keeley, of the McIntyre staff, has returned to the mine after a month's holiday.

GYPSUM EXPORTS RESUMED FROM CAPE BRETON.

The Iona Gypsum Company, whose quarries are at Iona, Cape Breton Island, is making the first shipment of gypsum since operations were resumed after the war. A cargo of 2,500 tons is being loaded for Philadelphia, where before the war, Cape Breton gypsum was in much demand.

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THE DOER.

Make the best of the worst of things, is the attitude of he who would be wise. The optimist insists on cheerfulness. He needs it mentally as the system needs oxygen. A fake optimist is a bubble, bright and brilliant in sunshine, but when touched with rough stuff bursts. The read hard-rock optimist is a tonic and a jewel. He is an expander. The world is too small for him. Incidentally, he is the man with the pick and shovel who starts the movement to new locations. The Yukoners know him well. Many a time they have seen him strike out for the hills with his pack and dog and gun, an independent fellow, earnest, a bit of a fatalist, adapting himself readily to circumstances. He will tackle a raging river on a few logs bound together with willows. If he goes under, no one may ever know the how or when of it. If he wins, thinking nothing of it, he follows his course. If he is out for placer gold, he has an eye for rimrock and gravel banks in creeks and gulches; if a quartz man, he looks for "float" along the bars and fringes of the waterway. Patiently he will dog a likely prospect to its lair in the virgin rock. When the "float" is increasing he knows that he is drawing near the source.

He may find no more than a small piece or two in a whole day's tramp, but he is experienced as well as hopeful. A change in the water course, an eddy, a current, has its effect. He studies nature instructively. The good prospector is a born naturalist and observer. He knows his rock as thoroughly as Faber does his spider or the blind wood borer. When the "float" ends abruptly, there the prospector camps. The glow of his fire lights the darkness, the crackle of burning logs break the stillness. A bit of canvas on a couple of poles, a blanket spread on spruce boughs, a piece of bacon in the pan, a biscuit, a pot of tea, a pipe, and your optimist feels like a lord. If he has luck, a Keno Hill or Mayo boom may result.

And what follows? Look over the history of mining throughout the world. In the glow of his camp-fire on river or mountain did the prospector see a railway reaching across the wilds? Did he see towns, cities? Hear the hammer of the worker, feel the throb of industry? No, likely not. But he made all these things.

His name may never be known outside his own small circle of cronies, but his works ring round the earth.—From Dawson "Weekly News".

Washington reports state that iron ore has been found in the Philippines, on the Island of Mindanao, in very large deposits, up to 500,000,000 tons of ore having been ascertained to exist within easy transportation distance of Dajkin Bay, a fine natural harbor. The United States was not unblessed with iron ore when it had not acquired outside territories, but if the foregoing is approximately correct, the new find, added to the known Cuban deposits and the domestic iron ores, should relieve the United States steelmakers of any pressing anxiety for iron ores in the years to come.

Within one politically undivided territorial unit, the United States possesses the most generous supply of coal and iron of any nation. It is a country that could not avoid commercial greatness, even if it tried.

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COAL QUOTATIONS.

Toronto, Oct. 8—Coal during the past week has been a little easier in the Toronto market, but the car supply for the past week has been very meagre which will mean a considerable curtailment of receipts in the course of two or three weeks. Hard coal is still quoted at from $8,00 to $16.00 gross tons at the mines, American funds. Mine run is quoted at $13.85 to $14.25 f.o.b. Toronto and smokeless rnles at from $14.00 to $15.00.

Montreal: Spot bituminous is obtainable at about $8.00 per ton, American funds at mines. The price delivered to domestic consumers in the City is now about $17.000 compared with $18.00 a few weeks ago. Lower quotations on New York funds and better deliveries at the mines are assisting in lowering the price of soft coal. Some deliveries have been made by the mines on contract coal at the lower prices at which these contracts were made, which is an indication that the demand is easier.

No coal is coming to Montreal and district from the Nova Scotia collieries, and none is likely to come this year. For the first time in memory, householders in Nova Scotia are being restricted in their coal purchaess, and actually the coal being mined in the Maritime Provinces is insufficient for the local needs, including Newfoundland.

The discovery of a new vein on the surface which excavating for installation of a rock crusher, has given new interest to the possibilities of making other finds by intensive surface prospecting. Silver mines of the Cobalt district die hard, for rich veins are often encountered as work proceeds. It is never safe to predict the end of the life of one of these mines.

UNDER LICENSE FROM "UNCLE SAM".

The Canadian people heave a sigh of relief at the report that enough coal will be available for another winter. The essential supply comes from the United States.

Until Canada develops her own rich coal deposits, the Dominion will operate every winter under license procured from Uncle Sam. Before a Canadian representative is installed at Washington our relations with the United States should be placed on a self-respecting basis.—"Montreal Star".

CONSOLIDATED M. & S. CO. COMPLETE TRANSMISSION LINE TO COPPER MOUNTAIN

The West Kootenay Power and Light Company (which is owned by the Consolidated Mining and Smelting Company) has completed the power line extension to Copper Mountain.

The railway company has completed its spur into the property and is now ready to transport the output of the Canada Copper Company to the Smelter at Trail, where the ores will be treated. The power company have contracted to supply 5,000 h.p. to be used in connection with the mining operations at Copper Mountain.

NATURAL GAS SHORTAGE IN ONTARIO

The Natural Gas & Fuel Co. of Hamilton has cut off supplies of natural gas to manufacturers, and has warned householders and others that natural gas must be reserved for lighting and cooking in domestic establishments, and next for cooking in public establishments. No gas is to be used for heating purposes unless there is a surplus over the first-named requirements.

MINING OPPORTUNITIES IN MANITOBA

Mineral Areas

Approximately three-fifths of the total area of Manitoba is Pre-Cambrian. In the Pre-Cambrian of Ontario, the well-known camps of Sudbury, Cobalt and Porcupine have been developed. In Manitoba, there was but little prospecting before 1912, when the Rice Lake Camp was opened up, and the Hudson Bay Railway gave access to the mineral areas in Northern Manitoba. Attention is being directed particularly to the Pas Mineral Belt and the Rice Lake Area, but prospecting is being carried on in the Cross and Pipestone Lake Area, the Oxford Lake, Knee Lake, God's Lake and Island Lake Area, and the West Hawk Lake, Falcon Lake, Star Lake Area.

Development

Since 1915, development has been rapid in the Pas Mineral Belt. Twenty million tons of low-grade copper ore have been explored by diamond drilling at Flin Flon Lake and are now being actively developed under option. High grade copper is exported from Schist Lake to the smelter at Trail, B.C.; over seven million pounds of copper have already been realized. Other copper prospects are under development and the building of a smelter at the Flin Flon property will lead to the establishing of a large copper industry. Gold is now produced at Wekusko (Herb) Lake, and active underground development work is being carried on at Wekusko Lake, Copper Lake and in the Rice Lake District east of Lake Winnipeg

Transportation

Transportation is available to the Rice Lake Area by steamboat from Winnipeg to the Hole River, and thence by launch and Provincial wagon road. The Copper Belt is reached from The Pas by the Ross Navigation Co's. steamboats to Sturgeon Landing, thence by wagon road and canoe. Herb Lake is reached from Mile 82 on the Hudson Bay Railway (less than one day from The Pas.)

Mining Regulations

The mineral resources are under Federal control and the Federal mining regulations apply to Manitoba. No mining license is required. Work to the value of $100.00 a year must be performed for a period of five years on claims filed under the quartz mining regulations. The office of the Mining Recorder for the Rice Lake district is in Winnipeg, and for The Pas Mineral Belt at the Pas.

Opportunities

The districts are comparatively new, and on the eve of substantial development. There are good opportunities at the present time for prospectors, mining companies, and particularly for development companies.

For maps, reports and general information, apply to—

THE COMMISSIONER OF NORTHERN MANITOBA

THE PAS, MANITOBA.

EDITORIAL

McGILL ESTABLISHES ENGINEERING PHYSICS COURSE.

The establishment of a course in Engineering Physics in the Faculty of Applied Science in McGill University, with special facilities for the teaching of electrical science, is a sign of the times, and of the virility of a famous University.

The contributions to scientific knowledge made by the research departments of the great electrical companies, in the United States, in Britain and in Germany, have in recent years been most noticeable. The researches of such men as Langmuir are symptomatic of the entirely novel views on matter, space and time that have been arrived at by those who are attempting to solve the mystery of electrical energy.

No branch of science is today so abstract in theory and so concrete in application as electrical phenomena, or demands for its reasonably full understanding so generous a grounding in mathematics and physics. The studies required to fit a young man to enter the ranks of really well-equipped workers in electrical science are so severe that while probably many will consider themselves called, few will be found among the chosen. It must also be admitted that Canadian universities, when they can refer to such names as Rutherford and McLennan (to select without invidious intent two names from among many) can not be accused of backwardness in physical science, yet the faculties have not been so thoroughly equipped to give such extended and progressive instruction in physical science as is now the purpose of the authorities at McGill University.

One of the objects of the new course is stated to be: "To institute a class of highly-trained engineers "who are capable of overcoming the difficulties and "improving the practice in electric power generation and distribution". This is an object felicitously chosen to suit Canadian resources, particularly in that portion of Canada within McGill's territorial radius. A paucity of fossil fuel and a plentitude of waterpowers, awaiting improved methods of transmission and industrial application, characterise the district served by McGill, and there can be little doubt that the natural necessities of the East, assisted by the facilities for technical specialization that the University has undertaken to provide, will in time develop a local technique that will worthily carry on the traditions of this University.

MINE TAXATION AND MINE ACCOUNTS.

Our British Columbia correspondent reports that the Local Government is being urged to amend the Taxation Act so as to provide for the depletion of ore reserves in mining properties. The representatives of mining interests in British Columbia ask for statutory recognition of the effect of diminishing ore reserves upon the value of a mine for taxation purposes, in lieu of the present method of mine taxation, which does not admit this principle, but make all allowances as a concession, following an investigation by government officials, and not as a right.

The request is reasonable, and it is pleasing to hear that it was given a sympathetic hearing by the Government.

The equitable assessment of taxation upon mining property is one that has bothered many governments in recent years, and in one or two instances, the finance ministries have frankly appealed to mining engineers and mine accountants to assist in framing regulations that will meet not only the varying conditions of mining, but also the difficulties presented by the differing stages of development of any one selected mine. In the United States, the American Institute of Mining Engineers, in Britain, the Institution of Mining Engineers and the Institution of Mining and Metallurgy were asked by the governments to assist them in regard to this extremely involved question of mine taxation. The proper body to advise our own governments, local and federal, is, of course, the Canadian Institute of Mining and Metallurgy, and it is to the credit of the British Columbia Division of the Institute that it has taken a really constructive interest in the discussion of mine taxation, and the onerous position that existing economic conditions have placed the precious metal mines in.

The principle of diminishing assets is, of course, the one that is most important in deciding a taxation basis for producing mines. There is another principle, however, that is bound up with that of diminishing assets, and arises from the same cause, namely the principle of increasing cost of production, usually found to be in more or less direct ratio to the age of the mine under consideration. The problem which has presented itself to governments in assessing mine taxation has to a large extent originated in the haziness of the accounts of the mining companies themselves, and the general disinclination of mine accountants (or mine directors) to saddle the produc-

tion costs of a mine in its early productive stages with a proportion of the enhanced costs which are inevitable in the last producing stages of the same mine. Mine production costs should not only contain a proper provision for depreciation of equipment and for depletion of ore reserves, but also for the disabilities attending production which are inseparable from increased length of haulages, increased depth of deposits, increased costs of ventilation and pumping and the upkeep of widely extended underground excavations.

The tendency in mining enterprises is unfortunately to let posterity look after itself, and the succession of managements (which is, if not an unmixed evil, yet certainly an evil too common in mining enterprises) leads to a partial view of mine accounts. Partial views are always wrong views, and no system of mine accounting can be actuarially correct that does not conceive of a mine as an enterprise that has a beginning and a definite end, usually comprised within a period that can be ascertained with some accuracy.

There has been too great a tendency in mining enterprises to concentrate on the items of labor and material entering into the mine production costs, and a deliberate avoidance of equally important items, such as bond interest, depreciation, reserves for depletion of areas, reserves for purchase of properties to replace the depleted areas, provision for redemption of capital and disaster insurance. Each of these items has a proper and unquestionable place in a mine cost-sheet, yet so hazy are the ideas of mine directors on these questions, that when government control has forced them on the unwilling attention of mining boards and operating executives, there has been some dubiety of mind as to whether these items were actually permissible.

Many a mining company would have been deterred from paying out unwarranted dividends, voted by boards that based their decisions on partial, and necessarily incorrect information, if mine accounting had been actuarially correct.

The formulation of a standard mine-cost sheet that shall contain every proper charge against production is suggested as a worth-while activity of the Canadian Institute of Mining and Metallurgy. Even if the attempt did not produce a form that satisfied all requirements, the discussion of the many-sided problem of mine taxation might clarify individual thinking and add to the general fund of ideas.

THE BRITISH COAL STRIKE.

The coal strike in Britain is in many respects a more dangerous occurrence than the outbreak of war in 1914. Britain could never have gone down before the German so long as she remained sound at home, and so long as she had access to the whole world supply of bituminous coal except that in Central Europe, but a coal strike is aimed at Britain's most vital and vulnerable spot, and is excessively dangerous, because the effect, if not the intent, of a strike of coal producers is to bring about a general cessation of work barely distinguishable from a general strike. An uneasy questioning can also hardly be avoided when simultaneously with the British strike similar action is announced by the miners in Belgium and France, and there have been "conversations" between the British leaders and the coal unions on this side of the Atlantic. There is too evident a connection between the Geneva Convention and subsequent happenings to be ignored. We suggested some weeks ago that the miners of the countries represented at the Geneva Convention had accepted their selection to lead a frontal attack upon society as it now exists, because of the absolutely essential and irreplaceable nature of the commodity which they produce, and subsequent events have not dispelled this impression.

The strike can hardly succeed in its object, even if that be limited to obtaining increased wages, because the market value of the product of the British coal mines will not pay the rate of wages demanded by the miners, even though they absorb every cent of profit, unless it is accompanied by increased individual production. England has always been a free trade market for raw materials from abroad, and it would be an easy matter, even at the present time, for the United States to land coal in Britain at a cheaper delivered price than it can be mined there. When the United States has really sized up the European coal market, and measured its own tremendous advantage in coal areas and production costs against Europe's needs, it will become apparent that even in the home markets, let alone such formerly exclusively British coal markets as South America and the Scandinavian countries, the United States is in a position to limit the wages which the British miner can be paid by his employer, whether that employer be an individual or the State itself.

At the present time the United States can mine the same tonnage of coal with one-quarter the workmen employed in British coal mines. The United States also possesses today a tidy mercantile marine, and is not looking for ships to carry freight, but is looking for freight to employ its ships.

It is also becoming evident that the workers in the United States are just as shy of foreign labor entanglements as they are of foreign political entanglements, and if the British miner goes dancing after the bubble of communism, he will not be followed by the American worker. The public in the United States possesses probably the highest general level of informed intelligence in any country outside of Canada insofar as relates to business matters. The people of the United States see clearly the trend of the

times. They know that whatever goes up must also come down, and market movements, the recurrent cycle of depression and prosperity, commodity prices, and all the significant information contained in the financial pages of the newspapers, are popular knowledge in the United States, but this is by no means the case across the sea, hence the greater instability of the workers.

The United States coal operator, and the mine-workers in that country will see nothing more in the British situation than an enlargement of their country's newly-founded coal export trade, and they will wonder at the curious insanity which has driven the British miner to strike for additional wages at a time when unemployment parades have commenced in London, and a scaling-down in commodity prices is energetically in progress.

So far as markets are concerned, Britain's defect as a coal producer will not affect Canada, inasmuch as we have not yet attained to the decent dignity of being self-supporting in coal supply. It should, however, increase the demand upon the British Columbia coalfields.

In all other matters of trade and commerce the British coal strike, if prolonged, will be an unmixed evil to Canada. It will further depreciate our exchange, and will close off one of our best markets. We have every reason to hope that the strike will be of short duration and limited extension.

SELECTION OF WORKS COAL BY THE MICROSCOPE.

The microscopic examination of thin coal sections is commencing to yield useful results. Early observers, as Lomax in Lancashire, laid the basis for empirical deductions by examining and tabulating the appearance revealed by the microscope; and eventually Lomax was able to build up sections disclosing the nature of coal seams from floor to roof, which when correlated with accepted theories of the formation of coal seams from forest growths, annually deposited over periods of inconceivable vastness, and chemical investigations of the main constituents of coal, as disclosed by the microscope, have thrown light upon problems connected with the suitability of selected coals for industrial uses, that ultimate chemical analyses of coal did not explain.

For example, two coals of similar appearance and identical chemical analysis will act dissimilarly, say in the coking process.

A paper read before the Iron and Steel Institute at the Autumn Meeting (Sept. 21-22) by Mr. A. L. Booth of Manchester intimates that Messrs. Armstrong, Whitworth and Co. have used the microscope in the selection of some 250,000 tons of coal used annually for different purposes. It was found that coals that had for years been found satisfactory for certain purposes, when examined microscopically, had certain characteristics of color and structure which made them distinguishable as a type, and that coals selected because of recognizable type resemblances—irrespective of analysis—were found satisfactory upon trial.

A series of colored plates (which typographical limitations prevent reproduction of) accompany Mr. Booth's paper, and show clearly three main types of coal, namely humic, spore and cannel coals.

There is now fairly general agreement among investigators of coal substance that the original vegetable component of coal has much more to do with its behavior in the various processes of industrial use, than the subsequent forces of heat, rock pressure or geological age, and it is the nature of this original substance that the microscope is eminently fitted to disclose.

Mr. Booth states that the microscope not only helps in the selection of coals, "but in some cases is of use in deciding whether or not it will pay to wash them, and will explain why an apparently good, clean coal has, for instance, a high ash content. Washing may be quite useless in such a case."

The presence of disseminated free sulphur, of infinitesimal fineness, is also detectable by the microscope, as has been shown by Dr. Rheinhardt Theissen.

Coal sections from representative Nova Scotia bituminous seams indicate by their characteristic reddish tinge and abundance of cuticle matter that they belong to the group of "humic" coals, which are stated by Mr. Booth to coke well, and to give a good hot fire without too long a flame. This describes accurately the behavior of these Nova Scotia coals.

Other qualities that are determinable from microscopic examination are tendency of a given coal to yield an inflammable dust, or liability of coals to spontaneous combustion.*

Coal from a given seam will show generally uniform characteristics, over large tracts, which points to the employment of microscopical examination to determine the correlation of seams separated by folds in the stata, or areas of denudation.

In deciding upon the suitability of seams of unknown qualities, and in formulating opinions on such limited evidence of suitability as may be obtainable say from a diamond-drill core, the combined use of the microscope, with chemical analysis, for comparison with sections of well-known coals, suggests itself.

The microscopic study of coal sections is a younger and in some respects, a more difficult art, than the related sciences of metallography and petrography, but it bids fair to yield equally important results, and to become as indispensable a part of industrial laboratory equipment, in the allied steel and coal industries more particularly.

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*See Lomax, Trans. Inst. Min. Eng., Vol. XLVI, Pt. IV.

The Pas Mineral Belt in 1920

By R. C. WALLACE, Commissioner of Northern Manitoba.

During the present summer development work in that territory from Flin-Flon Lake eastwards to Herb Lake, now generally known as The Pas Mineral Belt, has been confined mainly to the western and eastern ends of the district. There has, indeed, been considerable diamond drilling in Copper Lake and a good deal of interest in gold discoveries at the north end of Elbow Lake, as well as a larger amount of prospecting in the Reed Lake territory than during any previous summer. The fact remains, however, that the two pivotal points are the Flin-Flon ore body in its importance to the copper mining industry in the western part of the belt and to the mining industry in the eastern part of the belt. As far as copper development is concerned in particular, there has been a tendency to await the development of railway facilities consequent on the operation of the Flin-Flon property before any very considerable expenditure of capital is made on other copper properties in the western part of the belt.

The Flin-Flon Ore Body.

From the work that has been done during the present summer by the Thompson interests, through the Longyear Exploration Company, it is now possible to study the ore body underground and to get a clearer conception of its relationships to the country rock than heretofore. There are many questions of very great importance in this connection which need not be discussed here. The work which has now been done has exposed an ore body in which the Province of Manitoba will legitimately take very considerable pride.

In No. 1 (the south) shaft there has been two hundred feet of sinking, and in the beginning of September two hundred and ten feet of cross-cut, as well as some hundred feet of southward drift. When the cross-cut has been completed to a width of two hundred and fifty feet there will be exposed over a hundred feet of solid sulphides, thirty feet of high-grade disseminated copper ore and some ninety feet of low-grade disseminated.

In No. 2 (the north) shaft the cross-cut has been run at the hundred-foot level to a length of some hundred and seventy feet, entirely in ore with the exception of some forty feet of horse. Sinking is now proceeding to the three hundred foot level.

The work already completed underground has been of great value, not only in checking up the diamond drilling but particularly in determining the costs of mining and best method of mining development. There are undoubtedly many problems ahead which will attract the most skilful metallurgists before the best method of ore treatment and smelting practice is determined for this ore body. The fact that is so satisfactorily established is, however, that there is an ore body of very large dimensions in the Flin-Flon deposits; an ore body which will become increasingly important, not only to Northern Manitoba, but to the Province as a whole. It is for all who are interested in provincial development to assist by all the means in their power in the work of seeing this property placed on an operating basis, not so much for the sake of those who are financially interested in the property as for the sake of the development of the Northland and the Province as a whole.

Other Copper Properties.

There has been considerable activity in the district immediately north of the North Arm of Lake Athapapuskow, the district which would seem to provide at the present time the best field for intensive prospecting in the whole belt.

In a property held by Baker and Patton, in which the country rock is a quartz porphyry striking north and dipping 80 deg. east, an iron sulphide body has developed on surface showing at least one hundred and thirty feet in width and bounded on one side by muskeg, in which there is a probability that the ore body also will be found. Generally speaking, this iron deposit is similar to many others in the mineral belt. There is, however, for a width of eighteen feet in the centre of the body, very considerable copper mineralization, and in other places more limited copper pyrite. The surface showings of copper are sufficiently important to warrant expenditure on diamond drilling in order to determine the extent of the copper mineralization underground. It must be remembered that a deposit like the Flin-Flon is simply an iron sulphide deposit with sufficient copper mineralization to make an ore body. All iron sulphide bodies which show surface copper should be prospected underground. It is understood that there are other showings of copper sulphide of somewhat similar type in this area. A very interesting discovery during the summer, from a mineralogical point of view, was that made by Rosen, east of the Big Island Lake district, which it was impossible, owing to limited time, for the writer to visit, but on which very full notes were kindly furnished by Mr. L. G. Thompson. At the contact between granite and greenstone there has developed very considerable mineralization of cobalt minerals, particularly smaltite in very fine grains weathering into cobalt bloom. Associated with this, and more particularly in a trench seventy-five paces to the East, chalcopyrite mineralization is found in the greenstone and also in the granite. The occurrence of cobalt minerals is an interesting one in the district and seems, judging by other work in the mineral belt, to be fairly wide-spread. The importance of cobalt minerals and the cobalt bloom stain in the Cobalt country in Ontario has been the close association of cobalt minerals in narrow calcite veins, with native silver and silver sulphides. Unless the geological conditions are similar there is no necessary connection in this field between cobalt minerals and native silver. If, however, a late diabase and associated narrow calcite veins can be found in this territory, it should be considered to be a favorable prospecting ground for silver.

Copper and Elbow Lake Territory.

In this central part of the mineral belt diamond drilling proceeded during the summer months upon the large quartz property of J. P. Gordon of Copper Lake. It is understood that the diamond drilling showed the quartz to be associated underground with very considerable prophyhy, and that mineralization with iron sulphides was found in a heavier degree than on surface showings. No further work has been done on the Red Rose vein of high-grade ore. Work is now proceeding on some claims east of Bear Lake, imme-

diately north of the Third Cranberry, in which stringers of chalcopyrite are found in a fairly solid greenstone and more particularly in quartz porphyry intrusions into the greenstone rock. The quartz porphyry holds a clean ore, which, if developed in sufficient quantity, will readily concentrate.

At the north end of Elbow Lake considerable prospecting was done during the earlier part of the summer, owing to the fact that discoveries were made by Webb of high-grade quartz veins on the Sherlock claim, immediately west of the mouth of Webb Creek. The quartz is irregularly distributed through a twisted hornblende schist, and at the present time a showing about one foot in width of highly quartzitic rock is being mined and hand crushed and pulverized in order to recover the gold by sluicing. In the same property several exposures of quartz, one at least four feet in width, occur, the value of which has not yet been determined. Interest has also been taken in other properties at the east end of an island in the north part of Elbow Lake. The Bow vein was staked in greenstone schist, and as its name implies, is characterized by reduplicated folding. The average is probably fifteen inches; the vein in places is thirty inches thick. This vein has been found, on careful sampling, to give high gold values. Immediately east of this vein, and parallel to it, is an intrusion of quartz porphyry varying in width from four feet to twelve feet and extending over the greater part of two claims. This porphyry is mineralized with pyrite and a little galena and is criss-crossed with narrow quartz veins. It would appear to be a rock of a type which might prove of value for fluxing purposes.

The Herb Lake Situation.

While considerable prospecting was done in the Reed Lake district this year, the men in the field confined their attention mainly to the working of properties in the Herb Lake and Little Herb Lake areas. A very interesting discovery was made north of Little Herb River, at the right-angle bend, by R. Kerr and P. Gasse in a rock which is an altered sediment, and which varies in composition from a typical mica schist to a quartzite. Very considerable galena has been deposited by replacement apparently from a granite, contact of which with the sediment is immediately west of the main discovery. Associated with the galena is pyrite, a little pyrrhotite and arsenical iron and here and there stibnite (antimony sulphide) in considerable quantity. From the trenching which has been done it would seem that the mineralization has taken place in more or less parallel bands which strike at an angle of about 30 deg. west of the schistosity of the rock. In the main trench, for a distance of fifteen feet, there is heavy mineralization, mainly of galena, partly of pyrite and to a slight extent of pyrrhotite and stibnite. The importance of the discovery is that the galena carries high values in silver. It is interesting that north-west of Osborne Lake galena has also been found in a very similar rock type by J. Kerr, while east of the main discovery galena is found by P. Kobar and stibnite by E. Stewart. It would thus appear that the mineralization is fairly extensive and much surface trenching, and particularly diamond drilling will undoubtedly be carried on in this district in order to determine the extent of the silver values. This is a new type of mineralization in the belt and adds one more to the possibility of economic development of a belt which is remarkably many-sided in its mineral types.

During the past year R. Woosey and others have prospected the northwest end of Herb lake. On an island immediately south of Woosey's Island a heavy mineralized basic rock shows iron and copper sulphides over a width of fifty feet from the top of the cliff to the lake shore. The rock, which is rather unusual for the district, is of a type in which a basic segregation of sulphides is possible, and the occurrence has particular interest for that reason.

On the east side of the lake, the Rex mine and the Bingo property have been responsible for the development work during the Summer. On the Rex mine work is now proceeding to develop the mine to the 300-foot level, and at the same time to stope from the 100-foot level in order to supply the mill, which is now operating. Great credit is due the management for carrying on under considerable difficulties. It will now be possible to stope over 150 feet in the south drift with an average width of three feet, and 70 feet on the north drift with an average width of two and a-half feet, at the same time as sinking is continuing to the 300-foot level. When there is sufficient labor available to run the mill to capacity, the clean-up from those remarkably large stopes should be sufficient to place the property on a good footing for subsequent development on a much larger scale.

At the Bingo property sinking has been completed to 50 feet, the vein averaging to this depth approximately eight inches, with at the bottom some quartz coming in, which will increase the average width by perhaps two inches. A contract has now been taken by Mr. Kennedy to sink to the 300-foot level and to do considerable trenching and cross-cutting. The assay values obtained to the depth at which the shaft has developed the vein are very high.

To many observers of the situation in the eastern part of the mining field, it has been clear for some time that the advisable procedure would be to consolidate several properties on the east side of Herb Lake, making the Rex the centre of operations and conveying ore by an air line from the other properties to the Rex. If a strong mining corporation could succeed in effecting such a consolidation, the future for the Herb Lake district would be very good. The vein at the present time developed on the Rex mine is such as should attract a strong corporation, provided that a sufficiently large number of other properties could be consolidated with the Rex, in order that practically all the capital expenditure on mining machinery could be concentrated on the one property. There is a feeling in favor of such a movement on the part of owners of property in the district who realize that in this way the Herb Lake mining field will come to its own much more successfully and satisfactorily than in any other possible way.

INCREASE OF WAGES AT WABANA IRON ORE ORE MINES, NEWFOUNDLAND.

The Dominion Steel Company has increased the wages of day-rate men employed at the ore mines by four cents an hour. An increase of fifteen per cent has also been granted to the staff.

It is understood the Dominion Company has made satisfactory arrangements with the Newfoundland Government in connection with the export tax that the Government proposed, and that this will not unduly penalise the export trade which, it is anticipated, will eventually attain large proportions.

The McIntyre Porcupine Mines Ltd.

Making Strong Bid For Position of Second Greatest Gold Mine in Canada.

By J. A. McRAE.

The McIntyre-Porcupine Mines, Ltd., situated at Schumacher, in the heart of the Porcupine gold area, has now challenged all others for the position of second place among the gold producing mines of Canada, and at the time of writing is establishing a record second only to that of its big neighbor the Hollinger Consolidated.

Output at this time is being maintained at a rate well over $2,000,000 a year, and the ore reserves are being added to in an extensive way. The deposits, which close to surface were extremely erratic, have been found to be uniform below the 700-ft. level, and a future of great magnitude has opened up before this company.

Mining interests who may find their early efforts disappointing, and who may feel somewhat discouraged, may turn their attention to the experience of the McIntyre and find consolation in the fact that this concern, only a few years ago, was also obliged to flirt with chance. At times, money was difficult to secure, and on certain occasions the McIntyre mine might reasonably have been classed as an exceedingly long shot, with the chances pointing strongly toward failure.

THE McINTYRE-PORCUPINE MINE, SCHUMACHER, ONT.

From the humble beginning of a doubtful prospect, optimism on the part of a few men has finally overcome all adversities, has brought the mine to the position of second producer in Canada, and has enabled the company to disburse large dividends. As an illustration of its growth, the McIntyre mine, in addition to producing over two million dollars during the past fiscal year, and realizing net profits of around one million dollars, was able to add nearly a million dollars to its ore reserves. That is to say, in a period of twelve months, and at a time when economic conditions were exceedingly unfavorable for gold mining, this company was able to develop close to three million dollars.

The McIntyre History.

The original McIntyre claim of 40 acres was located by "Sandy" McIntyre, one of the best known prospectors in Northern Ontario. Shortly after its location, the property was purchased by the present company. Development work commenced in 1911. During that year, the West McIntyre of 34 acres, and 68 acres under Pearl Lake, were purchased. It was in 1912 that the first mill was erected and placed in operation. The plant consisted of only 10 stamps.

Up to the time of the labor strike which lasted from Nov. 1912, to June 1913, a total of 1,400 tons of ore were milled from which $31,243 was recovered. Operations were greatly retarded by the strike, but a 150-ton cyanide mill was carried to completion, and development work got well under way by the end of that year.

During each of the next three years, the mill was enlarged by adding equipment to treat an additional 150 tons daily, bringing the total up to close to 600 tons in 1916. Since that time, no milling additions have been made, attention having been directed toward enlarging underground operations and adding to the physical condition of the mine.

The Merged Properties.

During 1915, the McIntyre Extension Company was organized, taking over 120 acres formerly belonging to the Pearl Lake Company. Also, in November of the same year, the McIntyre-Jupiter Company was formed, taking over the holdings of the Jupiter mine. On the 31st of December, 1916, an amalgamation between the McIntyre, McIntyre Extension, and McIntyre Jupiter was effected. And, with a view to still further pursuing the policy of expansion, an option was taken on the Plenaurum mine, a property of very attractive possibilities which is situated adjacent and on the east side of the Jupiter in direct line with the strike of the main vein system of the Jupiter. This option is still held, and the 130 acres which it involves would give the McIntyre-Porcupine a total of 462 acres.

The McIntyre-Porcupine also holds an option on the Newray, but this is regarded as very speculative and should not be as yet referred to as a likely addition to the holdings of the company. The company has also recently purchased coal lands in Alberta, taking a half interest with the Temiskaming Mining Company in the Blue Diamond Coal Mine and the Canadian Coalfields. These properties are generally regarded as of speculative value.

The present policy of underground development work on the McIntyre itself, is gradually placing the mine in such a strong physical condition as to lead to the belief that further milling additions may soon be considered, in which case the yield would be accordingly increased.

Ore Richer at Depth.

An extremely favorable feature has been a steady increase in gold values encountered as the workings of th mine reach deeper levels. The following figures

illustrate the increasing value of the ore per ton, and the steady increase in total production:—

Year	Val. per ton Recovered	Production
1912	$5.25	$ 76,166
1913	7.05	225,752
1914, to March 31, 1915	8.39	718,332
1916 (fiscal)	7.38	779,991
1917 (fiscal)	9.55	1,864,914
1918 (fiscal)	9.61	1,714,258
1919 (fiscal)	9.29	1,671,646
1920 (fiscal)	11.02	2,080,178
		$9,131,237

The Dividend Record.

The company paid its first dividend of 5 p.c. on Feb. 15, 1917, the disbursement amounting to $180,514. Up to Sept. 1st, 1920, dividends totalling 55 per cent, and $1,985,656 have been paid.

In addition to returning this amount to its shareholders, the company has built up an ore reserve of $5,595,500 and has a surplus of $1,445,000.

The Pioneer Work.

Any written history of the McIntyre-Porcupine would be quite incomplete without mention of the few men who steered the enterprise through its days of uncertainty, the outstanding figure being the late Col. Alexander M. Hay. It is to Col. Hay that the greatest credit is given for the sound basis upon which the affairs of the company were placed, and although he died in January, 1917, just one day before the company declared its first dividend, he handed down to those who succeeded him a mine already developed to a place of importance.

Among others who contributed to the successful efforts in a manner second only to Col. Hay, is R. J. Ennis, the general manager, as well as a former president, Albert Freeman, and Director C. B. Flynn.

The company is capitalized at $4,000,000 made up of 4,000,000 shares of the par value of $1 each. Of these some 3,600,000 are issued.

From these figures, and keeping in mind that profits are exceeding $1,000,000 a year, dividends at the rate of about five per cent quarterly appear reasonably to be looked for in the immediate future as compared with interim disbursements during recent years at the rate of five per cent at intervals of each four months.

Conclusions.

In concluding, the point should perhaps be made clear that the success of the McIntyre has hinged upon the development of what is known as No. 5 vein, upon which development work has been carried to a depth of nearly one-third of a mile. In its brief history, the work done has revealed a total of approximately $14,700,000 of which $9,131,237 has been produced, with $5,600,000 in sight, and the reserve increasing from year to year. To grasp the full significance of the possibilities of the future, it is necessary to keep in mind the fact that the company controls 462 acres, and that only during recent months has discoverd another ore body below the 1000-ft. level which is believed to be the eastward continuation of the No. 83 ore body of the Hollinger, and appears not unlikely to develop into a healthy rival of the great No. 5 deposit. This new ore body is a tremendous potential asset.

CANADIAN INSTITUTE OF MINING AND METALLURGY.

Annual Western Meeting, Winnipeg, Oct. 25th to 27th.

Owing to unforeseen circumstances the complete programme of the Winnipeg Meeting of the Institute is not available for publication, but the following provisional arrangements indicate the scope of the Meeting.

On Monday the 27th, the meeting will be opened by the Address of the President, Mr. O. E. S. Whiteside. The Institute will be the guest of the City at luncheon, and will be welcomed by Mayor Gray, who is himself an engineer.

In the afternoon a paper will be read describing the Manitoba Rolling Mills at Selkirk, and a general discussion on the outlook for an iron and steel industry west of the Great Lakes will take place. The subject will be considered in relation to location in British Columbia, Alberta, Manitoba and Western Ontario.

The evening gathering will include general papers with popular addresses, and lantern slides and moving pictures showing water-powers and mineral resources of the West.

Tuesday's proceedings will hinge largely on questions connected with coal. Mr. Lewis Stockett and Mr. F. W. Gray have prepared papers on this subject.

At luncheon, the Institute will again be a guest, this time of the Winnipeg Board of Trade.

In the afternoon, coal matters will again be taken up. An account of the result of steaming tests carried out on Alberta coals by E. H. Oliver of the Alberta Department of Mines will be given. The work of the University of Alberta in connection with the more efficient utilization of western coals will be reviewed by Professor Norman C. Pitcher, of the Department of Mining Engineering. Mr. David King is expected to discuss the problems connected with the marketing of Western coal.

The Smoker and usual entertainment will take place on Tuesday evening.

On Wednesday morning papers on the mineral resources of Northern Manitoba, Southern Manitoba, Saskatchewan, and the West generally are expected to be given by Mr. J. A. Campbell, M.P., Commissioner R. C. Wallace, Prof. J. S. DeLury and others.

The luncheon will be an Institute affair, addressed by local Institute celebrities.

The afternoon will be taken up by a sight-seeing trip and a visit to the Selkirk Steel Mills.

The Banquet will be held on Wednesday evening, and will conclude what bids fair to be a worth-while programme.

Mr. R. R. Rose, the Assistant Secretary will attend the meeting.

CANADA AS A COAL CADGER.

Canada's unnecessary dependence upon the United States for coal involves the Dominion and, industrially, the British Empire in American domestic affairs, Canada is pictured always as a suspicious character prowling around Uncle Sam's coal-bin. At a time when the American public is naturally anxious and apprehensive as to the fuel supply for the on-coming winter, to represent Canada before the people as a cunning appropriator of fuel needed in the United States is to arouse feelings destructive of international sympathy and good-will. Yet this will be done, every year, regardless of the facts, until Canadians work their own coal deposits.

"Montreal Star."

VISIT OF BRITISH CHAMBERS OF COMMERCE TO HAILEYBURY, ONT.

The first half of October was marked by a visit to Northern Ontario of the members of the delegates of the Chambers of Commerce of the British Empire. These men, representing all portions of the Empire, expressed keen pleasure and surprise at the advanced stage to which the mining industry of this new country has been developed, and showed actual amazement over the magnitude of the potential resources awaiting utilization.

The visitors were shown through the Cobalt silver field as well as the gold mining district of Porcupine. They were shown more than a score of mines in operation, and their journey by railway and by motor through the vast stretch of territory lying along the T. & N. O. Ry, and around the mining centres which have sprung into being during the past few years, left them deeply impressed and they left with the promise that they would spare no effort in making known throughout other parts of the Empire the opportunities presented in Northern Ontario.

At the conclusion of their visit to Cobalt, the delegates were tendered a reception in the Armories at Haileybury, at which some 600 guests were present.

During the course of the evening, Balmer Neilly, speaking on behalf of the mining industry of Ontario, and making special reference to the silver mines which has just been shown the visitors, tendered the following address, the full text of which is given, the "Canadian Mining Journal" being specially represented at the gathering.

The Address.

Since the discovery of Cobalt, in 1903, we have had the honor of entertaining many distinguished people and great among those distinguished parties are our guests of this evening. On behalf of those interested in the Mining Industry, we would bid them a most hearty welcome here tonight. We hope their visit to this North Country will prove not only interesting, but that from an Imperial standpoint, it will provide fair and conclusive evidence that Canada is indeed developing at a pace that can only be understood by those constantly in touch with the situation. When this Congress last met in Canada, Cobalt had not been discovered, but to-day — 17 years later — we have a new, vast country stretching from North Bay to Cochrane and ere long to the waters of the Arctic Ocean.

The land has been cleared, railways built, numerous mining camps of world prominence have been opened up, providing a ready market for the pioneer settler and farmer. From an agricultural standpoint we are gradually becoming self supporting and our great forest resources are being called upon to supply a world deficiency in the paper market.

Temiskaming proper has an estimated population of 45,000 people, all optimistic as to Canada's future within this Empire, and during the war sent overseas some 5,000 men, who classed second to none and who won commissions on the field ranging from the junior position to that of Brig.-General. Those who remained at home worked to support those overseas and their families who remained at home. Without casting reflections upon the efforts of other towns here; but speaking particularly of Cobalt because I am personally familiar with their work there, let me say that that camp, with a population of say 7,000 people, produced and shipped one per cent of all Red Cross Supplies, sent overseas from Canada. This was, of course, mostly the work of the women and we are proud of them, but the men were not idle and with the assistance of the ladies, raised almost $5,000 every month, so that the raw material could be purchased and the families of the soldiers assisted through the Patriotic Fund on a scale somewhat better than that generally prevailing throughout Canada, during the war.

And we didn't stop there. Our welcome to those brave men whom the fortunes of war permitted to return, was genuine and sincere. Club houses have been provided in nearly every town in Northern Ontario for the exclusive use of these men and not only, have they received their old jobs, but better and more suitable position have been provided where possible.

Many of our men, unfortunately, were not permitted to return and while we sorrow with their relatives, we also join in their pride because of a noble sacrifice given freely that right and justice may prevail and that this old Empire may continue to function, standing for relief and freedom to all mankind.

Tonight I have been asked to speak concerning the Mining Industry in Northern Ontario, and Cobalt in particular.

The Discovery of Cobalt.

The Cobalt Camp was found purely by accident in 1903. A blacksmith named LaRose, working with the contractors then constructing the present T. N. O., either found or had brought into his little shop a fair sized piece of a peculiar looking mineral. Little attention was paid to it and the story goes that it was hammered and examined by many a man before the suggestion came that it might be valuable. Samples were sent south and finally, Dr. Miller, our Provincial Geologist, came North and pronounced the find of silver — cobalt — nickel and arsenic genuine.

Every effort was made by the Dept. of Mines to enlist interest in this new mineral field, ,but the people of the Province knew little and cared less about mining and the men of experience reasoned that ore so rich indicated pocket formation and would probably amount to little in importance.

In 1904 some four veins were worked, but little staking was done, and not until 1905 was the real value of the discovery appreciated. Indifference gave way to unbounded enthusiasm and prospectors, from all parts of the world, flocked to this district.

The veins are comparatively narrow, averagiug perhaps 2" to 4" in width, but the ore is phenominally rich. The ore taken from the surface in boom days probably averaged over 3,000 ozs. silver to the ton and miners, in many cases, with ouly hand steel, produced a fortune.

A boom developed and many properties, with little or no merit, were sold to the public at fabulous prices.

However, many of the prospects did develop iuto mines and have returned to fortunate shareholders, mauy times their investment.

Gradually real miners were attracted to the country, inexperience gave way to experience and mining methods were developed suitable to this class of deposit. Workiug constantly to improve their process, the men of Cobalt have coutributed several very important improvements to the art of metallurgy and ore dressing.

Growth of Output.

Cobalt's production increased in leaps and bounds and in 1911, when the apex of production was reached, the Camp produced 31,507,790 fine ozs. silver, or 14 per cent of the world's production for that year. Since then the production has gradually declined, for two reasons. Firstly, it was but natural to mine the high grade deposits with the least possible delay. Secondly, with concentrating machinery, the mines were able to give proper consideration to the lower grade ores and as the price raised, the grade workable at a profit naturally lowered. This is well illustrated by pointing out that while the production in 1918 had dropped to 17,661,694 ozs. as compared with the 1911 production of 31,507,791, the money return for 1918, by reason of the higher price of silver, was some $1,387,943 in excess of that obtained in 1911.

Dividend Record.

Up to the end of 1919, Cobalt had produced silver to the value of $182,145,699 and had paid dividends to the entent of $80,780,513. If to the dividends we add the liquid reserves of the operatiug companies, it is found that the miues have returned to their fortunate shareholders, up to this time, about one-half the value of their gross output, and we are proud of this record.

Lead to New Fields.

Those who were successful in Cobalt struck out to prospect and develop the surrounding country and to-day iu addition to the Sudbury Nickel Mines, supplying as you were told 85 per cent of the world's nickel requirements, we have Porcupine, producing at the rate of nearly $12,000,000 a year; about 60 miles Northeast, we have Kirkland Lake Camp,, just coming into the profitable production stage. About 50 miles Northwest we have Gowganda, another silver camp of importance, and 20 miles South of here, the South Lorraine Camp, where British capital will apparently reap a bountiful reward.

You may be inclined to ask as to the future promise of this Camp. The deposits are high-grade and erratic and you may be interested to learn that few mines have ever beeu in a position to announce over two years' positive ore reserve. New discoveries continue to be made and they in turn suggest other possibilities, but the big factor in any estimate must turn on the future price of silver. The amount of ore classified as profitable or unprofitable in any mine will continue to fluctuate with that price.

Nationalization Impossible.

Mining is described as a gamble. In the same way iusurance is a gamble, if you confine consideration to any one individual

risk. However, it can be proved mathematically that insurance, by grouping many risks and working on known averages, is after all the very opposite of gambling. Positive data, such as insurance companies have available, is impossible in the case of mining and a certain hazard must always be connected with the industry. For this reason, if for no other, it is not possible to nationalize the industry. If a Government were to take over our industry to-day for the benefit of the State, the hope of individual reward would, to a great extent, be removed and the prospectors would not, nor could they be expected to risk their time, health and money, sowing for others to reap.

Gradually the known ore deposits would be worked out, the money thus made and perhaps large additional amounts, would be spent in prospecting with little hope of success. Not only is nationalization impossible, but great care must be taken to prevent any lessening of the prize, that now keeps prospectors interested in their calling.

There is no known method whereby the profitable risks may be separated from the bad risks, be it mining or insurance. Nevertheless we would not be justified in accepting all risks. Careful investigation of all the conditions surrounding or pertaining to any risk, is essential. And that investigation must be made by those who have had long and successful experience. Sending a plumber, described for the job as a "well known mining engineer," to take grab samples and having those samples assayed to the third and fourth decimal place, is not economy and should be a criminal offence. We were asked by some of the members of the Imperial Press Conference how best we could co-operate to prevent flotations of ill advised ventures on the British market. Our answer is that you have in the Institution of Mining and Metallurgy, London, an organization well fitted to function in this respect. Their membership is world wide and their opinion may be generally accepted at par.

Per Capita Output.

Canada's position from a mining standpoint is so promising that only the truth and nothing but the truth will serve her best interests. To trace the growth of our mineral production, tion, let us quote as follows: Canada's per capita production in mineral wealth was in

1886	$ 2.33
1896	4.38
1906	12.81
1912	18.27
1918	24.59

And let me say here in all sincerity and as one who has spent the last 14 years in this country, that we have only begun.

Statistics at a function of this kind are generally tiresome,, but in order to give you some definite idea as to the distribution and present production in Ontario alone, let us quote the following figures for 1918, giving the market value in the nearest thousand of dollars:—

Nickel	$27,840,000
Silver	17,416,000
Copper	8,533.000
Gold	8,503,000
Cobalt	1,616,000.
Iron Pyrites	1,145,000
Iron Ore	625,000
Arsenic	567,000
Talc	247,000
Graphite	209,000
Fluorspar	154,000
Feldspar	112,000
Molybdenum	60,000
Mica	50,000
Corundum	27,000

Turning to the purely metallic production of this Province note that in 1903 the year in which Cobalt was discovered and Temiskaming born, the total value of Ontario's production was $12,870,000, while in 1918 that total had increased to $80,-309,000.

In 1903 taking Canada's mineral production as a whole, the value was $61,741,000 and in 1918 that total was $211,302,000.

We are, therefore, progressing, but by no means as fast as conditions would warrant.

We are advised that of all railroad borne freight in the U. S. 53.09 per cent originates in the product of the mine. On our T. N. O. the last available report shows that their income from handling products of the mine is 48 per cent of the total freight returns.

A similar report from Dept. Railways & Canals, Canada, shows only 38 per cent and when it is admitted, as it is on all sides, that Canada's mineral resources are second to that of no other country in the world, it is but fair to assume that we are behind in our proper development, at least to the extent of an annual tonnage equal to 15 per cent by weight of all goods freighted on our Canadian Railways.

So much authentic information is available in the way of Government reports concerning the wealth and distribution of our mineral resources, that I think we may fairly take their possession for granted. Let us then consider what we have in the way of ready resources that will assist in the proper development of new mines.

Summary of Resources.

1. We have in the great pre-Cambrian area radiating North-West and North-East from say North Bay to the shores of the Arctic, a country dotted with numerous lakes and rivers so distributed that it is possible by means of short portages to travel the whole district by canoe. Water is everywhere wholesome. Fuel abounds, game and fish will supply much of the prospectors food requirements.

2. Railways and telegraph lines supply a ready means of communication as between different districts.

3. The mining laws are simple and equitable and administered without partiality.

4. While we lack coal, fire-wood is available for the early stages and nature has been lavish in her distribution of water power in this North Country. In 1918 Government reports show that in all Canada water power had been developed to the extent of 2,305,310 H.P. and of this Ontario had developed 53 per cent. The possible amount to be developed is to-day unknown but it might be interesting to state here that in Northern Ontario there has been developed for the use of the mines approximately 50,000 H.P., and the financing of this development has been largely the work of the mining companies.

5. There has been attracted to this district a fine class of citizen — men and women who are not easily discouraged, but on the other hand, are full of hope and resource and constantly striving to the end that success must eventually crown the efforts of those who ever and honestly use the talents with which nature has endowed them.

What Are Our Difficulties?

(1) The people of Old Ontario have a very different knowledge of the problems of the Mining Industry. Their ideas have been obtained from brokers' circulars describing astounding profits made and predicted. As a result of these mistaken ideas many honestly believe that practically all the profits derived by successful mining companies should be taken by the Government to pay for improvements in Old Ontario.

(2) While we as pioneers in a new country must clear the land, develop water power, build roads, bridges, construct telegraph lines and railroads, provide schools, hospitals, water, fire protection and many other public utilities, we are taxed as though all these things were provided by the community, as in Old Ontario.

(3) City life, with high wages and expensive tastes as developed during the war-time munition-manufacturing period, has permanently unfitted many for the privations and hardships of pioneer life. City population has approached the point of saturation and only a gradual decrease in industrial development within the cities coupled with immigration from countries where the people are not socially above handling a pick and shovel, can remedy the present grave labor shortage.

What We Hope To Do.

(1) We hope to provide the load that will make the development of our water powers an economic possibility and provide power in such abundance as to largely offset our lack of coal,

(2) We hope to develop our iron ore resources by means of beneficiation to the point where Ontario and Canada may depend upon our own resources, in place of importing 95 per cent of our iron ore, and iron and steel products to the extent of some $180,000,000 as in 1918.

(3) We hope to educate the people of Old Ontario and incidentally the Government, to the problems and possibilities of the North Land and then persuade them that our necessities should in no sense be contingent upon conditions in Old Ontario alone,

(4) We hope to encourage an influx of real men in sufficient numbers to permit industry to follow well-balanced and economic plans,

(5) We will welcome capital carefully invested, from any quarter, and more especially will we welcome the interest and council that would naturally follow capital coming from other parts of this Empire.

(6) Finally, by more intensive prospecting we hope to broaden the scope of the mining industry, until the whole pre-Cambrian country is a hive of industrial activity. Mining will continue to do the pioneer work with agriculture, lumbering, pulp and paper-making following in our wake.

The objects of the Chambers of Commerce, as we understand it, is to foster a better understanding between the different partners in the Imperial Commonwealth. But it must go further than that and seek a better understanding among the nations of the world. Surely then there is no place better fitted to carry on this plan of education, than on the frontiers of

civilization. The boundary lines are ever moving outwards. The lure of the new country is drawing men from their old homes and old surroundings, social caste disappears, old prejudices are forgotten, a broader vision is the result, and plans for the future can be formulated on the basis of merit rather than expediency.

Our appreciation of the honor done Temiskaming through this visit of the Chambers of Commerce is genuine. We are full of unbounded faith in and loyalty to the Empire, and we hope that through discussion of the various problems unfolded through observation, as you travel across Canada, much good will result and that your memory will ever keep green the possibilities and the promise of this North Land, the land of lakes and rivers, farms, forests and mines.

LABOR SITUATION AT THE NOVA SCOTIA COLLIERIES.

The coal operators, with the exception of representatives of small companies, failed to meet the Wage Scale Committee of the United Mine Workers in conference at Truro as requested. The large companies take the stand that if the recommendations of the Royal Commission are not accepted by the union as a basis of agreement, the award of the Mc. Kinnon Conciliation Board and the agreement of January last which resulted from the work of the Conciliation Board, automatically come into effect. This agreement provides the machinery for adjustment of any interim disputes during the life of the contract, and the operators stand prepared to meet the men as provided under the January 1920 agreement.

The Executive of the Union is taking a strike vote on the 22nd October, and there is little doubt that a majority of the miners will vote for a strike, although, under a secret vote, the issue would not be so certain.

A conference is to be held in Montreal on the 20th between representatives of the larger companies and the union officials. The conference is being held at the suggestion of the Minister of Labor, who is expected to be present.

While the large companies are adopting a definite attitude and insisting upon the carrying out of existing agreements, there is a tendency among the smaller operators to take advantage of the brisk market which will be available should the workmen of the big operators go on strike. This disunity among the operators has for some time been very skilfully employed by the union officials, who in their public statements make no distinction between the small or large pits, but accord to each individual operator equal importance, much to the mystification of the newspaper readers at a distance. The deciding factors nevertheless are the Dominion Coal Company, the Nova Scotia Steel Company and the Acadia Coal Company, which between them mine 85 percent of the coal produced in Nova Scotia.

Should a strike take place, about 12,000 mine-workers will be directly affected, and possibly 8,000 steel and railway workers would be immediately thrown idle. The running of the trains on the Canadian Government Railway, and other public utilities would not be immediately effected, as resources would be had to winter stocks, but curtailment of service, both freight and passenger would be necessary within a week, should the strike take place.

The course of events will turn upon the Montreal conference, and at the time of writing cannot be forecasted.

NOTES ON ASBESTOS & OTHER MINING IN QUEBEC.

By Mr. THEO. C. DENIS (In C. M. I. Bulletin).

The Asbestos Corporation of Canada has given a contract to the firm of Fraser, Brace & Co., for the removal of 600,000 cubic yards of overburden at the King mine, Thetford, to enable them to extend their operations. An hydraulic transportation system is being installed to remove the soil and sand to a dump across the Thetford river, a mile and a quarter from the mine. This will uncover an area of asbestos-bearing ground 1,300 feet by 1,000, that had previously been proved by diamond drilling. Prospecting by drilling is being continued over the property, and reserves are said to be now assured at that mine for some thirty years of operation at the present rate of mining.

The Reed property near Black Lake has been leased to the Maple Leaf Asbestos Company, in which the Wiser interests, of Prescott, have a controlling share. Plans are being made to remodel the small mill, which was built some twelve months ago by Messrs Blais & Fillion, the previous lessees.

The Consolidated Asbestos Company, which took over the properties formerly controlled by the Jacobs Asbestos Mining Company, are hastening the underground development work on the second level at the Jacobs mine to begin mining as soon as possible. Hoisting from the first level is now proceeding satisfactorily. At present the underground development work at this mine comprises a total length of nearly three miles of haulage ways, cross-cuts, inclines and shaft.

The Mutual Chemical Company of Canada which is working a chrome mine near Caribou lake, between Black Lake and Coleraine, has sunk the shaft to 300 feet, but all mining is done on the 200-foot level. The lens of chromite on which they are now working appears to be about 500 feet in its longest dimension. The new concentrator is giving good results and shipments of chrome concentrate have been continual all summer.

J. V. Bélanger Mining Company, which is working the chrome property adjacent to that of the Mutual Chemical Company of Canada, started the new concentrator early in July, and it has been in operation practically without a stop ever since. The mill capacity is 180 tons of ore per day.

Metal mining is extremely quiet in the province. At present the only metal mine in operation is the Weedon mine, working a deposit of copper-bearing pyrite, at Weedon, north of Sherbrooke. Steps are being taken to resume operations at the Montauban mine, of the Zinc Company, Ltd., at Notre-Dame des Anges, where mining had been suspended some time ago in order to concentrate the work on diamond-drilling exploration.

Quarrying and brick-making are extremely active throughout the province. The operations are only limited by the shortage of labour. Production of lime has also been handicapped by the shortage of coal for the kilns, to the great inconvenience of the paper-pulp industry, which uses a very large quantity of lime in the production of pulp. The output of one of the largest lime companies in the province is practically all taken by the pulp mills.

Northern Ontario Letter

THE SILVER MINES.

The Cobalt Field.

Cobalt mine operators have taken an optimistic view of the silver situation. They believe the recent decline in quotations is only temporary, and will be marked by a gradual rise to not far under the price obtaining in the United States. For instance, on Oct. 12th, quotations declined to 83 cents an ounce with no sales reported. On Oct. 13th, the bid increased to 87 cents an ounce with no sales reported. Meanwhile, the United States Treasury continues to pay 99½ cents an ounce for all silver produced in the United States, and this is regarded as the factor which seems certain to so deplete the market for general consumption that the world price of the metal cannot long remain below that point.

According to advice just obtained, the Mining Corporation of Canada is on a fair way to establish a production record for 1920 equal to that of 1919. The output for the year will actually exceed the amount of silver estimated in the reserves at the beginning of the current year. As to this, in common with other important silver producers in this field, the Mining Corporation is mining over a large part of its underground workings and finds that early operations were directed toward mining high grade ore shoots and that a large tonnage of medium and low grade ore was passed up. In view of the great extent of the underground workings of the Mining Corporation, the life of the mine is expected to be comparatively long. In this connection, it is significant to note that no ore has as yet been drawn from the Buffalo mine which was acquired early this year. The Buffalo, with its large amount of medium and low-grade ore remains a big reserve asset. Added to this is the 350,000 tons of old tailings which are being treated at the rate of about 3,50 tons daily, and which will last for nearly three years.

W. G. Miller, Ontario Government Geologist, together with Thos. W. Gibson, Deputy Minister of Mines, have just completed a visit to the leading mining district of Northern Ontario, including Cobalt, Gowganda, Porcupine and Kirkland Lake. This is the first general visit for a long time, and the press of Northern Ontario has made special comment, the following editorial appearing in the "Mining Review:—

"The visit to Northern Ontario this week by "Dr. W. G. Miller, Provincial Geologist for "Ontario, together with Thos. W. Gibson, Deputy "Minister of Mines attracts interest. These "gentlemen are in charge of important Depart- "ments bearing vitally upon one of the basic "industries of the Province.

"In the North, the visit is welcome, and is only "marred by the thought that their coming should "of necessity be referred to as a "visit".

"Surely the mining industry of Northern "Ontario should receive more frequent calls, and "surely the requirements of the industry could "be better ascertained by frequent tours through "the mining areas.

"The Mining Review has no complaint to "register in regard to the ability of either of "these men who have won the good-will of mining "men in general in Northern Ontario. We "merely desire to urge upon those filling impor- "tant posts the advisability of making personal "close-up observation of progress and results. "We are confident the industry would benefit "from such added attention."

The mines have as yet found no relief from the shortage of underground workers, and with attention being directed toward maintaining production, the amount of exploration and development work is suffering as a consequence.

The wage problem at the silver mines is due for consideration on or before Nov. 1st. In Aug. 1919, the mining companies in dealing with their employes after breaking up the Western Federation organization, agreed to pay a flat wage on silver below 80 cents an ounce. On 80 cent silver or over, an extra bonus of 25 cents a day was agreed upon, with an extra 25 cents for each 10 point advance. As a consequence, when silver went to $1.37 an ounce early in the year, the bonus amounted to $1.50 above the flat wage. Later on, when it commenced to decline, the mining companies, in May, last spring, announced voluntarily that they would continue to pay a $1.25 bonus daily until Nov. 1st, even though silver should decline below $120 an ounce. Therefore, although according to the former agreement with the men, the bonus on silver at under 90 cents an ounce would be only 25 cents daily, the mine workers have received the benefit of an extra $1 a day.

As regards what action will be taken on Nov. 1st, it is difficult to say. But, in view of the $1.25 bonus plus the flat wage combining to make a total just about equal to the wage being paid in Porcupine and at Sudbury, it is believed the mines in Cobalt will continue to pay this rate of bonus, at least until the cost of living declines or other factors enter into the situation and make it necessary to reduce the bonus.

Cyril Knight, Ontario Government Geologist, who is making a re-survey of the geology in the Cobalt district, is now engaged in a study of conditions at the Kerr Lake mine and that vicinity. Mr. Knight will discontinue the work a little later in the year, and will resume in the spring with a view to completing the task next summer.

Elk Lake and Gowganda.

Announcement is made that operations are to be commenced on the property of the Anvil Lake Silver Mining Company, situated at Anvil Lake in the Maple Mountain district. Chas. Dalby has been engaged to manage the work, and operations are to be carried on throughout the winter. The property lies close to the White Reserve mine.

In the meantime, negotiations are still under way between the White Reserve Mining Company and British interests, whereby it is hoped to complete a deal which would cause the property to be worked in an aggressive manner. Just now, only two men are kept at the property, pending the outcome of the negotiations. It is understood the White Reserve Company is itself prepared to proceed with work even though the present deal does not materialize.

Considerable disappointment has been caused over the failure of the Canadian Light Railway Construction Company to provide Gowganda with a narrow-gauge railway this year. However, with the advent of good sleighing, transportation will again be made more satisfactory, and is expected to lend added impetus to activity in this area during the coming winter.

During the week ended Oct. 15th. five Cobalt companies shipped an aggregate of thirteen cars containing nearly one million pounds of ore, the weeks shipments ranking among the highest during the current year.

The Mining Corporation was the leader, with the Nipissing a close second. Following is a summary:—

Shipper	Cars	Pds.
Mining Corporation	6	391,042
Nipissing	4	307,307
McKinley-Darragh	1	100,976
Hudson Bay	1	63,756
Kerr Lake	1	61,137
Totals	13	924,208

THE GOLD MINES.

The Porcupine District.

The gold mines of the Province of Ontario are receiving a premium on their gold, at the rate of over a million dollars a year. This added income has offset to some extent other adverse economic factors, and the total income of the gold mines for the current year will be greater than ever before in the history of gold mining in this province.

This record is being established at a time when labor is so scarce as to permit the mining plants to be operated at only two-thirds capacity, and for that reason the achievement is doubly significant. In due time, with a full force of workman available, the increase in output and net earnings will be large and may reasonably signalize a general increase in the rate of dividend disbursements.

Achievements in the gold mining industry of Northern Ontario, where the mines of Porcupine and Kirkland Lake are alone producing nearly twenty-five per cent as much gold as the entire United States, are regarded as exceptionally remarkable. The gold output of these mines has been increased at a time when the production from mines in many other countries has been gradually falling off. For instance, in 1915 the gold output of the United States amounted to $101,000,000. For the year 1920 it is estimated as likely to be below $50,000,000. This state of affairs is alarming for the United States, Canadians, therefore, have reason to be especially pleased to witness the steady increase in production of the yellow metal in Northern Ontario, with the promise of this output being greatly increased just as soon as sufficient workers can be secured.

It is reported in unofficial circles that the Dome Mines Company is considering some plan to increase its capitalization. Officials are reticent regarding this, but the object in view is to prevent unreasonable taxation, according to rumor. This would in no way alter the dividend policy, and would give the present stockholders the benefit of any increase in capitalization. As regards the present operations, the developments at depth are understood to point to the likelihood of the Dome Mines experiencing very little difficulty in going on a dividend paying basis of 20 per cent annually, just as soon as the necessary number of workers can be procured.

The extra dividend of 1 p.c. declared by the Hollinger Consolidated, payable No. 3rd, is the seventh disbursement made this year. The disbursement will amount to $246,000 and makes total of $1,722,000 paid so far this year.

During recent years, the Hollinger has made 1 p.c. disbursements every eight weeks, with one extra in December, making 7 p.c. a year. The custom has been to have a regular disbursement fall early in December with the extra at the end of the month. Therefore, it is believed the stockholders will as usual receive the two December disbursements, in which case the total for this year will be brought up to 9 p.c. or a total of $2,218,000.

Provided the December disbursements actually materialize, the Hollinger Consolidated will again regain its position of being the largest dividend paying mine in this district, the second largest being the Nipissing with an annual record of $1,800,000.

Not only this, but the Hollinger achievement is being accomplished at a time when workers are scarce and when it is possible to operate the company's mill at about two-thirds capacity. This holds out great promise for the future when workers are available in adequate numbers.

The Hollinger has close to 1,000 men on its pay-roll, but is anxious to secure several hundred more. In the meantime, pending the securing of these additional men, the mill is operating at about two-thirds capacity, and the output for the current year promises to approximate $6,000,000.

A diamond drilling program of 1,200 feet has been completed on the Porcupine-Miracle property. A wide zone of mineralization was intersected, and the core has been shipped away for assay. Provided the gold content is sufficiently encouraging, further drilling may be undertaken during the winter.

Work has not yet been resumed on the Premier-Langmuir Barite Mine, in Langmuir township. The directors recently visited the property in company with an expert, and this gave rise to an earlier report that work had been resumed.

The Kirkland Lake District.

Outstanding features in connection with the Kirkland Lake district include the fact that the main shaft of the Lake Shore Mine is well on its way from the 400 to the 800-ft. level, that the mill of the Wright-Hargreaves mine will be completed by the end of the current year and that machinery for a new mill on the Ontario-Kirkland will be hauled to the property during the coming winter.

The Tough-Oakes mine is still idle, and it is believed no move will be made toward resuming general operations until next spring at least. The cost of heating the plant is a factor against deciding to start up at this season, while the difficult of securing men is another. The chief underlying cause of the prolonged idleness is difficult to determine, as arrangements were made last spring to start up. The opinion has taken form locally that the causes may be more serious than is generally believed, and may have something to do with the amalgamation arrangement between the Tough-Oakes, Burnside and Aladdin-Cobalt.

A deal is said to be pending for the Elstone-Duncan property, situated about half way between the proven part of the Kirkland Lake district and the Argonaut mine at Beaverhouse Lake. Although sand overburden conceals the greater part of the rock in this territory, it is generally believed the gold-bearing formations extend all the way from Kirkland Lake to the Argonaut. For that reason, any movement or deal calculated to develop the Elstone-Duncan would be interesting and success in such work would open up possibilities over a wide field.

Clifford E. Smith, Chairman of the Toronto Branch of the Canadian Mining Institute has just completed a brief examination of the Associated Goldfields of Larder Lake. Mr. Smith has found the large low-grade bodies do not carry sufficient gold to make them profitable to mine on a large scale at a profit, and will probably recommend an entire change in policy. Provided this proves to be the case, the advertised plan to construct a large low-grade mill will have to be abandoned, and mining will take the form of prospect work to learn whether or not it will be possible to make a profit out of the smaller streaks of ore. This will no doubt come as a distinct disappointment to stockholders who had been led to believe in the latest annual report that a huge volume of ore exists in which the gold values average $11.15 to the ton, the total indicated valne being over 159 million dollars. To fall from such high hopes to the fact of having only a mining prospect with really no assurance of success is something which is reducing the enthusiasm born in the past of vague inference and mysterious reports.

A party of men left Haileybury this week for Lightning River where they will carry on operations throughout the winter on the property of the Lightning River Gold Mines. They were accompanied by Dr. Lucy of Guelph, who is going in to make a brief inspection of the property.

Operations are being resumed on the Mondeau property, at Boston Creek. Work was snspended a few weeks ago, at which time an official announcement was made that the step was only temporary and was not in any way due to lack of merit in the property.

On the Miller Independence mine, cross-cutting operations are proceeding in three directions at the 500-ft. level. As yet, no high grade ore has been encountered at this depth, although favorable indications are in evidence.

COAL PRICES.

Toronto, Oct. 22.—It is considered likely that the British strike will have a tendency to advance the export market for coal. Another feature which will have more or less effect on the market is the calling off by the Attorney General at Washington of the Fair Price Commission which may have the effect of stiffening the market. Hard coal is still quoted at from $8 to $16.00 gross tons at the mines, American funds. Mine run is quoted at $13.85 to $14.25, f.o.b. Toronto and smokeless rules at from $13.50 to $14.50.

Vancouver.

Bitnminous coal retails in Vancouver at $14.50 for lnmp coal, delivered in sacks, $13.50 for nut coal, and $10.00 for slack coal. The use of slack coal, combined with wood, in domestic furnaces is common, and permissible because of the milder elmate of the Coast.

Sydney.

A general increase in the price of coal will be necessitated by the findings of the Royal Commission, as notwithstanding the failure of the parties to agree, some increase in the expenditnre of the operators on wages is certain, and there is little disposition on the part of the miners to increase production. Sydney operators have already increased the price of runmine coal to local consumers from $5.50 to $6.50 per short ton. Screened coal is quoted at $6.75. Higher prices are likely.

TORONTO MINING STOCKS.

Following are of average quotations for active gold, silver and miscellaneous stocks on the Standard Mining Exchange for the week ending 17th October, 1920.

Silver.	High	Low	Last
Adanac Silver Mines, Ltd.	2¾	2½	2½
Bailey	4½		4½
Beaver Consolidated	39	38½	39
Cobalt Provincial	48¼	47½	47
Crown Reserve	27¾	26	26
Foster	2½	2½	2½
Hargraves	1⅞	1⅞	1⅞
La Rose	32	30	32
Lorrain Con. M. Ltd.	4⅞	4	4⅞
McKin.-Dar.-Savage	55	50	55
Mining Corp. of Can	1.74	1.59	1.70
Nipissing	9.40	9.30	9.40
Ophir	2½	2	2½
Peterson Lake	13¼	13	13
Right of Way	2	2	2
Silver Leaf	2	2	2
Temiskaming	34¼	34	34½
Trethewey	25	24¼	24¾
Gold			
Apex	1¾	1¼	1½
Atlas	12	12	12
Dome Extension	40½	39	39½
Dome Lake	5	4¾	4½
Dome Mines	12.50	12.25	12.25
Gold Reef	3½	3¼	3½
Hollinger Cons	5.85	5.60	5.75
Hunton Kirkl'd G.M.	11½	10	10
Keora	17	16½	16¾
Kirkland Lake	47¾	45	46
Lake Shore M. Ltd	1.06	1.02	1.02
McIntyre	2.05	2.01	2.02
Moneta	11½	10	11½
Newray Mines, Ltd	5½	4	5
Porcupine Crown	24	22¾	23¼
Porc. Gold .. EX.R	1	1	1
Porcupine V.N.T	26	25	25
Preston East Dome	2¾	2	2¾
Schumacher	21½	21	21½
Teeb-Hughes	8	8	8
Thompson Krist	7¾	7½	7½
West Dome	6½	6	6¼
West Tree Mines Ltd.	5	5	5
Wasapika Gold M. Ltd	10	10	10
Miscellaneous			
Petrol Oil (The)	53	50	53
Rockwood Oil, Gas	3½	3½	3½
Vacunm G.	27½	26	27½

METAL QUOTATIONS.

Fair prices for Ingot Metals in Montreal, October 20th 1920. (In less than carload lots).

	Cents per lb.
Copper, electro	21
Copper castings	20½
Tin	47½
Lead	8¼
Zinc	9⅛
Aluminum	35
Antimony	8¼

British Columbia Letter

The Metal Mines.

Representatives of the Mining Operators of British Columbia are anxious to induce the Provincial Government to amend the Taxation Act in order that allowance may be made for the depletion of ore reserves in mining property. As it now stands anything that is allowed comes as a concession from the Minister of Finance after an investigation. The opinion among mining men is that the principle of allowance for depletion of ore reserves should be recognized in arriving at the basis for the taxation of a producing mine. A delegation from mining companies interested in this Province recently met the Premier and members of the Executive to discuss this and other phases of the Taxation Act. The hearing given them was sympathetic and they are confident that the force of their arguments will have the effect of producing the desired amendments at the next session of the legislature.

Instructions have been given the Provincial District Mining Engineers of British Columbia to prepare to deliver a series of lectures at the different important centres of their several districts during the winter months. They will deal with elementary geology and mineralogy, the idea being to give prospectors and others interested an opportunity to obtain the knowledge necessary to guide them in selecting prospecting ground and to enable them to recognize mineral when encountering it. Hon. Mr. Sloan, Minister of Mines, in adopting this policy has accepted a suggestion from the Prospectors' Protective Association of British Columbia. This organization made a number of recommendations, and that of the establishment of schools for the benefit of the prospector and the "would-be" prospector was among them. Mr. Sloan thought it a good suggestion, especially in view of the decline in the numbers of the men who search for mineral wealth in the Summers and return to think out what they are going to find next season, and also because of the extensive field offered by this Province for this class of pioneer work.

Members of the Canadian Geological Survey, who have been at work in British Columbia, are beginning to return and to leave for Ottawa to compile their reports. J. B. MacKenzie, who conducted a party into the Taseke (Whitewater) Valley, Clinton Mining Division, for the purpose of making a geological and topographical survey with special reference to the reported large deposits of limonite and hematite iron ore deposits of that Section, is one of the latest to be heard from. He states that on arriving in this District he met F. J. Crossland, who was at the head of a party sent in by the Provincial Government to pursue investigations bearing particularly on the tonnage of iron ore available. The two expeditions co-operated in their researches and their reports are being awaited with interest. Mr. McKenzie explains that he is unable to make any statement of values in connection with the iron deposits. He explains, however, that "the ores are derived from a pyrite, iron sulphide, which occurs in some places near the base of a great series of volcanic rocks, and these cover a very large area in Central British Columbia. The iron has been extracted from the pyrite by a process of oxidization, has been carried down the slopes, and deposited in the flatter ground. The beds of limonite, the subject of investigation, thus are found in different parts of the lower sections of the valley. "In September, Mr. MacKenzie make a reconnaissance across the eastern Coast Range, passing the headwaters of Tyaughton and Churn Creeks, and the Yalakon River down French Bar Creek to the Fraser River. Only general geological work could be done owing to the lateness of the season but nevertheless the trip was of importance because it was the first geological survey of any kind of that country.

W. E. Cockfield and M. F. Bancroft, also of the Geological Survey, are other workers in the western Canadian field who are en route East. The former has been working in the Keno Hill, Mayo, and other adjacent sections of the Yukon while the latter has spent the summer obtaining material necessary to tie-up geological maps of the Lardeau District of the Province.

Of the Keno Hill region Mr. Cockfield has little to say regarding general development except that there is much activity and that much development is being carried on by the Yukon Gold Company, one of the Guggenheims' enterprises. The Company expected to ship 3,000 tons of ore this winter. The ore assayed high-grade silver-lead, running from 200 ounces of silver and from 50 to 60 per cent of lead to the ton.

The principal ore was galena, occasionally carrying freibergite. The gold content was small, not exceeding, as a rule, $4 to the ton.

On the upper Stewart River there were some stamp mills in operation but little placer mining was being done. A gold dredge had been in operation on Highett Creek during the summer.

Referring to the Lardeau Mr. Bancroft explained that he had examined the central mineral belt where are located such mining properties as the Silver Cup, Triune, Nettie L., and further north, the Truefisher, Broadview and Great Northern. Lack of capital was retarding development work. The belt was remarkable for its fissures, the rocks being carboniferous with fine grained sedimentary rocks, such as quartzites and limestones, much in evidence.

Discussing general conditions it was stated that much of the mineral had been Crown granted and left without development. The difference between this section and the Slocan was that in the latter the ore deposits were found closer to the surface, so that the expenditure required in opening and proving them was not so great.

A shipment of ore from the Nettie L. ran $290 silver to the ton while other shipments have given returns of 21 ounces of gold, 230 ounces silver, a considerable percentage of lead and a small percentage of zinc.

Vancouver, B. C.

Drilling for oil continues in the Fraser River section of British Columbia and, from reports, the indications at the Empire Company's well, which is down 2,200 feet, are encouraging. A gray gumbo, thickle studded with what is described as oil sand, has been encountered. Small quantities of oil have been brought to the surface in mud, it is asserted, and the statement has been made that the Well, as it stands, is capable of producing a considerable quantity of oil.

Nelson, B. C.

At the Nelson Fall Fair one of the features was a Mineral Exhibit collected by the prospectors and operators of that section of the Kootenays. A specimen of copper ore from Iron Mountain, Beasley, was awarded first prize in competition with samples of other dis-

coveries made during the past year. A collection of gold ores from the Bayonne District was highly commended. These specimens averaged $75.30 in gold, besides carrying silver and lead. A first-class sample of placer galena from Boulder Lake was much admired. Copper-silver and copper ores from Crawford Bay, silver ore from the Providence Mine near Greenwood; and lead ore from the Lardo were among other samples that held the attention both of local and visiting mining men.

Trail, B. C.

During the last nine days of the month of September ore receipts at the Trail Smelter, of the Consolidated Mining Smelting & Power Co., aggregated 12,744 tons, bringing the total for the year to 251,735 tons. The Washington Mine, of Sandon, is added to the list of shippers. Mines of the smelter company contributed 11,549 tons of the total for the last days of September leaving 1195 to the credit of independent operators.

Stewart, B. C.

W. R. Tonkin, president and manager of the Fish Creek Mining Co., is quoted as stated that seven years work on their property, situated on the west of Salmon River and on the American side of the Portland Canal area, has justified a continuance of work and that shipment of ore will commence as soon as transportation facilities are secured. The leads, he states, are quartz fissures carrying high values in silver and gold and it is proposed to instal a concentrator. Mr. Tonkin declares that as large a tonnage of ore will be developed on the American side of Salmon River as within Canadian territory, affirming that it has been only because of the remarkable showing of the Premier Mine that the adjoining section has not received the attention its merit deserves.

About 600 feet of diamond drilling is to be done on the Titan Group of Claims, located on Fisher Creek. This property possesses a well defined quartz vein. The Riverside Group also has been under development, 350 feet of tunnelling having been done with satisfactory results.

On the Premier Mine the concentrating mill, which will have a capacity of 100 tons a day, is making good progress. Water power is to be utilized and electricity will be available both for the mine plant and for all buildings of the camp. Employees will be provided with comfortable housing, being supplied not only with light but as well with hot and cold water. Equipment now is being hauled over the road on the American side, over the border and the river to the mine. A warehouse has been built on the new dock for storage of the ore pending shipment. There are 200 men on the payroll at the Premier Mine Camp.

THE COLLIERIES.

The situation in the coal fields of Eastern British Columbia and the Province of Alberta has not mended during the past week. In Alberta it is about the same. The claim is made by representatives of the U. M. W. of A. that the tie-up is not general and that few of the mines are seriously affected. The O. B. U. officials, however, declare that the strike call has been responded to by the majority of the workers and that more have been coming out every day. The Crow's Nest Pass District, B.C., the mines have been practically closed down since the 6th inst.

It is an unusual condition because the issue does not appear, at any rate at present, to concern the operators so much as the two rival labor organizations, viz., the United Mines Workers of America and the One Big Union. The latter want the "check-off" system abolished, this being the practice of taking from the men's wages the dues which go to the U. M. W. of A. The U. M. W. of A. asks that its Agreement with the Operators be re-opened so that provision may be made for an increase of wages to day-workers. The O.B. U. failing to get satisfaction called a strike. The U. M. W. of A., did not go that far, advocating negotiation. Consequently the original dispute seems to be somewhat obscured in the heat of the struggle for control between the two labor factions. The Operators, for their part, have declared that there can be no action on the question of a revision of the Agreement to provide for additional wages until the men go back to their work.

The possibility of a fuel oil famine in the northwest is turning the attention of transportation companies to the task of providing for a substitute. Joshua Green, president of the Puget Sound Navigation Co., in testifying before the Washington State Public Service Commission recently, stated that his Company probably would continue to use oil as long as it could be had, but that it was increasing so in price that increased passenger and freight rates were imperative. It was his opinion, however, that within the next two years the use of oil for fuel and gas making would have to cease in the Pacific Northwest. Consumers of fuel oil would have to turn to something else, presumably coal. "We are experimenting now with powdered coal", he said, "but the result still is doubtful. We find that the coal cannot be pulverized at plants on shore but must be powdered aboard the boats." It is difficult and dangerous to handle, Mr. Green asserted, because of its inflammability.

The total coal production by the collieries of Vancouver Island for the month of September was 150,807 tons. This is made up as follows :

	Tons.
Canadian Western Fuel Co., Nanaimo	56,775
Canadian Collieries (D) Ltd., Comox	42,005
Canadian Collieries (D) South Wellington	8,461
Canadian Collieries Extension	14,545
Pacific Coast Coal Mines Ltd. S. Wellington	7,088
Nanoose-Wellington, Nanoose Bay	5,456
Granby Consolidated Mng., S., & P. Cox, Cassidy	16,477
	150,807

These figures indicate that the coal fields of the Island are holding their own in point of output. The outstanding feature is the increase in the production of the Granby Collieries at Cassidy, 16,477 tons for September as against 9019 tons for the month of August.

PORT ARTHUR NOTES.

By J. J. O'CONNOR.

The Port Arthur Shipbuilding Company announce that negotiations are proceeding for the manufacture of mining machinery at their plant here.

Mr. Samule Hoare, representing the Canadian Mining Shovel Company, of Virginia, Minn., and closed contracts for the construction of a considerable num-

ber of Armstrong shovel loaders, in addition to the contract already in hand. The first of those completed was thoroughly tested out during the past week, and came up to requirements. Others are being assembled, and the first shipment of them will go forward the early part of next week.

In addition to mining machinery, the company will add the manufacture of a full line of papermaking machinery including all classes of grinders, wet-machines, chippers, digesters and heavy paper making machines.

The acreage, and floor space of the shops are ample to accomodate an enterprise of this kind, in addition to the shipbuilding operations of the company.

Vice President P. G. Chase, states that the company is assured of steady work for another year, and that with negotiations for further shipbuilding contracts that have reached a favorable stage, he expects to be able to announce the signing of new contracts in the near future.

The Reliance Mill and Trading Company, of New York, will handle the sales of the paper-making machinery for the company.

A magnetic survey is being carried out on a large tract of iron ore lands, lying east of Poplar Ledge, Lake Nepigon. These lands were recently diamond drilled by United States interests, with very gratifying results.

A new shaft house has been constructed at the Grace Mine, Eagle Lake, and an Ingersoll steam hoist, with ventilating fan attachment is being installed. The old Camp, and mine buildings have been put in thorough repair, preparatory to an active campaign of mining development work, on or about November 1st. next.

DOVER OIL FIELD, ONTARIO.

Messrs. Kiely & Smith, stock and bond brokers, Toronto, have sent out the following circular:

New developments are under way in the Dover Oil field which undoubtedly will be of considerable importance to the different companies operating in this district.

A franchise has been granted to the Petrol Oil & Gas Company, giving this company the right to build an independent pipe line from the producing field a distance of about twelve miles to connect with the Southern Pipe Line Company, a subsidiary of the well-known Doherty interests of New York. This new pipe line should be completed within two weeks, and will allow of the producing companies in the Dover field obtaining a market for their gas at a price over three times that now obtainable.

The Petrol Company has already accepted a contract to deliver gas to the Southern Pipe Line Company, and no doubt other companies in the field such as the Vacuum Gas & Oil, Eureka, Thames Oil & Gas, Inland Oil & Gas, etc., will be very glad of the opportunity to enter into arrangements with the new interests for the sale of their gas when producing wells are brought in by them.

The fact that these important United States interests have become interested in the Dover field indicates that from this district very great things are expected in the way of production.

The Petrol Company has at present two wells producing oil and about 1,000,000 feet of gas per day, and a third well nearing completion. The Vacuum Gas & Oil Company is drilling at a depth of about 2,900 feet with every indication an important producing oil and gas well will be brought in within the next thirty days. The No. 3 well of the Petrol has reached a depth of something over 2,800 feet, and expectations are that this company will soon have three producing wells in this district. English interests are drilling a well near Paincourt which has reached a depth of something over 2,700 feet, and we understand already shows indications of oil. These interests have something like 5,000 acres under lease.

The building of this new pipe line at considerable expense will naturally encourage and benefit all those interested in this important oil and gas field. The higher market available to the producer will mean in the case of the Petrol Company increased net yearly earnings of not less than $60,000. While a number of wells are at present being drilled by different companies, the fact that a better market for gas is obtainable, due to the new pipe line coming into the district, will undoubtedly result in extending the field of operations.

LADY GEOLOGISTS IN CANADA.

Shortage of the right kind of men, presumably, has led the Canadian Geological Survey to engage women. Two lady geologists are reported to be in the field. They ought to be able to collect all the information necessary for a useful report; indeed, they are said to carry a gun and a revolver as part of their outfit, so that if anybody is slow in coming forward with the necessary data they will be in a position to exercise persuasive powers of more than usual feminine effectiveness. We shall expect sundry distinctive touches in the writings of these ladies, and the introduction of new descriptive terms. For instance, they are likely to find pleats in the shale, ruching in the rhyolite, and tucks in the trachyte. Stranger things have happened. The "selvage" of a vein is akin to the "self-edge" of a piece of cloth. "Seams" came into mining by grace of the seamstress. Joking apart, geologizing by women is no new thing. The oldest Geological Society, namely the one in England founded by Lyell and Murchison, includes a considerable number of the gentler sex. Many of them have contributed valuable articles to the proceedings. Geology used to be considered a polite study, it was one that was untainted by commercialism, it appealed to gentlemen and ladies, that is, to amateurs. And that is why the geology of the Victorian period in England contributed so little to the aid of mining. The geologists of both sexes looked askance at any phase of their subject that touched on money-making. They delved in fossils, they delighted in glacial drift, they enthused over stratigraphic difficulties. All that is changed, and the ladies too. Undoubtedly the new recruits to the Canadian Survey will have an eye to the economics of their subject; they will be in sympathy with the miner, and they will collect the data helpful to him in his search for metals. We welcome them with the grave courtesy suitable to the occasion. There is plenty of work for men to do: many of them are doing the work that women can do: it is well that there should be a proper distribution of talent and energy into suitable channels.

"Mining & Scientific Press".

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"The output of the property is dependent upon the supply of native labour".

"Orders amounting to over six months output are now in hand; in fact, owing to the uncertain conditions of labor, it is necessary to refuse orders for execution so far ahead".

This is the crux of the situation prevailing at the New Modderfontain property—the second largest gold mine in the world—at the Rand, and at the properties of the Cape Asbestos Company, in Cape Colony.

The statements re-echo throughout mineral industries, everywhere and anywhere.

Gold is needed to replenish the depleted treasuries of the nations. The New Modderfontein is producing nearly $13,000,000 per annum.

The Chairman of the Cape Asbestos Company confidently declares "the general outlook is distinctly promising; the asbestos industry is still in its infancy, each year seeing some new application of the materials".

Like views in endless reiteration might be offered in behalf of coal and silver producers—the nickel industry—the copper mines—it is altogether too obvious that go-as-you-please-seek-the-line-of-least-resistance policies are hobbling them. Mineral industries are running on flat tires—while politicians and economists prescribe speed limits of production, without thought of how that can easiest be brought about—by the immediate provision of domestic or imported labor, as well as by the elimination or material modification of surtaxes. No surer sources of new wealth exist than in the diversified mines of the Dominion. Lloyd George very aptly took the stand that advances in wages must be based upon increased production. With this as the datum line, the do-as-little-as-possible dictum of trades organizations would have a reciprocating action not much in evidence at present. Languishing industries have to make other than lean purses. Mineral industries were not privileged to operate during the War on a cost plus basis. Nickel producers abstained from profiteering. The gold mines could not retain their labor and were confronted by special taxation and war costs of everything.

So, a National Policy by which mineral resources more speedily can be brought into the credit balance is something which might receive official consideration. The shortage of basic materials is no less acute than that of precious metals.

A MODERN PLANT FOR MINING, CONCENTRATING & SMELTING MAGNETITE FORTY MILES FROM NEW YORK.

Lean Siliceous Ore of 36 per cent Iron Content.

An iron-ore mining enterprise of significance to Canadian readers as bearing upon some much debated problems of the utilization of magnetite, is that of the Replogle Mine near Wharton, New Jersey, which is described at length, with many illustrations, in the "Engineering & Mining Journal" of 2nd October.

The ore is described as lean, and high in silica, running about 36 per cent iron. It is being concentrated, first in a dry mill by magnetic separators, and the tailings by tables in a wet mill. At Wharton, two new blast furnaces are being built with a capacity of 500 tons of pig iron daily from each furnace.

New Jersey in 1882 produced 920,000 tons of iron-ore, but the industry has decayed owing to competition of lake ores. Increased cost of carriage from the lakes and the improved methods of concentration now available are tending to revive magnetite mining.

The deposit controlled by the Wharton Steel Co., which owns the Replogle Mine, is estimated to contain 27 million tons of ore, as proved by diamond drilling. About 875 to 1,000 tons of crude ore are being crushed daily. The ore body is described as a lens of magnetite in gneiss, without definite contact between the magnetite and the gneiss, there being a gradual change from one to the other. The installation of the wet mill was made necessary by the occurrence of martite (Fe_2O_3) intimately mixed with the magnetite, which makes a portion of the ore non-magnetic and not susceptible to the magnetic separation process used in the dry mill.

A sintering plant of 800-900 tons per 24 hours capacity is being erected, intended to sinter a portion of the concentrates, mixed with flue dust from the old furnaces, of which a considerable accumulation is available. Lime for fluxing is being obtained from Ogdensburg, N. J.

The article describing the Replogle Mine is by A. H. Hubbell, and it is interesting in Canada because of the somewhat parallel conditions of ore occurrence. The Replogle Mine has, however, the advantage of being close to an industrial centre, being about forty miles from New York.

THE USE OF GRAPHITE, TALC AND MICA IN SOLID LUBRICANTS.

(Condensed from "Financier and Bullionist")

Quite a number of solid materials can be used for lubricating purposes, as graphite, talc, soapstone, mica, white lead and flowers of sulphur. Some of these, as flake graphite or mica possess a tough and flaky character which allows them to withstand considerable pressure without disintegration. Others, such as amorphous graphite or sulphur, are easily crushed into a very fine powder under pressure.

Again, certain solid lubricants can be changed into a colloidal form and carried in suspension in liquid so as to render them easier of application. Examples of these are the colloidal graphite preparations known as oildag and aquadag being diffusions of graphite in a colloidal form in oil and water respectively.

Of all solid lubricants graphite in one or more other of its forms is perhaps of the most use to engineers, as it is not changed in composition by high temperatures and will resist the action of acids and alkalis.

Talc, which is very soft ,resists acids and alkalis, and also cold and heat, and commercial preparations of this should find a number of uses in the engineering world. The refuse from mica works, when finely ground, forms a material suitable for lubricating purposes.

This problem of preventing separation of solid and liquid lubricants is one that is causing many difficulties and no satisfactory method of dealing with the matter has yet been devised. Some little time ago a firm patented a mixture of finely-pulverised graphite and glycerine for lubricating the cylinders of steam engines. Before mixing the graphite with the glycerine it was impregnated with a sufficient amount of petroleum or other similar material insoluble in glycerine so as to reduce the specific gravity of the more solid portion to that of the glycerine itself, so that there was no tendency for the mixture to settle out. This compound was quite satisfactory in use and could

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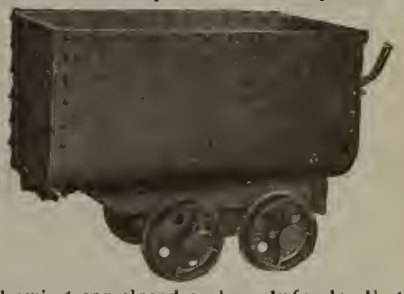

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be pumped by a mechanical lubricator in the ordinary way.

Solid lubricants of all kinds can, of course, be mixed with oil to any consistency and applied by hand to bearings or parts requiring lubrication, but for general purposes it would seem that the colloidal preparations of graphite give the most satisfactory results. A report recently received from a British railway is to the effect that good results have been obtained by using either colloidal graphite or flake graphite mixed with the ordinary locomotive engine oil. The graphite is not used for regular running, but only as a temporary remedy whenever important bearings are inclined to heat. In a number of industrial works excellent results have been obtained on heavy duty bearings, such as those of pumping engines, by the continued use of colloidal graphite mixed with pure mineral oils.

This form of lubrication has been remarkably successful with bearings which previously gave trouble, even when using oils heavily compounded with fixed oils. Not only did the bearings run cooler, but there was an appreciable reduction in the consumption of oil. Bearings of high speed machinery, such as draught or ventilating fans, which were troublesome with oil alone, ran reasonably cool when the same kind of oil mixed with graphite was used.

QUICKSILVER PRODUCED IN THE UNITED STATES DURING THE SECOND QUARTER OF 1920.

From April 1 to June 30, 1920, inclusive, 3,685 flasks of quicksilver of 75 pounds net, was produced in the United States, according to F. L. Ransome of the United States Geological Survey, Department of the Interior, who obtained the figures from the producers. This is 1,214 flasks less than was produced in the first quarter of 1920 and 255 flasks less than was produced in the second quarter of 1919. Only 13 mines were reported as productive—8 in California, 1 in Nevada, 1 in Oregon, and 3 in Texas. California produced 2,704 flasks, Texas 952 flasks, and Nevada and Oregon together 29 flasks.

The average monthly price of quicksilver per flask in San Francisco for the quarter, as quoted in the Mining and Scientific Press, was $100 in April, $87 in May, and $85 in June. The average price for the quarter was therefore about $91 as compared with about $86 for the first quarter.

The chief cause of the decrease in production during the second quarter was the destruction by fire, on June 20, of the reduction plant of the New Idria mine, in California, and the consequent loss of quicksilver already reduced during the earlier part of that month. Because of this misfortune the production for the third quarter of 1920 will probably be still smaller than that for the second quarter. Reconstruction is in progress, and it is expected that the plant will be in partial operation in August or September of this year. Other causes that contributed to the decrease in production were a shortage of efficient labor and a reduction in the average grade of the ore.

At a time when initiative in the quicksilver-mining industry is at a low ebb and the tendency is rather to abandon enterprises already begun than to embark on new ones it is of interest to note that the formerly productive Klau mine, in San Luis Obispo County, Calif., has been reopened under very capable management as the Carson mine, and that its 50-ton furnace has been put in repair, so that the mine is likely to become a considerable producer.

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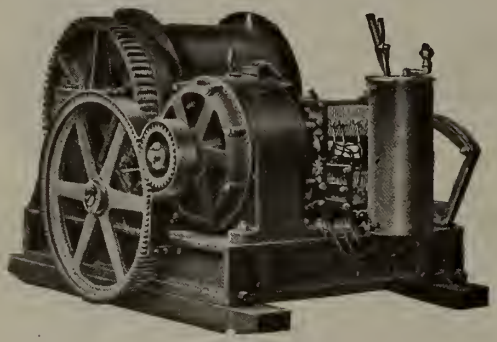

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EDITORIAL

THE SECOND WESTERN MEETING OF THE C. I. M. & M.

The Canadian Institute of Mining & Metallurgy is meeting in Winnipeg this week for the first time in annual general assembly, following the precedent of an annual western meeting inaugurated last year at the unqualifiedly successful gathering in Vancouver.

The choice of Winnipeg, hitherto the metropolis of an almost exclusively agricultural population, for a convention of mining men and metallurgists is significant of several things. As was the case in Toronto, so has been the course of events in Winnipeg, when the northern extension of a railway into the mineral-bearing pre-Cambrian rocks led to the discovery of valuable metals; and, although, with the possible exception of the Flin-Flon deposit, the mineral belt north of Le Pas has not yet been demonstrated to contain mineral wealth comparable with that of Northern Ontario, the conditions geologically are so similar as to suggest a possibility amounting to a probability that it may do so.

The Institute is to be the recipient of the official hospitality of the City of Winnipeg and of the Winnipeg Board of Trade, a compliment that the Institute will thoroughly appreciate.

The selection of domestic production of coal and iron as topics for discussion is recognition of their importance in Canada, which may be expressed in a sentence. The total value of the mineral output of Canada in 1919 was 173 million dollars. The value of importations of coal, petroleum, and iron and steel into Canada in that year was 272 million dollars. In mineral production alone, to say nothing of other items, this country is 100 million dollars per annum on the wrong side of the ledger.

OIL AT FORT NORMAN.

The finding of oil at Fort Norman is one instalment in a modern romance of prospecting. Fort Norman is as far north of Edmonton as that city is north of Denver, being only 400 miles upstream from the mouths of the Mackenzie River and just outside the Arctic Circle.

The difficulties of commercializing an oil-flow situated so remote from transportation routes, and so very far north, are great, but need justifies great effort and creates initiative. With an annual importation of 450 million barrels of petroleum into Canada, and a domestic yield of only 240,000 brls, Canada's necessity for a domestic source of petroleum is quite clear. While such an oil-flow as is reported from Fort Norman would have been more immediately useful if found further south, yet the important thing is to know that it is contained within Canadian territory.

The President of the Imperial Oil Company has given out for publication a cautiously worded statement which very properly points out the uniquely difficult geographical location of the oil-strike, and expresses the opinion that while the strike is scientifically of much value, from a commercial point of view it is not of immediate value. The implication in Mr. Stillman's statement that the Imperial Oil Company is prepared to spend years in making the oil available for sale in the Canadian market, and that oil may be present in such volume as to justify the laying of a pipeline through the inhospitable wilderness, strike us as the most important portions of Mr. Stillman's remarks, as they disclose the intention of the Imperial Oil Company to prosecute an enterprise on which already much expenditure has been risked, and apparently not without good grounds.

The incident is the latest justification of the employment of the geologist, and confirms the deductions of the officers of the Canadian Geological Survey as to the possibilities of the Mackenzie River Basin, and especially Mr. D. B. Dowling's statement in our issue of April 9th last. Mr. Dowling noted the existence of Devonian beds that exhibit a very slight degree of folding in the Mackenzie Valley. These beds are divided by the Nahanni Mountains into two distinct basins, in one of which the Fort Norman well is situated. In both these basins, stated Mr. Dowling, "There seem to be great masses of oil-saturated shales, and porous dolomites, from which oil is expected to be obtained by drilling."

The Imperial Oil Company's oil-prospecting campaign is widely-extended and scientifically directed. In addition to the party that wintered on the Mackenzie River and the well drilled at Fort Norman, there is a drilling rig near the Great Slave Lake, and others in south-western and eastern Alberta and in south-western Saskatchewan. The mass of exact stratigraphical information which the drillings will enable to be compiled, and the utilisation of this by the trained economic geologists that are in the Imperial Oil Company's service will, it is hoped, be placed at the disposal of the Canadian Geological Survey by the Company, and will form a very welcome and a very substantial addition to the literature on this matter.

Some entirely novel developments in oil transportation seems likely to arise from any attempt to get this

northern oil to market, not the least of the difficulties to overcome being the handling of oil under low temperatures of long-sustained duration, and it looks as if once again the peculiarities of our geographical position will call out that adaptability for developing a special technique that, as in many other instances that could be named, gives Canadian technical workers a distinctive and honored position, and has in great measure created a characteristic national mentality that welcomes the hard jobs and is bored by the easy ones.

THE ASSOCIATION OF WORKMEN'S COMPENSATION BOARDS.

The Association of Workmen's Compensation Boards in Canada is becoming an important body. Originally planned to exchange information, statistics and other data interesting to men engaged in the administration of workmen's compensation in the various provinces of Canada, this association is rapidly developing into a national advisory council in matters pertaining to occupational accidents.

Co-ordination of statistics, comparison of the incidence of accidents, exchange of views of accident prevention, on rates of compensation, medical aid, pension funds, and many other matters that might be mentioned, provide useful and proper activities for conference by the representatives of provincial compensation boards, but, according to newspaper reports, the Association has extended its deliberations to the passing of resolutions advocating changes in workmen's compensation laws that amount to advice to the various provincial legislatures interested. Such resolutions are within the proper province of a meeting of citizens, but we think they are distinctly improper activities for an association of officials charged with the administration of workmen's compensation laws that differ in every province of Canada.

For example, a newspaper report states the opinion of the delegates to the Association at one session to have been that workmen's compensation should be extended to every workman, and not limited in its application to any set of industries. Another resolution passed was that accident prevention work should be placed under the compensation boards in each province, following the lead of some provinces that have already adopted this plan. There is much to be said for these opinions of the Association, and we would not wish to attack the merits of either proposal, but we conceive it to be distinctly outside the function of provincial officers, appointed to administer a statutory office, to advise the country at large as to what should be the trend of workmen's compensation legislation. As private members of an accountants' society, medical association, or bar society, such opinions might be properly advanced over the names of their advocates, but they are distinctly not the business of an "association of Workmen's Compensation Boards in Canada."

HOOKWORM INFECTION IN A CHINESE MINE.

The "Mining Magazine" (London) contains a first instalment of a paper by Dr. F. C. Yen, Dean of the Hunan-Yale College of Medicine, China, describing the measures taken to control the hookworm disease (ankylostomiasis) at the Pingshiang Colliery in the province of Kiangsi, Central China. The colliery has been in operation twenty-two years, employs 12,000 men, and produces one million tons annually. The climatic conditions are tropical, hot and damp. The temperature in the mine does not fall below 78 to 80 degrees F. and the average humidity of the mine air is 97.7. The mine is wet and muddy, no toilet facilities are provided, the workers dispense with clothing, and the water in the mine drains is used for drinking and washing purposes. The conditions are therefore ideal for intensive and repeated infection, and are shockingly opposed to every western idea of sanitation.

In strange contradistinction to this state of affairs is the attempt that is being made by Dr. Yen, who judging from his scholastic titles is a medical man of eminence even to western ideas, to combat the all pervading infection of the hookworm larvae by sanitation, microscopical examination, and the resources of modern medical science. It is a picture that is typical of the social condition of a great nation, not so far removed by distance from Canada, that we can afford to be entirely indifferent to the phenomenon.

The debilitating effect of hookworm disease is pathetically told by the figures of production; for, even the primitive mining methods of the Chinese collie do not explain a production of less than one-third of a ton per man per day.

Dr. Yen emphasises the necessity for control of the hookworm disease by pointing out that mining is an industry only just beginning in China, and that if the old mines could be freed from the infection, the new mines could be saved, and an inestimable boon would be conferred upon the industry.

It is impossible to remain unmoved by sympathy at the unvarnished—and in some details revolting tale—of a lone fight by a man of science against a disease that has its origin and residence in dirt and filth. Even the patient persistence of a learned Chinese doctor, equipped with all the armory of medical science against parasitic diseases, might quail before the herculean nature of his task. Neither self-sacrifice nor high romance can be said to have flown the earth in face of undertakings like this.

In Canada, probably the last thing we may fear in our mines is hookworm infection, and this is chiefly attributable to our climatic conditions, and the absence,

so far, of any deep hot mines which are at the same time moist mines. There is little doubt that if Canadian mines were possessed of the disposition to receive hookworm infection, such would have been reported, because infected workers have undoubtedly been employed, and, with some notable exceptions, such as the mines at Sudbury, no particular attention has been paid to underground sanitation. It has not been regarded as necessary, and from the point of the possibility of hookworm infection, it has probably been unnecessary. Nevertheless, reasonably sanitary, conditions are just as important underground as they are on the surface.

PROBLEM OF THE WORLD'S GOLD. RECEDING OUTPUT.

Below is reproduced a condensation of a speech delivered before the Brussels Conference by Mr. Henry Strakosch (South Africa), Managing Director of the Union Corporation, taken from the "Financier." Mr. Strakosch's conclusion that economy in the use of gold for monetary purposes is only possible through the restoration of sound monetary and credit policies, so largely destroyed by the financial straits occasioned by war expenditures, seems essentially sound. Artificial methods of gold stabilisation cannot restore the wastage of war, and as Mr. Strakosch lucidly phrases it, international credit can only be restored by the accumulation of savings resulting from increased production.

Currency and Exchange.

Dealing with the question of gold production generally, and especially as it has been affected by the war, Mr. Strakosch said the gold production of the world has steadily increased from 1893, when its value was 32.4 millions sterling, to 1915, when it reached the high-water mark of 96.4 millions. Since then it has rapidly declined, until in the year 1919 the value of the total world output was reduced to 72 millions sterling. He estimated that the yield for the current year would probably not exceed a value of 69 millions sterling, and he predicted that the world's gold output would show a further decline in 1921, and that from then onwards the output would more or less steadily recede.

The Uses of Gold.

As to the uses to which the gold output of the world has been put, he stated that from 1907 to 1913, when the output of gold on an average amounted to 94.7 millions sterling, the amount absorbed was to the extent of 22.6 millions (or 23.8 per cent.) for industrial purposes and for the arts in Europe and America, while the East, and especially India, has taken 17.7 millions sterling (or 18.7 per cent.) of the world's production, so that the world consumption of gold for purposes other than money has amounted to 40.5 millions (or 42.5 per cent.). The balance of 54.4 millions (or 57.5 per cent.) he assumed to have been devoted to monetary purposes.

The Diminution in Output.

"The rapidly diminishing world output of gold and the radical change which has taken place in the uses to which that metal is put at present, as compared with pre-war days, deserve special attention," he went on. The diminution in output, it was clear, had been brought about by increased cost of production, which was unaccompanied by a corresponding rise in the value of gold. As to the change in the uses of gold, the conclusion was irresistible that the low value of gold, in terms of commodities, had very materially extended the demand for that metal in the East and for industrial purposes. The increased prosperity of the country and the rise in silver and the fall in gold have had as their natural consequence an increased demand for the yellow metal, "for which these Eastern peoples are evidently prepared to pay more than the Western world is willing to give in order to secure it for monetary purposes." The cheapness of gold had also very naturally stimulated its demand for industrial purposes in the West. Hence the material curtailment of the supply of gold for monetary purposes.

"The prospect of a diminished world gold output very naturally invited consideration of the possibility of measures which have for their object economy in the use of gold for monetary purposes, while the heavy depreciation in the currencies of many of the countries which formerly adhered to the gold standard suggests measures to prevent the value of gold from rising to its pre-war level.

Stabilising Present Value.

"To prevent the value of gold from rising means, in other words, to stop the price of commoditiees from falling in terms of gold. I, for my part, entertain great doubt as to the possibility of achieving this by interuational agreement. But if it were possible, what would be the consequeuces? The figures which I have given you, showing the material changes in the uses of gold since its price in the terms of commodities has fallen, clearly indicate the effect of any attempt to fix the value of gold at its present level. It would lead to a materially diminishing world output of gold, and, what is more, it would divert, as it has done during the last year, an increasing proportion to non-monetary uses. Is not then the conclusion forced upon one that it is neither practicable nor desirable to preveut the price of gold from rising in terms of eommodities? I should add that a rise in the price of gold, while probably not increasing the world output of that metal, will certainly tend to retard its decline. But what is more important, it will have the effect —as in pre-war days—of preventing a predominant proportion of the gold output from being used for purposes other than money, so that we may, in these circumstances, again look forward to a very substantial proportion of the gold produced annually being devoted to monetary purposes.

"It is true that a rise in the value of gold—connoting as it does a prolonged process of deflation with falling commodity prices— would have detrimental effects ou trade and euterprise, and consequently upon employment. But can it be expected that the maintenance of high commodity prices, by a more or less permanent depreciation of the monetary standards, will avert these pernicious effect? I, for my part, doubt it, The ravages of war have naturally very materially reduced the real purchasing power of the people, and that can only be gradually restored by savings resulting from increased produetion.

Economising Gold.

"A word about economising gold for monetary purposes. Great strides in that direction have been made in the deeade or so prior to the war. The progress in that direction is undoubtedly due in a very large measure to the increasing mutual confidence in the methods of money and credit creation practised by the great commercial nations. This must surely be a sine qua non to any attempt at economising gold for the purpose. The money and credit polieies imposed upon most of the nations —it is true by the hard necessity of war—are not conducive to restoring that confidence immediately. Only the putting into practice of a fixed determination to revert to sound methods can in time re-establish it, and thus pave the way to economies in the use of gold for monetary purposes."

OLIVER IRON MINING CO. SUED FOR ALLEGED INFRINGEMENT OF ORE WASHING PROCESS.

A $40,000,000 suit by Capt. Alexander McDougall, of Duluth, against Oliver Iron Mining Co. for damages in connection with alleged infringement of an ore washer process is on trial in Federal Court here before Judge Booth of St. Paul. Plaintiff claims damages at rate of $2 a ton on ore mined by defendant company between 1913 and November, 1918, and treated at its ore washing plant at Coleraine, Minn.

In evidence presented, attorneys for Capt. McDougall sought to prove that no genuine difference exists between the washer he invented and the type used by the iron company. Plaintiff alleges he submitted his invention to defendant company in 1908, and was informed that use could not be made of the stripping device, but the usefulness of the ore-washer was not denied.

Oliver Iron Mining Co. is contending that the McDougall patent is invalid, since a similar ore washer had long been in use. It denies that John G. Greenway, an engineer in its employ at the time, filed a patent for an ore washer after he had seen the McDougall invention and that the former's device was based on the latter.

The Case for a Bounty on Iron Ore Mining in Canada*

Iron Ore Mining, and an Adequately Developed Iron and Steel Industry, are Essential to Industrial Independence in Canada

The present status of iron ore mining in Canada is in anything but a satisfactory condition, considering the enormous bodies of iron ore within its borders.

The majority of the known deposits are what is known as low-grade ore, and require more or less treatment to bring them to merchantable grades, to meet furnace requirements.

The general classification of low-grade ores contain all non-merchantable ores. On the basis of iron content, they may be classified as follows:

1. Ores containing less than 40 p.c. of natural iron.
2. Ores containing between 40 p.c. and 50 p.c. natural iron that are used to some extent at the present time as concentrating ores, or are mixed with ores of high iron content, in order to increase the tonnage.
3. Ores containing over 50 p.c. natural iron that are not of the necessary physical structure to meet demands of furnace practice.

The necessary treatments take the form of magnetic separation, roasting, calcining, grinding and briquetting, and are collectively known as "beneficiation". All of these forms are well known to metallurgists, and have been brought to a high degree of perfection, especially on the iron ranges of Minnesota, where enormous sums have been expended in exhaustive experiments to demonstrate the commercial feasibility of magnetic separation, and other forms of beneficiation, with results that are so highly satisfactory that millions of dollars are being expended in the construction of plants for the exploitation of low-grade magnetites, averaging between 25 p.c. and 30 p.c. natural iron content.

The Mesabi Iron Company expended $750,000 in testing magnetic separation, in an experimental plant, at Duluth, Minn. on ores of this character from the Eastern Mesabi range, and are now constructing an operating plant at Babbitt, Minn. the first unit of which, will entail an expenditure of $3,000,000 and have a capacity of 3,000 to 4,000 tons per day. They are laying out a town on broad and permanent lines at this point, including all modern conveniences for a large force of operatives, metallurgical and office staffs, showing their confidence in the future outcome of their enterprise. This plant will be in operation this Autumn, and will enter the shipping class on the opening of navigation in 1921. It is fully expected that it will be a prominent factor in iron ore shipments from Lake Superior in the years to come.

This undertaking is being carried out by experienced metallurgists and iron ore mining operators, after thoroughly satisfying themselves that ores of the low iron-content mentioned above, can be mined, treated and placed on the market, in a form to meet the highest furnace requirements, at a profit, in competition with the high-grade ores of the Mesabi range. The efficiency of the machines developed in the Mesabi Iron Company is such, that the concentrates can be perfectly controlled, from the lowest grade, up to 72.4 p.c. iron content, thus enabling them to meet any furnace demand. The concentrates are produced in the form of a porous sinter, a most desirable form for furnace use.

The iron deposits of Northern Ontario are very similar in character to the low-grade ores of the Eastern Mesabi, and are largely amenable to the same form of treatment. Therefore, we should consider ourselves fortunate, that experience and responsible individuals, have successfully carried the beneficiation of low-grade magnetites through the experimental stage, and set the pace for what may be done with similar ores in Ontario.

Canada has immense quantities of beneficiable ores in the prospected parts, more particularly Northern Ontario, that are known to contain many millions of tons, at points traversed by the Canadian National Railway, the Canadian Pacific Railway, and the Algoma Central Railway. This will obviate a large initial expenditure for transportation facilities, which, ordinarily have to be overcome in the development of new iron fields.

Estimates, based upon diamond drilling, place the quantity of ore in certain Northern Ontario deposits at figures ranging from 100,000,000 tons downward. In other provinces of the Dominion, there are very large, but less definitely measured, possibilities in available ore.

In this connection, it may be pointed out that only about 50,000 feet of diamond drilling has been done on the Ontario ranges, as against some 10,000,000 feet on the Minnesota ranges. Drilling so far carried on, has resulted in disclosing large bodies of good merchantable ore, where only lean jaspilites showed on the surface. It may reasonably be assumed that further, and sustained drilling will locate other valuable deposits, when iron ore mining receives the encouragement that is its due.

Statements covering details of tonnage of the various Northern Ontario and other ranges, are included in an appendix hereto.

Our known deposits of iron ore thus represent supplies for years to come. The potentialities of the unprospected portions of the Dominion are enormous.

Iron ore mining in Canada is confined to Northern Ontario. The Algoma Steel Corporation, Ltd., operating the Magpie Mine, producing siderite ore, and the Moose Mountain Ltd. operating magnetite properties in the District of Sudbury, constitute the only activities in iron ore operations. Both these companies have extensive reserves of ore, proven by diamond drilling and milling development work. Both companies have carried beneficiation processes to such an extent, that they are convinced, that with reasonable Government aid, these low-grade ores can be profitably converted into marketable grades.

This has been arrived at, only after an extremely large expenditure, and is highly significant of what the possibilities are in beneficiating low-grade ores. It shows that under proper encouragement, Canada

* A memorandum presented to the Tariff Commission at Port Arthur, 16th October, 1920.

may produce sufficient domestic ore to displace the United States ore we are importing at the present time.

Canada's imports of iron ore has passed the 2,000,000 ton mark annually. Imports of iron and steel products for the year ending March 31st, 1920 reached the enormous figure of $189,907,602. With an extensive railway mileage, years in arrears for betterments, and necessary upkeep, after six years of almost complete cessation of all classes of constructive development. With the necessity of catching up these arrears, and meeting the growing wants of our fast developing country, the imports of iron ore, and iron and steel products, may reasonably be expected to increase, unless active steps be taken to develop a domestic iron and steel industry, and displace the imported ores, and iron and steel products by our own resources.

The tonnage of domestic ore charged to furnaces in Canada, has fallen from about 300,000 tons in 1915, to less than 100,000 tons in 1919, or about 5 p.c. of the total tonnage smelted. Of the total of 653,137 tons of ore charged to 7 blast furnaces in Ontario, for the six months ending June 30th, 1920, only 58,387 tons were of domestic origin, the balance being imported from the United States. Exports of domestic ore are negligible.

What Iron Ore Mining Means to Canada.

It is quite obvious that the successful operation of iron mines means more that the employment of so much labour. It implies a maximum of activity in all lines of endeavour, a continuous flow of freight traffic, so necessary to our National Railways, the erection of steel works, by-product plants, wire, and wire nail plants, slag-cement works, and all classes of industries subsidiary to iron and steel works. It also implies the upbuilding of prosperous communities in the agricultural areas surrounding the iron ore deposits. The magnificent stretches of arable land in the great clay belt of Northern Ontario will be brought under cultivation, with markets provided by an iron mining industry. No class in the community will receive greater or more direct benefit that the farmer.

An iron and steel industry, on an adequate scale, will do more to solve the tariff problems of the former in Canada, than anything that could be done in his behalf, by way of tariff changes. We can never hope to have cheap agricultural machinery while we are obliged to import raw material in the vast quantities we are now doing.

If trade and commerce in Canada is to be put on a sound foundation, it is plain that this must be built up on a combination of the two great basic industries, of mining and agriculture.

Canada has done her part well in the upbuilding of the blast furnace industry, in granting $17,000,000 in bounties during the period of 1896-1912. Without these furnaces, Canada would have been in a sorry plight during the Great War. While they have been, and are doing splendid service, they have been built up at the expense of the neglect of our own ores. This can be accounted for, largely from the fact of the easy accessibility of United States high-grade ores, and the further fact, that beneficiation had not been brought to the high state of perfection it is in today.

There are many reasons why Canada should take definite and immediate steps to develop an iron ore mining industry, some of which may be briefly summarized as follows:

1. The vital necessity of establishing an iron and steel industry on a stable basis, in order to secure the industrial independence of Canada in the matter of iron ore.
2. The development of our vast resources in iron ore, as a means of defraying the tremendous financial obligations created by the war, the profitable development of our gigantic railway system, and the improvement of the water-ways of the Dominion.
3. The Canadian National Railway traverses four-fifths of the iron ore deposits of Northern Ontario, and would be immediately and directly benefited by the increased traffic developed by an iron mining industry. The product of the mine may be made the largest single source of railway traffic in Canada. In the United States, the mining industry contributes between 55 p.c. and 60 p.c. of all freight moved. Iron ore mining contributes a larger volume of freight traffic than any other branch of the mining industry.
4. To produce from its own ores the plates necessary for the construction of the ships of Canada's Merchant Marine, a branch of industry vital to the future prosperity of the Dominion, if a profitable and successful export trade is to be built up, and to enable Canada to take her old place in the world's shipping lists in the matter of registered tonnage, that she occupied at Confederation.
5. To furnish the traffic necessary to keep the ships of Canada's Merchant Marine profitably employed in exporting manufactured articles to world markets.
6. To solve the farmers' tariff problem, by the manufacture of cheaper agricultural machinery, more and more of which will be required as the west develops.
7. The development of Northern Ontario's iron ore resources would do more to wipe out the "East and West" in Canada, than anything else that could be undertaken. It would form a complete union of the two geographical sections.
8. It would materially decrease imports, right the balance of trade, and stabilize exchange.

While Ontario's iron ore resources have been more particularly referred to in this memorandum, these reasons apply with equal force in every Province of the Dominion.

NEEDS OF AN IRON ORE INDUSTRY.

As mentioned above, the iron ores of the Ontario ranges require some form of treatment to bring then to grades suitable for furnace use. The cost of this treatment varies with the different grades and qualities found in the Canadian ranges. To place Canadian iron ore operators on a parity with United States producers, some form of Government aid is vitally necessary to enable them to overcome the cost of the necessary beneficiation.

The Dominion Government has been memorialized by a larger number of Boards of Trade, Municipalities, Mining and other Industrial organizations, praying for the granting of a subsidy, to cover a period of fifteen years, of a fixed sum of seventy-five cents per ton, on all Canadian iron ore mined and marketed without restriction.

If Government aid to the extent of seventy-five cents per ton, be granted on all iron ore mined in Canada, it would immediately make possible the development of the immense deposits of low-grade magnetites, hema-

tites, and siderite ore of the Northern Ontario ranges. As iron-ore mining is now at such a low ebb in Canada, the amounts accruing to iron-ore operators under this system, would be very small for the first few years, as it would take some time to equip and develop ore lands, before the shipping stage could be reached. The amounts payable thereafter, depending as they do, on ore actually mined, beneficiated, shipped and sold, will simply be a measure of the growth of the industry. The larger they are, the larger will be the benefit to the country generally, as the subsidy would bring about disproportionately large returns in the stimulation of industrial activity.

Tangible assistance of seventy-five cents per ton on all Canadian iron ore mined and marketed without restriction, will unquestionably induce widespread activity in iron ore mining in Canada. The subsidy should be:

(a) In force for fifteen years.

(b) Paid monthly to mine operators.

(c) Reckoned (1) when the ore is milled or treated, on the long ton weights going into the milling or treating process; and (2) when not milled or treated, on the long ton shipping weights going to the furnace.

Necessity for Utilization of Our Low-Grade Ore.

The Province of Ontario is wholly dependant on the United States Lake Superior ranges for its supply of high-grade iron ore. The enormous tonnages of these ores that are being mined, shipped and smelted—between 55 and 60 million tons annually—naturally suggests the question: How long will these ranges hold out an available supply of high-grade ore for Canadian furnaces? The terrific drain on their resources must, within a measurable length of time, bring them to the point of depletion, insofar as the high-grade material is concerned. It would seem, therefore, that Ontario ores must, at no distant date, be called upon to supply the furnace requirements of this province. It is but the part of sound economy to be prepared for that eventuality. The only means of reaching that stage, where we will have an abundant supply of our own ores, is through Governmental assistants by way of a subsidy, to offset the costs of beneficiation.

When the utilization of our low-grade ores is undertaken, it must be on a large scale, with large plant units, capable of handling large tonnages daily. The plants must be built in the most substantial manner, equipped with machinery that will operate efficiently and continuously, under heavy loads, with a minimum of personal attention. This requires a large investment of capital, that can only be induced to take up the enterprise, with the Government assistance above referred to. These plants will require to have heavy and costly machinery installed, most of which, would have to be imported, on which, the Government should remit the duty, as a further measure of assistance.

To show that the references to the high-grade ore supplies of the United States Lake Superior ranges, have not been overdrawn, I beg to quote Prof. Edward W. Davis, of the Minnesota School of Mines Experimental Station, University of Minnesota, Minneapolis, Minn., in Bulletin No. 7, May 22nd, 1920 in "The Future of Lake Superior District as an Iron Ore Producer:"

> "It is, of course, recognized by everyone, that at some future date all of the merchantable ore will have been removed from the district. This date is placed by various estimators at from 15 to 30 years hence. This statement is based on the assumption that the present rate of shipment will continue until the end of the season of the last year. This, of course, cannot be the case. The history of any successful mining district shows that during the first few years of life, small tonnages of high-grade material are mined. As time passes, and a district is more largely exploited, the tonnage mined each year increases. As the tonnage increases the grade of the ore usually becomes lower. After a certain time, the yearly production reaches a maximum, and after the maximum is passed, the production gradually decreases. The rate of decrease is quite rapid at first, but absolute depletion may not occur for many years. The distribution of the Lake Superior ores among the various furnace companies shows that, while some companies have a sufficient supply or ore to last them 30 or 40 years, other companies have enough to last only 5 or 6 years. These companies are already looking about for new sources of ore supply, and if they are not found in the Lake Superior district, the companies will go elsewhere."

It may thus be seen that the present source of supply of high-grade ores for Ontario furnaces, have but a comparatively few years of expected life.

Electrical Development

Northern Ontario is in the fortunate position of possessing an abundance of water powers, that, on development, must play a considerable part, and be an important factor in the development and utilization of our iron ores.

The Nepigon River, in the District of Thunder Bay, is now under development by the Hydro Electric Power Commission, of Ontario. This River has a capacity of 200,000 H.P. of electric energy. The two first units of the present development will be ready for distribution at the Head of the Lakes. December 15th, 1920, followed by a further distribution up to 75,000 H.P. early in 1921.

When these powers are linked up with the modern methods and processes, for metallizing, and furnacing by electricity, already designed by a Canadian metallurgist, Mr. James W. Moffatt, of Toronto, we may reasonably look for the creation of a stable iron and steel industry, based on domestic ores, at an early date, provided the suggested aid be given by the Government.

These water powers are so located throughout Northern Ontario, as to be within easy access of all the iron ore ranges from the District of Rainy River on the west, to the most easterly deposits in the Districts of Algoma Sudbury.

APPENDIX.

Sources of Canadian Ore Supply.

ONTARIO.

1. Titaniferous magnetite ores of the Rainy River District, on Rainy Lake, where a large amount of diamond drilling has been done, disclosing large bodies of iron ore, high in iron content.

2. Steep Rock Lake, the most westerly extension of the main iron belt, quantities of high-grade hematite float led to the discovery, by drilling, of a body of soft ore some 70 feet in width. It is almost assured that the main body of the Lake is underlaid by this same deposit.

3. On the Atikokan range, west of Sabawe Lake, some 15,000,000 tons of magnetite has been proven by drilling operations, averaging 55 p.c. iron, 12 p.c. sulphur, and 10 p.c. phos. These are high sulphur ores, which, when roasted, make a most desirable furnace product.

4. East of Sabawe Lake, the Atikokan Mine, the only developed mine in the district, shows some 10,000,000 tons, averaging 55 p.c. iron, 2 p.c. sulphur, and 10 p.c. phos. This mine has produced 86.433 tons of ore, averaging 59.85 p.c. iron; 2 p.c. sulphur, and .11 p.c. phos.

5. On the Mattawin range, about 35 miles west of Port Arthur, and in Conmee township, in the same neighborhood, a large tonnage of lean ore is exposed averaging 35 p.c. or better. This deposit runs into many millions of ton, and can be quarried and handled by steam shovel. Tests made by the Dominion Testing Laboratories, Ottawa, show that by coarse crushing and jigging, a product running 50 p.c. iron can be obtained with a 2 to 1 concentration.

6. On the east shore of Lake Nepigon, known as the Nepigon range, there are numerous bodies running around 45 p.c. iron, or better. Drilling operations on this range located large bodies of good ore, where nothing but lean jaspilites showed on the surface.

7. At Little Long Lake, the eastern extension of the Nepigon range, there are extensive areas of iron outcrops. One body 30 feet in width, averages 42,67 p.c. iron, .05 p.c. phos. Another exposure 400 feet wide, averaged 42.35 p.c. iron, and another outcrop 20 feet in width averaged 49.78 p.c. iron.

8. The Loon Lake iron field is situated 26 miles east of Port Arthur. It is of a different geological age and character to the ores mentioned above, and is an undoubted extension of the Mesabi range in Minnesota. The beds are flat-lying, consisting of interbanded layers of high-grade hematite, and lean taconite, having a total thickness of 20 feet. The ore is easily separated by hand-sorting, yielding from one and three-quarters to two tons of merchantable ore, for every three tons of material handled. Less than one-third of this field has been tested by diamond drilling and pitting, yet 5,448,000 tons of ore, averaging between 48 p.c. and 55 p.c. iron, have been proved. Conservative estimates of the possible tonnage of this field are placed at 25,000,000 tons.

9. The siderite ores of the Michipicoten district in Algoma have been extensively drilled, and a tonnage estimated at over 2,000,000 tons have been proved at the Magpie Mine, and the New Helen Mine, by the Algoma Steel Corporation Ltd.

10. Over 100,000,000 tons of magnetite have been proved by diamond drilling at Moose Mountain in the District of Sudbury, by the Moose Mountain Mining Company. Estimates of the possible quantity of available ore go far beyond this figure.

11. Extensive deposits of magnetite are found on the Groundhog River, Rush Lake, and Wapoose Lake, on all of which diamond drilling has been done, disclosing large tonnages of ore.

QUEBEC.

1. The Bristol Mine is known to contain large depostis of magnetite, but has not been diamond drilled.

2. The Forsyth deposits of silicious magnetites have an estimated tonnage of 500,000 tons.

3. Extensive deposits of magnetic sands on the north shore of the St. Lawrence are estimated to contain 500,000 tons of magnetite.

4. The St. Charles deposits of titaniferous ores are estimated to contain 5,000,000 tons.

NOVA SCOTIA.

1. The Torbrook range with an estimated tonnage of 250,000 tons.

2. The Martin hematite property, with an estimated tonnage of 115,000 tons.

3. There are extensive deposits in the Arisaig area, with no available records.

NEW BRUNSWICK.

1. The Bathurst deposits are a mixture of hematite and magnetite, and have an estimated tonnage of 7,000,000 tons.

2. Hematite deposits at Woodstock, and limonite deposits at Maugerville; no available estimates.

BRITISH COLUMBIA.

1. The Texada Island deposits of magnetite, having an estimated tonnage of 5,000,000 tons.

2. The Puget Sound deposits of magnetite, estimated at 4,500,000 tons.

3. The Glen iron mine in the Kamloops district, with an estimated tonnage of 8,000,000 tons of magnetite.

4. Further discoveries are being located by sustained prospecting and development work, in various sections of this Province, that hold out great promise on development.

MANITOBA.

1. Black Island in Lake Winnipeg, has large outcropping of hematite ore of good quality.

ALBERTA.

1. Recent investigations by the Geological Survey, show a large indicated tonnage of low-grade ores.

Note.—Graphs and tables showing production and importation of iron ore and iron and steel products in Canada were appended to the foregoing memorandum.

COPPER PRODUCTION IN SEPTEMBER.

Lessened Production, and Little Demand.

Production of smelter copper by the 19 leading mines of this country and South America amounted to 99,202,841 pounds in September, compared with 105,516,912 pounds in the preceding month, a decline of 6,314,071 pounds.

In the nine months to Sept. 30, however, the same mines report an output of 934,000,000 pounds, or approximately 76,000,000 pounds more than in the first nine months of last year.

It is fair to assume that the total copper production of all mines in North and South America is now running between 115,000,000 and 117,000,000 pounds a month, on the lowest estimate at the rate of nearly 1,400,000,000 pounds of smelter copper a year.

Notwithstanding present mining operations throughout the country are cut to 60% capacity, the resultant output is still far ahead of demand. Copper quotations last week broke through to new low levels, the metal being offered at 16 cents per pound, with virtually none taken. Copper consumers believe they are safe in buying on a hand to mouth basis; they feel that the American copper market cannot advance very rapidly when Europe is unable to purchase and domestic business is in a hesitant state.

It is estimated present surplus of refined saleable copper amounts to 600,000,000 pounds; approximately 400,000,000 pounds more is enroute to refineries and in process of reduction. There is, therefore, virtually 1,000,000,000 pounds of copper above ground today.

Formerly Europe took between 40% and 45% of our production. Since 1914 productive capacity has been greatly expanded to meet the abnormal demand engendered by the war, so while current operations are down to 60% of capacity, production is still virtually the same as in the years prior to 1914 and demand distinctly less.

BRITISH COAL OUTPUT & WAGES.

The Danger of Flat Rate Increases. Bad Effects of the Disappearance of the Differential between Day-wages and Contract Rates.

(From "Iron & Coal Trades Review")

If the miners obtain another flat rate advance without any guarantee in regard to production, it is almost certain that the output per person employed will show a further decline. Flat rate increases are unsatisfactory; they assure exactly the same advance to workers of 18 years of age as in the case of married men, and the earnings of different classes of workers are disproportionate.

Assuming the owners' hands have not been tied in negotiations, they would appear to have missed an opportunity in attempting to equalise the "percentage" advances received by the various classes of workers employed in the industry, instead of suggesting a settlement on the basis of a wage advance for actual coal-face workers only, whose "net" earnings to-day, in comparison with pre-war days and other sections of mine workers, show a much smaller percentage increase. When it is considered that coal-face workers are entirely responsible for larger or smaller output, it is certainly in the interest of the coal trade in particular, and the country in general, that production should be stimulated, but any wage advance should be restricted to coal-face workers.

The percentage advances to coal-face workers varies with the bare getting price, but generally speaking it will be somewhere about 140 per cent.; against this, day workers in many cases have received advances of well over 200 per cent., whilst in the case of boys and youths it is even greater. On the face of things, therefore, it is obvious that the actual coal getters are entitled to something which should be given as a percentage increase on the bare getting price—not as a flat rate advance. By this means production might be improved.

The present flat rate advances paid to all workers over 18 years of age are:—War wage, 3s.; Sankey, 2s.; advance as from March 12 last, 2s. A total flat rate advance of 7s. per shift worked. After the commencement of the war, the first advance to workers engaged in the industry was given in May, 1915, in the shape of a war bonus of 15½ per cent. on total earnings. And it is very significant that each successive advance has been followed by a reduction in the output per person employed in the industry. The annual output per person employed in 1915 was 270 tons; 1916, 260; 1917, 247; 1918, 232; 1919, 197½. As from July 16, 1919, working hours were reduced from eight to seven per shift, it is necessary in order to get a true comparison to base the output as though eight hours had been worked the whole period. On this basis the output per person would have been approximately 211 tons. To be perfectly fair we must add to this a figure equivalent to the loss of something like five million tons as a result of the Yorkshire and other sectional strikes that took place during the year. If, therefore, we place the output per person for 1919 on an eight-hour shift basis at 216 tons, the fall in the production per person employed as between 1915-1916 was 10 tons; 1916-1917, 13 tons; 1917-1918, 15 tons; 1918-1919, 16 tons. A total reduction per person of 54 tons as between 1915 and 1919. At the present time there are approximately 239,000 more persons employed in the industry than the average number during 1915, owing to the fact that in that year such large numbers joined H. M. Forces, so that on the face of things it is obviously a wrong method to fix the datum line on that of total outputs, because, provided a sufficiently large number of persons were employed, the output could be attained, in spite of a further reduction in output per person employed. Therefore, the datum line should be fixed on the output per total persons employed in the industry.

The output per person employed for the first half of this year was at the rate of 204.8 tons per annum for seven-hour shifts. This is equivalent to 234 tons (approximately) for eight-hour shifts, and shows a decided improvement by comparison with last year's tonnage. So far as it goes, this is satisfactory, but there is still a good deal of leeway to make up to bring the output per person employed into the parity with that for 1915.

STANDARD STOCK EXCHANGE QUOTATIONS.

Silver	High.	Low	Last.
Adanac Silver Mines, Ltd	2⅜	2¼	2¼
Bailey	4	3⅛	4
Beaver Consolidated	39	36	38
Chambers-Ferland	4	4	4
Cobalt Provincial	47½	47½	47½
Coniagas	2.35	2.35	2.35
Crown Reserve	26	25½	26
Foster	1½	1½	1½
Hargraves	.7	.7	.7
La Rose	3½	30	30
Lorrain Con. M. Ltd	5	5	5
McKin.-Dar.-Savage	55	55	5
Mining Corp. of Can	1.74	1.70	1.74
Nipissing	9.50	9.05	9.25
Peterson Lake	12	11	11
Silver Leaf	3	2	2
Temiskaming	34¼	34	34
Trethewey	28	24¼	28
Gold.			
Dome Extension	40½	39½	40½
Dome Lake	4½	4½	4½
Dome Mines	12.85	12.30	12.50
Gold Reef	3½	3⅛	3½
Hollinger Cons	5.75	5.55	5.55
Hunton Kirkl'd G.M.	11	10½	11
Keora	16½	16	16½
Kirkland Lake	45	45	45
Lake Shore M. Ltd	1.05	1.03	1.05
McIntyre	2.02	1.98	1.99
Moneta	10	9	10
Porcupine Crown	23	23	23
Porc. Gold ...EX.R	1	1	1
Porcupine Tisdale	1	1	1
Porcupine V.N.T.	25	25	25
Preston East Dome	2½	2½	2½
Schumacher	22	22	22
Teck-Hughes	6	5	6
Thompson Krist	7½	7¼	7¼
West Dome	6	6	6
West Tree Mines Ltd	4⅝	4⅝	4⅜
Wasapika Gold M. Ltd	9¾	9	9½
Miscellaneous.			
Vacuum G.	27¾	26½	26½

F. H. SEXTON

Director of Technical Education in Nova Scotia.

(From the Bulletin of C. I. M. & M.)

Professor Sexton was born in New Boston, N.H., on June 9th, 1879, and his early education was obtained in the public schools at Billerica, Mass., and the English High School, Cambridge, Mass. From the latter he entered the Massachusets Institute of Technology, taking the mining engineering course and graduating in 1901 with the degree of B.Sc. For a short period after graduation he was engaged as assayer and chemist with the Carmichael Reduction Company of Boston and then acted as instructor in metallurgy at his *alma mater* for about eight months. For about two years following he was engaged as research metallurgist in the research laboratories of the General Electric Company, Schenectady, and left to take up the position of assistant professor of mining and metallurgy at Dalhousie University, Halifax, N.S.

PROFESSOR F. H. SEXTON, D.Sc., LL.D.

When Nova Scotia led the other provinces of the Dominion in establishing a comprehensive system of technical education in 1907, Professor Sexton was appointed Director of Technical Education and President of the Nova Scotia Technical College, Halifax, which position he has held to the present time.

During the summer of 1915, he prepared memoranda on the vocational rehabilitation of war cripples for Sir Robert Borden and Sir George Foster, and in consequence this matter was brought to the serious consideration of the Military Hospitals Commission. He provincial premiers and representatives in Ottawa in September, 1915, and placed the matter of industrial retaining before them with the result that the Commission was charged with the duty of actively proceeding with this important task. In March, 1916, he was asked to assist in the work of training the maimed and disabled soldiers for new occupations and was apwas a delegate from Nova Scotia to the conference of pointed to the position of Vocational Officer for Quebec and the Maritime Provinces. For four and a half years Professor Sexton has given his best efforts to this work in pleasant association with other prominent members of the Institute such as Mr. W. E. Segsworth and Professor H. E. T. Haultain. This work is now being finished under the Department of Soldiers' Civil Re-establishment and none can deny that Canada's efforts in this direction are as noteworthy as her record in the field.

Professor Sexton was honoured with the degree of D.Sc. from Acadia University in 1918, and LL.D. from Dalhousie University in 1919. He has always taken an active interest in social service, civic improvement and education of all kinds, sorts and description. His chief diversions are angling and gardening and his pet aversions snakes and Bolsheviki.

For five years Professor Sexton was a member of Council of the Mining Society of Nova Scotia and Pre-

sident of the Society for two years. He joined the Institute in 1914 and was first elected to the Council for the two-year term 1917-1918. He was re-elected last spring as one of the Councillors for Nova Scotia and is also serving at present on the Council of the Mining Society of Nova Scotia.

He is a member of the advisory committee on mining and metallurgy to the Honorary Advisory Council for Scientific and Industrial Research, member of the Council of the Association of Professional Engineers of Nova Scotia, District Governor of Rotary Clubs for the Maritime Provinces, member of the Nova Scotia Institute of Science, of the National Society for Testing Materials and of numerous other educational and public organizations.

Northern Ontario Letter

THE SILVER MINES.

The Cobalt Field.

Operators in the Cobalt silver area have announced that beginning with November 1st, they are prepared to pay their men a flat wage equal to the former wage plus the daily bonus on the high price of silver. This announcement came as a surprise, owing to the fact that silver quotations have declined steadily during the past six months.

The decision to include the bonus of $1.25 daily as of silver commanding $1.20 an ounce, will make the flat wage higher than ever before in Cobalt's history. It will add about $2,000 daily to the pay-roll or at the rate of about $750,000 annually, as compared with what it would have been had the companies decided to discontinue the bonus and maintain the former base wage.

On November 1st the Coniagas will disburse a dividend of 2½ p.c., which will call for the distribution of $100,000. This brings the total for the year up to $500,000 and makes a grand total of $10,040,000 since the mine was first opened. The company will close its fiscal year at the end of this week, and is understood to have had another successful year.

Some alarm was felt during the past week when silver quotations declined to a low of 76¼ cents per ounce. This quotation was about on a par with the cost of producing silver at some of the smaller mines, and left net profit to come only from the premium received on New York funds for which the silver is paid. Leading mines like the Nipissing, O'Brien, Kerr Lake and Coniagas were not threatened, but such properties as the La Rose, Crown Reserve, Peterson Lake, and even the McKinley-Darragh were obliged to do some close figuring. At the McKinley-Darragh, with production running at the rate of a little over 50,000 ounces monthly, the cost of producing the silver is understood to be not far under 80 cents an ounce. It may be seen, therefore, that at such properties the slump in silver quotations constituted just cause for alarm. At the time of writing, the price of the metal has strengthened several points, so that with the 10 p.c. premium, the margin of profit at such mines as the McKinley-Darragh is brought up to a very substantial amount.

The annual statement of the Temiskaming and Hudson Bay Mines shows an output of income of $102,688 for the fiscal year ending with August. Expenditure during the period amounted to $99,000, leaving a net profit of only $3,688. Ore reserves are estimated to contain 30,800 ounces of silver in the dumps, exclusive of the small areas underground which may yield limited quantities. The report refers optimistically to the company's holdings at Kirkland Lake and Gowganda, and points to these properties as valuable assets. As regards the Dome Lake which has been extensively backed by the T. & H. B., nothing definite has been decided upon as to future plans.

In view of the small profit realized on the Hudson Bay Mines, a good deal of strength is added to the reports that this property may be absorbed either by the Coniagas or by the Mining Corporation. In fact, it is intimated in usually well informed circles that the Mining Corporation is even now negotiating for a lease on the old mine.

The tailings pile on the Penn-Canadian mine has been optioned to the brokerage firm of F. C. Sutherland, Toronto. The Penn-Canadian has remained idle since the labor strike of last year, although a fair tonnage of medium grade ore still remains in the mine. No announcement has been made as to whether the Sutherland interests intend to re-treat the tailings pile or endeavor to arrange a sale to other interests.

At a depth of about 100 feet on the Ruby Silver mine, in the south-eastern part of the township of Bucke, a narrow streak of high grade ore has been encountered. Leaf silver also appears in the wall rock, and at the present point of operations shows commercial values over a width of close to three feet. The property is being operated under lease to Cobalt and Haileybury business men.

The Gowganda and Elk Lake Areas.

Another small shipment of ore has been made from the Castle property at Gowganda. About ten tons of high grade material came out recently. It is generally understood that current output is being maintained at a rate that covers the cost of operations, and that in the meantime, much necessary exploration and development work is being carried out. Latest advice would tend to show that the cross-cut at the 86-ft level has encountered the vein and with high values occurring at this point.

Unofficial advice just obtained conveys the information that the Miller Lake-O'Brien has encountered another high grade ore shoot. Whether or not this is in a new vein or on one formerly worked has not been ascertained.

As a result of favorable developments on the Miller Lake-O'Brien and the Castle, as well as general favorable conditions in the district, mining interests in this area have become more enthusiastic than usual, and a busy winter is anticipated.

Mr. Miller, Provincial Geologist for Ontario, together with Thos. W. Gibson, Deputy Minister of Mines, concluded their visit to this area last week.

The small mining plant on the Regent property near Elk Lake will soon be ready for operations, and sinking is to commence just as soon as steam can be turned on.

It is also learned that an endeavor is being made to raise finances to re-open the old Moose Horn property.

A shipment of about five tons of high-grade ore has been made from the Cane Silver Mines, a property situated south of Kenabeek, P.O., on the Elk Lake branch of the T. & N. O. Ry. The ore is said to contain from 500 to 1,000 ounces of silver to the ton, and was gathered by open-cutting a number of veins along the surface. It has now been arranged to commence sinking operations, and two shafts are to be put down

on two of the more promising veins.

During the week ended Oct. 22nd, four Cobalt companies shipped an aggregate of eight cars containing 653,339 pounds of ore. The Mining Corporation headed the list with four cars, as shown in the following summary :

Shipper	Cars	Pds.
Mining Corporation	4	283,230
Nipissing	2	194,815
Temiskaming	1	87,979
La Rose	1	87,315
Totals	8	653,339

During the corresponding period, bullion shipments were largely withheld owing to the slump in the price of silver. The Mining Corporation was the only bullion shipper, sending out 24 bars weighing 24,933.50 fine ounces.

Low water on the Montreal River has caused a shortage of power in Cobalt, as a consequence of which the mines of the district have been obliged to temporarily curtail work to some extent. Fall rains are considerably overdue, and relief is expected daily. In the meantime, the mines have mutually arranged to work alternately so as to share equally in the loss of time incurred.

THE GOLD MINES.

The Porcupine District.

The outlook for the gold mining industry as found in the Porcupine gold area is steadily improving. One of the most interesting and hopeful developments in the labor supply is now taking place, as found in the information that a large number of miners are already on the Atlantic, coming from the British Isles to work in the gold mines of the Porcupine field. It is learned to-day that 130 men are now in course of passage over the Atlantic and will be added to the strength of the force engaged at the Dome Mines. Another group of about equal number are to follow shortly. This information seems to suggest that the Dome has solved the problem of labor shortage and that by the end of the year this mine may be on a fair way to operate at full blast. In preparation for the improved situation, it is also learned the company has placed orders for additional mechanical equipment among which is included more than two dozen extra machines for underground work. As a consequence of all this, the general outlook has greatly improved.

It is reported that the Hollinger and McIntyre are planning to import about five hundred men from Wales but this report so far lacks official confirmation and is for that reason not emphasized in a manner equal to the more authentic advice regarding the Dome.

Mr. H. C. Hudson, superintendent of the Ontario Employment Bureau, Toronto, has stated some thirty mines in Northern Ontario gold and silver areas are prepared to take on an extra 1,850 men almost immediately, while an additional 500 could soon be absorbed. Wages are high and steady employment offered, and Mr. Hudson has issued a statement urging men to not overlook this opportunity to obtain steady work.

On November 3rd, the Hollinger Consolidated will disburse a 1 p.c. dividend, amounting to $246,000. This is the seventh disbursement so far this year or a total of $1,722,000. In addition to this, the company is expected to follow out its usual policy of paying two dividends during December, in which case the total for the year may be brought up to 9 p.c. or a total of $2,218,000 for the period.

The McIntyre-Porcupine is the center of increased attention owing to the great probability of ore reserves being added to at a rapid rate as a result of the aggressive development of the new ore body found below the 1000-ft. level, North of vein No. 5. This new orebody is believed to be the easterly continuation of Hollinger's No. 84 which is at present the largest individual deposit in evidence on the Hollinger.

Announcement is made that negotiations are under way in England, with the object in view of disposing of the Davidson Consolidated to English interests. The company is capitalized at 5,000,000 shares, a majority of which is understood to already be under option to the English interests mentioned.

The Kirkland Lake District.

A meeting of the shareholders of the Hunton-Kirkland is being held to-day at which arrangements are to be made to proceed with increasing the capitalization from 1,250,000 to 2,500,000 shares. This added million treasury shares will be used as a means of financing future work.

The newly incorporated Kirkland Lake Proprietary, 1919, Ltd., is appealing to the shareholders of the Ontario Tough-Oakes Company to transfer their shares on the basis of two of the old for one of the new. Announcement is made that this new company has completed the details of acquiring the assets and undertakings of the English Tough-Oakes, the Aladdin-Cobalt and the Sudbury Syndicate, and is now negotiating with a view toward taking over the assets and the undertakings of the Burnside, as well as the Ontario Tough-Oakes and the Sylvanite. These details are secured from an official source.

In regard to the Kirkland Lake Proprietary, 1919, the one point not clear in this country is the financial status of the concern and the plan of operation. No definite information seems to be available on this side of the Atlantic, a fact which has caused certain of the stockholders in the merging companies to hesitate about making transfer of their shares.

On the Kirkland Lake Gold Mines, Ltd., developments at depth continue quite favorable. At the 500-ft. level as well as at a depth of 900 feet, high gold values have been encountered during recent months. Frank L. Culver, president of the company, came north at the end of the past week and made the statement that the outlook is exceedingly good.

Nothing has been mentioned during recent weeks about the possibilities of a merger between the Teck-Hughes and the Orr Gold Mines with the Kirkland Lake. The proposal was regarded as doubtful from the beginning, owing to the complicated status of the Orr as well as the financial obligations of the Teck-Hughes to its bondholders, as well as the debts owed by the Kirkland Lake to the parent company the Beaver Consolidated.

A small shipment of ore has caused interest in La Santa Lucia property, formerly the Cartwright Gold fields, in the Painkiller Lake district east of Matheson. The ore was taken out of a narrow deposit. The property is not far from the Croesus mine which a few years ago yielded very rich ore, but which contained no great volume.

The feeling is getting abroad that the gold mining industry has reached a point where from this date forward steady improvement will be shown, and the next few months are expected to witness considerable growth.

British Columbia Letter

Hazelton, B. C.: The activity of the Kleanza Mining Company and of the Kitselas Mountain Copper Co. Ltd., the development being pushed steadily ahead by James Cronin, and the general interest being displayed in prospecting, the immediate future looks bright for the Omineca District, from a mining viewpoint.

For some years the deposits of Hudson's Bay Mountain have been receiving attention. On the northeastern slope are the Schufer, Martin, Carroll and Hanson properties and on the southern slope are the Coronada, Victory, Mamie, White Swan and several other claims. On the recommendation of J. D. Galloway, resident mining engineer, the Provincial Government has this year made substantial expenditures in the improvement of the roads and trails in this region. The road from Smithers to the Coronation and other groups in the same locality, as well as the transportation avenues on the northeastern side of the mountain have been much improved. Consequently a section giving promise of noteworthy productivity has been made accessible and may be expected to develop shipping mines.

The Kleanza Company is at work on a vein on Kleanza Mountain and is driving a tunnel which, it is figured, will make it possible to put their property in the shipping list. This tunnel should connect several veins of good ore if the plans of the management are realized. A sample of gold-copper ore came from this group carrying 4.2 oz. gold and 15 per cent. copper.

On Bornite Mountain, three miles out of Usk, the Hazel Group of Claims is being developed with promise of a successful outcome to those who have invested in the enterprise. The ore is a chalcopyrite and bornite, with a small quantity of grey copper. Specimens have been assayed with returns of 28 oz. silver, 24.4 per cent. copper, and 0.10 oz. gold. Tunnel operations are to be started on a vein about five feet wide of mixed high grade and milling ore. There is a large mineralized dyke in this section which has been cut by Emma Creek and through the action of this waterway the ore being opened up was discovered and located.

From the Peerless Claims of the same locality was taken a specimen which was awarded first prize at a recent northern British Columbia Exhibition for copper ore. It weighed over a hundred pounds and is estimated to contain over 50 per cent. copper. Epidote and hornblende from the matrix of the vein from which this was taken. It has been stripped for over 100 feet and several deep cuts made, the result being the uncovering of 26 inches of very high class ore, the remainder of a width of 7 feet being milling material. There are some one hundred tons on the dump for shipping and plans are being made for the resumption of operations next season on a large scale.

There is a force of fifteen men at work on the Kitselas Mountain Copper Company's property also situated close to Usk. North and south drifts respectively are being driven on No. 1 and No. 2 A veins and a foundation of concrete is being laid under the Mill and so extended as to provide for an addition when one is required. The concentrates coming from the chalcocite and bornite ore are high grade, giving returns of 48 per cent. copper, 40 oz. silver, and 2.20 oz. gold.

It is reported from the same section that notable success has attended the development of the Silver Horde Group of Claims at the head of Chiminess Creek, native silver being found in grey copper ore. The occurrence is in bands from an inch to a foot in thickness in a ten-foot dyke of calcareous material, lying in porphyritic trachyte. Assays have given returns of 266 oz. silver and 17 per cent. copper.

The Cronin Mine of the Babine Range has been under development for some years, the work most recently engaging attention being the driving of a tunnel into the ore from a level considerable below the outcrop.

The objective was reached this season, the workings now being in a substantial body of ore of a good grade. James Cronin, the owner and manager, is a well-known British Columbia operator. He proposes carrying on next year with a view to the commencement of shipping and it is possible that the Government, if its engineer's report is favorable, will make an appropriation for the improvement of the road into the district.

Stewart, B.C.

The Algunican Development Company has decided that further development of the George Group of Mineral Claims, situated on the south side of Bear River, Portland Canal Mining Division, shall be postponed to next season. The Company considers this as one of its promising holdings in northern British Columbia. Discussing it in a report recently issued George Clothier, resident mining engineer, explains that the country rock is greenstone, locally called the "Bear River formation" after McConnell; that there are several veins on the property lying in an extensive mineralized zone of from 70 to 80 feet in width; and that this large mineralization occupies an altered, more or less silicified area in the greenstone, and in which iron sulphides are disseminated, accompanied in some places by chalcopyrite. It is stated that combined chalcopyrite and pyrites also occur in bunches. There is a tunnel in this ore-body 105 feet long which is practically barren, the surface over the tunnel showing very little mineralization. This zone, it is asserted, might develop a large tonnage of low-grade ore. About 600 feet east of the tunnel at an elevation of 4,000 feet is a strong cropping of three veins contained in a width of 50 feet. Little mineralization can be seen on the surface in the filling between these veins but it is very probable that they are all in the same ore-zone. The best ore in all three will aggregate 10 feet, averaging $4 a ton in gold, 30 cents in silver, and 3 per cent copper. The veins stand practically vertical and have been traced for considerable distance on the surface.

Progress of importance has been made in opening up the property of the Indian Mines Ltd., situated on the west side of Cascade Creek, between the Salmon river glacier and Cascade Creek, Portland Canal Mining Division. The claims are at an elevation of 2400 feet and fourteen miles from tidewater at Stewart. Development consists of three open-cuts on the croppings and two tunnels. The former expose a vein from 12 to 20 feet in width, which can be followed on the surface for about 2,000 feet. The vein is quartz and appears to follow a wide dioritic dyke

which intrudes the greenstone-schists. The minerals found in the quartz are galena, sphalerite, and pyrites, the respective values being in the order named. The first two open-cuts going up the hill show very little galena the values being about $10 a ton in gold and silver. The upper or main open cut discloses the vein for a width of 20 feet of which from 5 to 8 feet is a high grade of galena while on the hanging wall are found values in galena and zinc and on the foot wall there are quartz and pyrites.

In describing the showings that have resulted from the driving of a tunnel for about 150 feet vertically below and for a little over 400 feet with the vein. Roy Clothier,, who has been in charge of the work this season, states that each of the ore-shoots exposed on the surface has been located. No. 1 shoot, it is said, shows considerable galena at this depth; No. 2 shoot is entirely quartz and pyrites and will yield chiefly gold values; No. 3, or the main shoot, was struck at about 400 feet in the tunnel and drifed on for 30 feet. The ore started from a seam on the footwall and has widened to 14 feet at the face, as exposed by two cross-cuts. Three sectional samples across the face averaged $2.40 gold, 3.5 oz. silver, 10 per cent lead, and 16 per cent zinc. The hanging wall crosscut at the face is in heavy zinc ore. Further work in driving this drift is considered of importance at the footwall portion of the vein, carrying the galena, is widening.

A lower tunnel, 150 feet below No. 1, has been driven about 60 feet on the vein in which there is from 1 to 3 feet of ore on the hanging wall.

Alice Arm, B.C.

For some weeks there has been a force of about 200 men employed at the Dolly Varden Mine, Alice Arm. During the summer large shipments of ore have been made, development and construction work also being carried on. The railway from the Mine to the Alice Arm townsite will have to be closed down, it is expected in the winter. It is understood that some 65 men will be kept on the payroll for development in the mine during the closed season.

Progress is being made in the opening up of the Wolf Claims, which belong to the same company and lie close to the Dolly Varden. Diamond drilling has been underway with satisfactory results and tunnelling is to commence without delay. An hydro-electric plant is being installed on the Wolf property of sufficient capacity to furnish the power necessary for the entire enterprise.

The Esperanza Mine, of the same district, has a shipment of high grade silver ore on the dump awaiting shipment to the Tacoma Smelter.

The Moose and Silver Tip Extension also are giving promise of becoming producers.

Slocan, B.C.

The lost vein of the Evening Star Mine, situated near Slocan, is reported to have been located from the old tunnel. There are indications that the old property will be in the shipping class again before long.

Grand Forks, B.C.

A. M. Johnson, who is interested in the Molly Gibson Mine at Paulson, states that there are good prospects of the property being a regular shipper, seven feet of high class ore having been uncovered in the old shaft. The intention is to sink to the tunnel which has been driven into the mountain a distance of 200 feet. The Molly Gibson recently shipped ore to the Trail Smelter from which excellent returns were obtained.

Marysville, B.C.

The Canadian Consolidated Mining and Smelting Co. is about to commence the construction of a concentrating mill on the old site of the Marysville Smelter. Preliminary work is in hand.

Cranbrook, B.C.

William Thomlinson, collector of ore samples for the Dominion Department of Mines, is engaged in assembling an exhibit of British Columbia ores for the Chemical and Metallurgical Exposition to be held in New York City. The co-operation of the B. C. Prospectors' Protective Association and the Boards of Trade of different provincial centres is being secured in the endeavor to make the display truly representative. Specimens about 12 inches square and from 3 to 8 inches in thickness are being asked for and it is announced that transportation will be free from points about the line of the C. P. R.

Vancouver, B.C.

An illuminating sidelight on the enterprise and the energy of the British Government in advancing the work of opening up regions at present very little developed, is furnished by Major General J. W. Stewart B. C., a Canadian contractor of national repute, who has just returned from England where he has been in touch with the Colonial Office regarding an important contract to be awarded for railroad construction on the Gold Coast, South Africa. The project involves the building of a railroad to the north extending into Togoland, formerly German territory, as well as the construction of a dock at Sekondi, the chief port of the territory. Besides the agricultural resources of the district which will be tapped at the completion of this work, General Stewart explains, will permit an iron property owned by British interests to increase its annual shipment of 20,000 tons to 200,000 tons. The ore is of an exceptionally fine grade.

While the coal strike in Alberta and Eastern British Columbia still was in force on October 15th last, the indications at that time were that conditions soon would be back to normal. Predictions were made that most of the mines of the Province of Alberta would be operating much as usual in a few days. The mines of the Crow's Nest Pass District continue to be idle. The situation in this field may be expected to improve as soon as it mends in the adjacent Province.

An interesting occurrence in Alberta during the past week has been the granting by the Courts on application of the Coal Mine Operators of Alberta of an injunction restraining the operation of the One Big Union in the Drumheller field. The Order was issued on two grounds, namely, that the striking O. B. U. miners did not ask for a board of arbitration under the Lemieux Act before striking, and that O. B. U. officials were inducing men to break a contract entered into as members of the United Mine Workers of America which has two years more to run.

The newly designed Carbon-Monoxide Detector, approved by the U. S. Bureau of Mines, has been adopted by Hon. Wm. Sloan, Minister of Mines, for use in the coal mines of British Columbia. He took this step as soon as the value of the tester was demonstrated and each of the Inspectors of Mines will be furnished with one to assist them in the discharge of their duties. Heretofore the only practical test of mine air for the detection of this deadly poison was the carrying of a canary or some small animal known to be very susceptible to its influence. By noting the behavior of the bird or animal it was possible to arrive at some conclusion as to the condition of the air. This test, at the best, however, was unsatisfactory. The perfection of this Tester, therefore, is a decided advance in the direction of making underground conditions in coal mines safe for the workers, especially as the instrument records carbon monoxide content as low as 0.05 per cent. The deadliness of carbon monoxide to the human is well-known but it may be stated that less than 0.5 per cent. in a mine atmosphere may cause death.

That negotiations are in progress between a syndicate representing the British Admiralty and the owners of the Ground Hog Coal Lands, northern British Columbia, for the purchase of the latter property by the former is an announcement that has been received with much interest in the Canadian West. The coal lands are situated about 150 miles from Hazelton, B.C., and the coal is claimed to be as of high a grade as that of Wales and Pennsylvania, and of unexcelled quality for steaming purposes. The property has been undeveloped because of the necessity of constructing a railway for some distance and at considerable expense. However, the owners have a charter which, of course, would be transferred in the event of a sale. It is known as the Naas & Skeena Rivers Ry., starting at a point near Nasoga Bay on Portland Inlet and running back 120 miles to the nearest coal lands. A deal in which the British Government was supposed to be interested was under consideration from 1912 to 1914, during which period examinations by capable engineers took place, but no conclusion was reached because of the outbreak of the war.

J. M. Savage, for some years General Manager with headquarters at Victoria, B.C., of the Canadian Collieries (D) Ltd., has been appointed Chairman of the Company's Executive, vice-president Henry S. Fleming, resigned. This announcement was made after a meeting in Eastern Canada of the directors at which it was decided to concentrate the executive management of the concern in British Columbia. Mr. Fleming's retirement comes somewhat as a surprise inasmuch as he was in the Province this Summer investigating the iron ore resources of the country in view of the possibility of the Company launching an iron and steel industry in the Canadian Northwest.

Coal production by the collieries of British Columbia for the month of September follows:

Crow's Nest Pass Field.

	Tons
Crow's Nest Pass Coal Co, Coal Creek	36,611
Crow's Nest Pass Coal Co., Michel	21,086
Corbin Coal & Coke Co.	15,381
	73,078

Nicola-Princeton Field.

Middlesboro Collieries, Middlesboro	7,445
Fleming Coal Co., Merritt	2,143
Coalmont Coal Co., Coalmont	1,141
Princeton Coal Co., Princeton	1,952
	12,681

Vancouver Island Field.

Canadian Western Fuel Co., Nanaimo	56,775
Canadian Collieries (D() Ltd., Comox	42,005
Canadian Collieries (D) Ltd., S. Wellington.	8,461
Canadian Collieries (D) Ltd., Extension	14,545
Pacific Coast Coal Mines Ltd. S. Wellington	7,088
Nanoose-Wellington Co., Nanoose Bay	5,456
Granby Cons. S. &. P. Co., Cassidy	16,477
	150,807

Note:—Between the time of writing and mailing word has been received that the miners of the Crow's Nest Pass, B.C., have returned to work. This would indicate that colliery labor conditions in British Columbia and Alberta once more are settled and all disputes in process of satisfactory adjustment.

ORE STATEMENT.

Following is a statement of ore shipments over the T. & N. O. Ry., for the month ending Sept. 30th, as shown in the regular monthly report by Arthur A. Cole.

Silver Ore.

Cobalt Proper.	Tons
1. Beaver	30.00
2. Coniagas Mine	75.50
3. Dominion Reduction	40.00
4. Hudson Bay	31.32
5. LaRose	83.25
6. McKinley-Darragh	42.44
7. Mining Corporation	212.09
8. Nipissing	985.87
9. O'Brien	104.02
10. Temiskaming Mine	32.48
11. Temiskaming Testing Laboratories	.30.00
	1,606.97

The above shipments were made to the following Companies:

Canada.

Deloro Smelting & Refining Co., Deloro Marmora	1,427.72
Coniagas Reduction Co., Thorold	62.50

United States.

American Smelting & Refining Co., Pueblo.	74.32
American Smelting & Refining Co., Perth Amboy	42.43
	1,606.97

Price of Silver.

Sept. 15th. Highest	95.000
Sept. 1st. Lowest	91.500
Average	93.675

CANADA COPPER CORPORATION COMMENCES OPERATIONS AT ALLENBY PLANT, B.C.

It is announced from New York that the Canada Copper Corporation started up its new plant at Allenby, British Columbia on October 18th. The plant was ready to commence work on July 1st 1919, but transportation facilities were delayed until recently.

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Richard Trevithick, His Life and Inventions*

By J. HARVEY TREVITHICK.

Richard Trevithick was born on April 13th, 1771, in the Cornish Parish of Illogan, about midway between Camborne and Redruth and not far from Dolcoath Mine, one of the oldest and deepest tin-mines in Cornwall, of which his father, Richard Trevithick, Senr., was the manager. The elder Trevithick was manager of several Cornish mines, as he came from a line well known in the annals of Cornish mining, and easily traceable back to the sixteenth century. He claimed kinship with the Vivians, a name as familiar almost as Cornish cream, and still farther back to the Llewellyns. At the time of his son's birth, the elder Trevithick was manager of Dolcoath Mine and mine agent for the Tehidy Estates. He is described as being a man of sound judgment, and, as a manager, was his own engineer.

At the age of 24 Richard Trevithick stood forward prominently as the leading competitor of the celebrated James Watt. Up to this time no one seems to have appreciated the advantages to be effected by the use of high-pressure steam. Trevithick, however, wrestled with this subject for a long time, and to him seems to be due with but very little doubt the honour of pointing out its great advantages. Watt, of course, was Trevithick's greatest opponent, being a strong advocate of low-pressure steam; indeed, he was so strongly opposed to the use of high-pressure steam that he tried to get a Bill passed by Parliament to stop Trevithick from making such engines on account of danger to the public. There seems, however, to have been only one recorded serious explosion, but Watt made most of this to strengthen his opinion. Watt and Trevithick were engaged in patent litigation for many years. Trevithick, nothing daunted, and still obsessed with the idea that high-pressure steam was the correct thing and the most economical in working, invented the single-flue or Cornish boiler, which was cylindrical in shape, and had a cylindrical flue inside. How rapidly Trevithick's appreciation of high-pressure steam developed is proved by the fact that in 1813 he supplied boilers 40 feet long and 5 feet in diameter to work at a pressure up to 100 pounds per square inch, a very remarkable fact in view of the manufacturing limitations in those days.

At the age of 26 Richard Trevithick was selected to fill the position of engineer to the chief Cornish mines. The first marked improvement that he made in this year (1797) was the plunger-pole pump, which was to take the place of the old wooden mine pumps that had barrels hooped with iron, with a packed bucket inside containing a valve. Much trouble was experienced with these pumps owing to sand-jamb. Trevithick's invention was the now well-known plunger-pump, with the plunger working through a stuffing box, but quite free from the casing. In the following year came the invention of his water-pressure engine the first of which was erected at Weald Druid Colliery. Its object was to make use of the energy that is available where there is a large supply of water with a considerable fall. Another instance is that of a water-engine erected at Trenelthick Wood in 1799. A third instance was his Derbyshire water-engine, erected in 1803, which operated on a beam like a steam-engine.

In 1800 Trevithick had produced the first high-pressure expansion steam-condensing winding-engine at Cook's Kitchen Mine for raising ore from the lower workings. The cylinder was double-acting, and the stream-pressure 25 pounds above that of the atmosphere. This engine had a crank, which was introduced probably for the first time, to give motion to the shaft; and with its 19-inch cylinder and 5-foot stroke was a standard type of beam-engine for nearly a century.

The most important period of his career saw his invention and development of the locomotive. It was, of course, the invention of the high-pressure steam-engine that made the locomotive possible, for the huge bulk of the low-pressure cylinders and boilers and the larger quantity of water required for condensing purposes were quite prohibitive on wheels. His first model (made in 1797) consisted of a horizontal cylindrical boiler with a vertical steam-cylinder let into the top at one end; connecting-rods from a cross-beam communicated the motion through cranks to the road wheels. A fly-wheel was attached to carry the engine over its centre.

In 1801 Trevithick brought out his first practicable locomotive. It consisted of a sort of Cornish boiler, but with a return flue; the steam-cylinder was embedded vertically in the boiler at one end and the motion transmitted through head connecting-rods to cranks on the road wheels. The following are notable details:—A fusible plug in the flue to prevent damage from shortness of water in the boiler; bellows worked by the engine to create a draught; an exhaust in the chimney for the same purpose and a feed-water heater. In order to ascertain whether there would be sufficient adhesion between a smooth wheel and the road, he had experimented with a heavy carriage by causing it to go up a steep hill by turning its wheel round by hand.

Several trials were made, and finally it was upset, and while Trevithick and his friends were having dinner the machine caught fire and was destroyed. A result of these trials was an application for a patent, which was granted to Trevithick and Andrew Vivian on March 24th, 1802. The road-locomotive which Trevithick constructed in 1802 had two rear wheels about 9 or 10 feet in diameter and one front steering-wheel. The experience which Trevithick gained from the trial of this engine proved to him conclusively that a smoother road, made of iron, was necessary to enable the best running results to be obtained, and from this time onwards he devoted his attention to the form of engine which ultimately led to the modern railway-locomotive. In 1804, at Merthyr Tydvil, South Wales, Trevithick built and set to work his first tramway-locomotive, when he won a bet of £500 with Mr. Hill, of the Plymouth Iron Works, by running a train from Penydarran to Quaker's Yard, a distance of about 10 miles, at the rate of 4 miles per hour. It drew a load of 25 tons of material and carried several passengers. This engine had smooth driving wheels, but the rails were flanged in order to keep it on the track. In the latter part of 1804 Trevithick had another locomotive running at Newcastle-upon-Tyne. This engine had flanged wheels and ran on plain top rails—the universal practice to-day. All these locomotives were fitted with some form of blast-pipe, either under the fire or connected to the chimney.

From 1804 to 1808 Trevithick did little or nothing with the locomotive, but in the later year we find him

* From a paper read before the Institution of Mining Engineers, Manchester, September, 15th, 1920.

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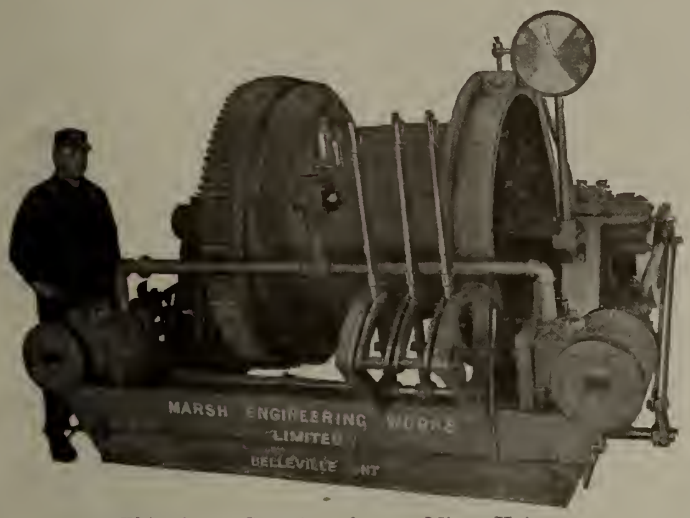

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again busy on an improved engine, which he called "Catch me who can." In conjunction with this locomotive he constructed a circular railway in London, practically on the spot where Euston Station now stands. This locomotive weighed about 10 tons, and could obtain a speed of nearly 12 miles an hour. For several weeks it was exhibited and run on this circular railway. Trevithick, who by this time had exhausted all his means, was obliged to give up his endeavours of trying to convince the public of the enormous advantages to be gained by the use of the locomotive. After this mishap, he seems to have given up this branch of engineering.

During his locomotive period—from 1797 to 1808—Trevithick was not idle in other directions. In 1801 he erected an engine at Tredegar Iron Works for operating large rolls for pudding. This engine remained at work up till 1856. In 1803 he constructed what was undoubtedly the first steam-dredger. The dredger worked for some 10 years.

Other inventions which emanated from Trevithick's fertile brain included:

Ship's tanks of iron to replace the old wooden barrels for holding drinking-water, and also for ballasting purposes.

A paddle wheel for propulsion by steam.

The steam-winch about the year 1805.

It is on record that Trevithick had steam threshing-machines and grinding-machines, and even steam-ploughs at work in 1813.

In 1813 an event occurred which brought about a break in his career. A man of great influence in Lima, Peru—Don Francisco Uville—came to England to see whether he could obtain engines for pumping water in the Peruvian mines. He placed orders with Trevithick for six engines complete with pumps. The cylinders of these engines were 24 inches in diameter by 6 feet stroke, and the pumps were 12 inches in diameter. The conditions were that the engines had to be despatched within four months. These conditions were fulfilled, and Don Francisco Uville persuaded Trevithicks to come with him to Peru to erect and start up his engines, with the result that he sailed for Lima on October 16th, 1816. He remained in South America for about ten years—till 1827. He was in Peru up to 1822, erecting engines, all of which worked with great success. In this year civil war broke out, which upset all the ambitions both of Don Uvill and Trevithick. All the machinery was destroyed by the insurgents and thrown down the mine shafts, and Trevithick left Peru, sacrificing all his prospects of great weath and apparently losing all that he possessed. From Peru he made his way to Costa Rica, where for the next five years he had a most venturesome time amongst the rich copper-mines there. In 1827 he returned to England. With all his genius, Trevithick never knew how to make money, or to keep it when he had made it.

For some time before his death, Trevithicks had been engaged at the works of John Hall, at Dartford, now the celebrated firm known as Messrs. J. and E. Hall, Limited. It was at these works that he and John Hall undoubtedly constructed and developed what is universally known as Hall's condenser. Trevithick was working at John Hall's works when the end came. Within two months of the design of the Reform Column, namely, on April 22nd, 1833, he had passed away at the Bull Inn at Dartford. He was penniless and without a relative by him in his last illness, and for the last offices

of kindness was indebted to some who were losers by his schemes. He was buried in the churchyard of St. Edmund King and Martyr in an unmarked grave. There is, however, inside the church, close to the pulpit, a handsome bronze tablet suitably inscribed "In memory of Richard Trevithick," which was placed there some years ago by Mr. Everard Hasketh, now managing director of Messrs. J. and E. Hall, Limited.

METAL QUOTATIONS.

Fair prices for Ingot Metals in Montreal, October 27th 1920. (In less than carload lots).

	Cents per lb.
Copper, electro	21
Copper casting	20½
Tin	50
Lead	8
⅜inc	9
Aluminum	34
Antimony	8¼

TORONTO COAL PRICES.

Toronto, Oct. 27.—There is very little buying of coal in Toronto in anticipation of a further reduction in prices and the market is quiet. The bituminous situation is still described as being up in the air although it is expected that a couple of weeks' time will see conditions back towards normal. Hard coal is still quoted at from $8 to $16 gross tons at the mines, American funds. Mine run is slightly lower, the ruling quotation ranging from $13 to $14 f. o. b. Toronto Smokeless coal, also, shows a downward tendency, being quoted at from $11.50 to $13.

NIPISSING COMPANY OF COBALT PURCHASES MAGNETITE MINE IN NEW YORK STATE.

Nipissing Mines Co. has purchased Magnetite Mines Co., an iron property some 60 miles from New York City. The property contains, it is estimated, ore reserves of many millions of tons, and up to time of its shut-down, 30 years ago, constituted the largest working iron deposit east of the Mississippi. Both the New York Central and the New Haven could serve the new acquisition of Nipissing.

It is understood the purchase price, together with cost of erecting a plant, does not entail much over $1,000,000. Nipissing has a surplus of between $5,000,000 and $6,000,000.

The ore runs about 37 per cent iron and concentrates about two into one, with a resultant product averaging 60 per cent iron. It is believed this would find a ready market, but greater profits would probably result from a pig iron product. This would entail erection of blast furnaces.—Boston News Bureau.

PERSONAL.

Mr. Allen B. Taylor of the firm of J. G. Beatty & Co. left on the "Mauritania" for Great Britain in connection with business pertaining to the Murray-Mogridge Mining Company.

Mr. Samuel W. Cohen, Consulting Engineer of Montreal, sailed recently on the "Empress of France" and will be in Europe for two months on professional business.

Bureau of Canadian Information

THE Canadian Pacific Railway, through its Bureau of Canadian Information, will furnish you with the latest reliable information on every phase of industrial and agricultural development in Canada. In the Reference Libraries maintained at Chicago, New York and Montreal is complete data on natural resources, climate, labor, transportation, business openings, etc., in Canada. Additional data is constantly being added.

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Canadian Institute of Mining and Metallurgy

Second Annual Western General Meeting, Winnipeg, 25th to 28th October, 1920

Another milestone in the Institute's progress, marking a new outlook for the Institute, the inauguration of a new era in the West, and a new Orientation of Industrialism in Canada.

The Canadian Institute of Mining and Metallurgy increases in influence and importance with a progressive persisteney pleasing to those who composed its membership and worked for its advancement in earlier days.

Since the First Annual Western Meeting held at Vancouver in November 1919, the Institute has held general meetings at Toronto, at Glaec Bay and at Winnipeg, thus gathering together under its leadership truly representative assemblies of the mining profession of Canada in the Far West, the Far East, the Middle East and the Middle West, and covering every activity of mining and metallurgy in Canada.

A series of meetings and deliberations so completely representative in attendance and subjects discussed, and so geographically comprehensive has probably not been recorded within any previous eleven months since the Institute was founded.

The Second Annual Western Meeting, just concluded, was the first general meeting of the Institute held in Winnipeg. The significance of the event was quickly apprehended by the citizens of Winnipeg and was expressed by the "Manitoba Free Press" which stated editorially that the selection of Winnipeg was: "a recognition of the fact that our province is on the "eve of very important developments in the establ- "ishing of a mining industry in copper and gold, "and that a convention of the mining men of Canada "to discuss the situation in Manitoba will do much "to direct those developments along the best channels."

The true function of the Institute, which is to be a centre of light and leading in every new field of mining endeavor in Canada, could not have been more accurately defined than by this quotation from the "Free Press", a newspaper that it is hardly necessary to state is an authoritative exponent of western sentiment.

Three things dominated the meeting, which in days not far gone would have seemed strangely alien to everyday life in Winnipeg; namely, the mining of coal, gold and copper, although, as will be seen from the list of minerals shown in the Fort Garry Hotel, these by no means exhaust the list of local mineral possibilites.

An encouraging feature of the proceedings—including the public gatherings—was the evidence that the West is alive to the serious consequences to Canada's national credit that must follow if the country continues to import more minerals than it mines at home, as it has hitherto done. This point was very lucidly exposed by representatives of the Government of Manitoba and leading industrialists at the concluding dinner.

Another western tendency of most hopeful augury is the manner in which the development of mineral resources is being entrusted to the universities and to trained technicians. It has most evidently been recognised by legislative leaders in the West that the minerals of the better known sedimentary areas along the main railways, and the little known pre-Cambrian and older sedimentaries of the North Country, present special problems in their utilisation which must be overcome by the gradual development of a special localised technique, necessarily based upon a broad-based foundation of scientific attainments.

The obvious regard in which the Commissioner of Northern Manitoba is held by the people of Winnipeg, and the importance attached to the scientific study of coal by the Government of Alberta, as expressed by its interest in the University of Alberta, are two indications, among many others, that the West is alive to the near approach of its predestined mineral predominance in Canada, and is in the act of seizing its opportunity.

In many respects the Winnipeg meeting was reminiscent of bygone Toronto meetings when Cobalt was young, and although the transportation question is a much more serious one in Northern Manitoba than was the case at Cobalt, the analogy of a metropolitan city with a hinterland of mineralized pre-Cambrian rocks to the North, naturally presents itself, and suggests that as Toronto experienced a vivifying influence when Northern Ontario disclosed its treasure house so will Winnipeg be stimulated when in Northern Manitoba, as the maps of the Geological Survey indicate to the prospector likely places for his pick and the diamond drill, more becomes known of the gold, copper, silver, zinc, and nickel of Northern Manitoba, already proved to be of first-class importance.

Proceedings of the Meeting, October 25th to 28th 1920

Monday Morning, 25th Oct., 1920.

The meeting opened in the Fort Garry Hotel, in the morning of the 25th October. Approximately one hundred persons were registered or in attendance throughout the three days during which the sessions were extended. A list of the registrants is published elsewhere in this issue. An important and illuminating feature of the meeting was the collection of mineral specimens displayed in the rotunda of the Hotel, assembled and arranged by Mr. L. G. Thompson of the University of Manitoba, a list of which will also be found in this issue.

The Institute was officially welcomed by Hon. Thomas H. Johnson, the Attorney General of Manitoba, who spoke on behalf of the Provincial Government and as representing the Premier who was absent from Winnipeg and prevented from welcoming the Institute in person.

The Attorney-General's Address.

Mr. Johnson said that those who lived in Manitoba were perfectly conscious of the advantages possessed by the City of Winnipeg, but he was disposed to attribute the selection of Winnipeg for the holding of the meeting not to its geographical position, but to the fact that the Institute has recognized the growing importance of Manitoba's mineral development. Especially in view of this did he welcome the Institute. There is, said Mr. Johnson, no organization which was regarded as of more importance in Manitoba at this particular time than the Institute.

Proceeding, Mr. Johnson said:

We are glad to be associated with Canadians, and Manitobans would prefer that our mining development, to as great an extent as possible, be in the hands of Canadians.

It is our privilege to have been associated with the national development, which has been so rapid that I have not heard of its like in history.

Within the limits of our short lives, Canada has changed her position absolutely and has emerged as one of the ambitious energetic nations of the world.

There devolves upon you a heavy responsibility by the fact that you are associated together to take a national view of our mineral resources, so comparatively undeveloped. There is a great deal of work to be done.

We are on the eve of a great development. Canada is just becoming known to the world. Canada's sacrifices in the war are going to influence her future for good. It is today a great privilege to be a Canadian. I have no doubt our development will be great, and sensible and intelligent, and that it is not going to be submerged by the disasters that have submerged other nations in our times, but is about to take her rightful place among the nations of the world.

The Question of Ownership of Natural Resources.

There is one Manitoban question in which we bespeak your interest in, because it directly concerns your own activities, that is the ownership of our natural resources.

I am not going to ask you to pass resolutions or memorials, but I want to point out that this is a question of very long standing. Many attempts have been made to settle it, but it will never be settled until it is settled right. The people of Manitoba are preparing now to renew their urging of the settlement of the question. Unfortunately there has been a disposition on the part of the Federal Government to temporise on this question by bringing in the other provinces of Canada, which has resulted in confusion, and has made a settlement more difficult than it otherwise would have been.

We seek to take nothing from any other province, but hold that the resources of Manitoba belong to Manitoba, and we make our claims solely upon the historical basis."

The President, Mr. O. E. S. Whiteside, delivered the Presidential Address, as follows; which took for subject the extension of the Institute's scope of usefulness.

The Presidential Address.

The Extension of the Institute's Scope of Usefulness.

In 1898 when the Canadian Mining Institute came into being it is quite certain that its founders would have scoffed at the idea of Manitoba ever being a field in which it might exercise its functions to useful effect. Indeed it is only within the last few years that any of us have regarded this Province as anything more than the great wheat growing area of the Dominion — the region whose wheat has made Canada famous the world over, but as if to prove her impartiality, and to insure that every Province of our country shall be possessed of mineral wealth, however richly endowed it may be with other natural resources, Nature has established wiithin your borders an area of PreCambrian rocks, which already have been proved to contain mineral deposits of great actual and potential value. Hence you have now in Manitoba the beginning of what we all trust will become an important and flourishing mining industry, and your faith in the future of that industry has justified you in founding here a Branch of the Canadian Institute of Mining and Metallurgy, which thanks to the energy and zeal of its officers and members has become one of the most active of all the local organizations of our Institute.

The aims and objects, the functions, and the past record and traditions of the Institute were doubtless now as fully realized and appreciated here as in those Provinces in which mining had been the premier industry for many years past. I may therefore be permitted to take advantage of this first Regular Meeting of the Institute in the Province of Manitoba to address you briefly on the possible extension of our scope of usefulness.

What are our aims, and objects and functions? In a word, "Service". Service through co-operation. And I do not hesitate to say that apart altogether from the practical ends we attain and the material good we accomplish, the Institute, in common with other associations of a like nature, exerts a far reaching and eminently beneficient influence in the community in general by reason of the spirit by which it is animated — by which it moves and has its being; a spirit that is essentially altruistic and fraternalistic. With most of our members it is not a question. "What can the Institute do for me, but what can I do for the Institute?" That at any rate has been the spirit that has animated us during the past, and I trust that it will continue to do so in the future. We have had in mind not so much the good of the individual member, as the good of all the members and the industry we represent.

To insist nowadays on the value of co-operation would surely seem superfluous. The power of it, and the value and importance of it was emphasised especially in the Great War; and was indeed the great lesson of the war. But though our Institute exemplifies the co-operative spirit, and could not exist but for the fact that this spirit animates its membership, yet when it comes to everyday business or commercial relationship I am inclined to question whether the majority of our members put into practice the principle of co-operation to any great degree than do any other class of the community. While I should be the last to decry the stimulating effect of competition in any relation of life, I am firmly of the opinion that there are limits to which competition should be allowed to go; for when it exceeds these limits it ceases to be salutory and becomes harmful. It becomes harmful when, in a word, it makes of a man a less desirable, a less useful citizen, or of a community a less worthy unit of the State. Is it too much to say that if in the past less of the spirit of competition between individuals, of rivalry between Provinces, and cities, and communities, had been in evidence, and if instead of sectionalism everywhere we had had displayed more of the communal spirit, the desire to co-operate, more tolerance, a greater disposition to "boost" for others as well as for ourselves and our own backyard, Canada, today would be in a stronger and better position than she is? To my mind then the chief functions of a national organization such as ours,

representing as we do one of the great basic industries of the country, is to teach both by example and precept the value of co-operation. We should begin of course in our own organization, following along the lines already established and steadily extending and amplifying in those directions. We have now, for example, branches or divisions in all the Provinces of the Dominion in which mining is carried on. The establishment of these Branches has done much to increase the usefulness of the Institute to the members locally, but as yet it has not contributed very notably towards the greater consolidation of the Institute. We should aim to make the Branches serve the dual purpose by encouraging them to co-operate among themselves. This would be entirely practicable in a number of ways. There could be not only a frequent interchange of papers on professional subjects of common interests but also an interchange of ideas on matters affecting the general welfare of the Institute, or of the Profession, or of the industry, and so far as possible joint action should be taken to achieve a given purpose.

Mr. O. E. S. WHITESIDE,
Coleman, Alberta.

President of the Institute 1920.

The Institute moreover should persistently offer its services to the Government. This we have not failed to do in the past but our opportunities now, in consequence of our gain in numbers and status, are greater in this respect than ever before. It will perhaps interest you to learn that at least one Provincial Minister of Mines has undertaken to submit all contemplated legislation affecting mining to the Provincial Division of the Institute in his Province for comment and criticism in advance of its introduction in the local legislature. While naturally the Minister is not bound to accept the views that may be presented to him by the Institute, the arrangement referred to will at least bring him into closer touch with the men best qualified to pass judgment on legislation affecting the mining industry; and it is safe to assert that any opinion or advice that is offered will be sincere and disinterested. If co-operation on similar lines between the Department of Mines in Canada (Provincial and Federal) and the Institute can be brought into effect it will undoubtedly enable us to extend our scope of usefulness to a very marked degree.

But there are boundless other opportunities for usefulness and effective co-operation on our part. The Institute represents both the industry of mining and the profession of mining. We are therefore in a position to establish relations for joint service with organizations of two distinct types, namely those primarily concerning themselves with matters of trade and commerce, and those whose objects are essentially the promotion of technical and engineering knowledge.

In the past we have been too inclined to allow Boards of Trade to speak for the mining industry on trade matters; and also we have displayed scant disposition to interest ourselves in the activities of sister societies representing other branches of engineering. These tendencies to stand aloof should be overcome. It should be the duty of the Branches in each Province to educate public opinion concerning conditions affecting mining, and to seek the co-operation of, as well as to co-operate with, such bodies as the Boards of Trade, the Canadian Manufacturers Association, and Mine Operators' Associations, in voicing the requirements of the industry from the trade or commercial viewpoint. In like manner, the establishment of more friendly relations with sister engineering institutions is greatly to be desired; and in the West especially it is conceivable that much benefit would result from joint meetings in such cities as Winnipeg, Edmonton, Calgary, and Vancouver of the different engineering bodies. Engineers of all branches have much in common. The mining engineer of to-day must necessarily know something of practically every branch of engineering. It would therefore be possible to ar-

range a programme of papers at joint meetings that would appeal to all. Discussion on rock work would be of interest alike to the railways, the municipal, and the mining engineer; electricity and mechanics would likewise afford a common meeting ground. And above all, such meetings would serve to promote good fellowship among the engineering fraternity.

A second important function of the Institute, capable of expansion, is educative. Our Charter states that one of our aims is the dissemination of information. No one will assert, I believe, that we have failed to carry out this part of our work well. We have reason to be proud of our publications. Our Bulletin is in a class by itself, and a monument to the untiring zeal and ability of our late secretary, Mr. H. Mortimer Lamb. But still I think we can even go a step further in our educational work. Heretofore we have been content to publish information for the benefit of our members only. This information for the most part has been of a highly technical character, and as such has been undoubtedly valuable. But outside of our membership thre is a class, a very big class indeed, sadly in need of education in respect of the mining industry and its importance to the community. That class is the Canadian public as a whole. Because of this general ignorance we are failing to realize the greatness of our own heritage; and we are allowing it to pass out of our hands into the control of others. The biggest and best mines in Canada are not owned by Canadians. It is almost hopeless to attempt to raise capital in Canada for home mining ventures, however worthy. Why? Because the Canadian public has been led to believe that mining is a gamble, a gamble in which the chances of a satisfactory issue are infinitely remote. The majority indeed are unable to realize that to invest money in the development of a promising prospect is an entirely different thing to speculating on margin or otherwise in mining stocks. It is the commonest thing in the world to hear the remark, from otherwise quite sane men in business, "Oh, I've no use for mining. I got badly bitten once, and once bitten twice shy", and if you ask for particulars, you will presently learn that this now discrete and sage person once plunged and lost heavily during the Rossland boom in some wildcat or prospect without even enquiring concerning its antecedents. Rickard, with his distinguished talent for accurate definition, has told us that capital sunk in mining must be regarded as a speculation rather than as an investment; but approached with due prudence and precaution there is no form of speculation that offers more prizes or yields richer returns. Obviously I refer to legitimate mining enterprise and not to the stock market. While we frankly welcome and sorely need more foreign capital to help us in developing our natural resources, it is nevertheless in the interest not only of the individual, not only of the community, but also of the nation that Canadian Mining should be undertaken by Canadians, and that the title of Canadian mineral resources should be retained as far as possible by Canadians. Hence the urgent need of education, of propaganda along these lines. The task is not an easy one, but that should not deter us from undertaking it. Time does not on this occasion permit me to detail a plant of campaign for the carrying on of this important work, but I may be allowed to suggest one or two preliminary means of attack. The first of these might well take the form of a series of public lectures, under Institute auspices in all the principal commercial centres of the country, followed by a wide distribution of literature of an educative character dealing with the question. We could doubtless enlist the public press of the country as our allies in this enterprise by an understanding that material supplied by the Institute would be directed towards impressing the public with the fact that mining is a business that may be engaged in with a reasonable certitude of profit by exercising ordinary common sense and foresight, and acting under competent technical guidance and advice. That would be our appeal to the individual and his self-interests. But we should go beyond this and show that to sell our birth-right for a mess of pottage is not good business either from the national or any other standpoint; and we should risk being trite by indicating that if it profits foreign capital to develope Canadian mines it would no less profit Canadian capital. Then thinking of the morrow, we should also aim to educate the rising generation in the national importance of a Canadian controlled mining industry; thus in most of the Provinces in which mining is a major industry the educational authorities would no doubt raise no objection to addresses on this theme to school children by members of the Institute who could be deputed to undertake this duty. Also it should not be impossible to provide for the introduction of simple text books in the schools treating of the natural resources and basic industries of Canada, in which of course due attention would be given the subject of mines and mining. Work of this sort, in short, could most fittingly be undertaken by the Institute.

In conclusion, may I be permitted to dwell briefly on the past record and achievement of the Institute, and the service it has rendered to the profession and industry of mining in this country, and to the country itself. It is true that this service has been criticised. We have been told that we might have done more. But such criticism, in the minds of many is unfair. Yet we may benefit from even unfair criticism if it be constructive, and our friend probably reasoned that way at the time, and I agree with him that the Institute's activities must not be allowed to lag. We must continue to justify our existence; and if we mean even to maintain the position we have won, to equal the record of past service well done, it is imperative that we should develop new fields of usefulness. At the same time the established activities, so ably initiated and performed in the past, will continue to occupy our attention. Of new work, apart from that I have just outlined, certain suggestions were made at the Annual Meeting in Toronto last March. These suggestions were that we might undertake to do in Canada what is done by the American Mining Congress in the United States. In a measure we have already done some work along these lines to good effect, that is to say in the matter of influencing legislation, and it should not be forgotten that the establishment of the Dominion Department of Mines was due almost entirely to the Institute's persistent efforts; which only serves to prove the wisdom of further strengthening our organization so as to enable us to do more and more of that class of work.

The opportunities for expansion along the lines suggested seem almost without limit. Have we the ability and initiative necessary to make it a success? Is it a good and proper work to undertake? As a society we can only advance or recede. There is no standing still. Let us all then, individually and collectively, be up and doing. If our Institute is worth maintaining at all if it means anything to us, it is surely the duty as well as the privilege of every member to do his utmost to contribute to its success. Fault finding may of course help in that direction, but I am inclined to think that there are other and more effectual ways of rendering assistance. The Institute may commit mistakes in policy. These, if not too flagrant, may be condoned. Inaction on our part, or an attitude of mere complacency with the position and reputation for good work we have won, with no desire to improve it, would be fatal and uncondonable. I need scarcely say that there is little likelihood of the Institute falling into that grave error.

Dominion Mineral Royalties.

The question of Federal royalties on minerals and particularly on copper and oil was discussed and it was pointed out that in connection with the Flin-Flon deposit the formulation of some definite policy by the Dominion Government was so necessary as to be almost tantamount to deciding whether this new industry should proceed to develop or not. Capitalists required some definite idea of royalty costs and title rights before making large expenditures. It was stated that Institute Committees had been appointed to deal with the royalties question at the last Annual Meeting in Toronto but that final reports had not yet been received by the Council. The attendance of several of the vice-presidents from the East had been confidently anticipated but at the last moment the vice-presidents were unable to be present. The names of Dr. Allan of the University of Alberta and Mr. C. R. Bancroft of the Mandy Mine were added to the Committee on Dominion Royalties.

Leasing of Bituminous Sands.

Attention of the meeting was drawn to the fact that the leasing of the bituminous sands in Alberta had been withdrawn by Ottawa but that before this was done a considerable lease had been granted to a private company of which Colonel Lindsay was the head. It was further understood in Alberta that, in the event of any old lease falling out of date, such lease would revert exclusively to the interests controlled by Col. Lindsay. The Provincial Government of Albert had made many enquiries as to the definite status of the tar sands in regard to leasing and mining, but no definite information could be obtained from Ottawa. The reply of the Superintendent of the Department of Mining Lands and Yukon Branch (Dept. of the Interior) to enquiries as to the terms upon which [illegible]

had been granted to General Lindsay states that "as the agreement is not final, and compliance with the terms thereof is dependent on whether or not the preliminary experimental work proves successful, it is not considered advisable, for the present to disclose the terms of the agreement." Similar answer had been given to enquiries sent from Alberta and also from eastern points, and there was a general agreement of the members present that the information vouchsafed was insufficient and that definite information was improperly withheld.

MONDAY AFTERNOON, 25th OCTOBER 1920.

With Dr. Allan of the University of Alberta in the Chair the afternoon's proceedings were largely devoted to consideration of questions concerned with coal and coal mining.

A paper on "Coal" by Mr. Louis Stockett, was taken as read in the absence of the author.

Mine Rescue and First-Aid Work.

Mr. Duncan McDonald, who is Inspector of Mines and General Superintendent of Mine Rescue Work in Alberta, read a paper with the foregoing title, and gave a demonstration of the salient points of the latest type of "Proto" apparatus.

Mr. McDonald said that the use of oxygen breathing apparatus was now recognised by legislation requiring its use in many countries, and that it was noteworthy that governments were paying attention to the safeguarding of the construction and use of breathing devices. The careful selection and training of men for rescue work was emphasised, and the speaker noted that no shortage of volunteers for training was found where the mine officials and the management took a personal interest in the work. Where the management was indifferent, poor results were probable.

The necessity for standardization of apparatus was dwelt upon, and the selection of one type for a province or state was considered desirable.

An annual Dominion contest in mine rescue and first-aid work was suggested by Mr. McDonald, in which there could compete teams that had been successful in local contests from every mining district of Canada.

The Province of Alberta has taken a leading part in the provision of mine breathing apparatus, and in the training of men in rescue and first-aid work. Three rescue-cars and six stations are now located at different points in Alberta under the direction of the provincial government, each car and station in charge of a fully qualified superintendent. Ninety sets of "Proto" apparatus are provided in these cars and stations, and 1,388 men have received training. The work was put under the supervision of the Workmen's Compensation Board in 1919.

Mr. F. W. Gray stated that when in the service of the Dominion Coal Company in 1907 he had brought to Canada the first Draeger apparatus, which, with the single exception of a Giersberg apparatus imported at an earlier date by the Nova Scotia Steel & Coal Co., but never used, was the first modern self-contained breathing apparatus used in North America. The Dominion Coal Company's station had antedated that of the United States Bureau of Mines by some months. Mr. Gray supported the suggestion recently made by Hon. Wm. Sloan, the Minister of Mines for British Columbia (see page 794, our issue of 1st October 1920) that joint action should be taken in Canada and the United States to design a standardized self contained oxygen breathing apparatus that would combine the acknowledged excellences of the main types now on the market and avoid their special defects.

Mr. Gray also urged that the word "rescue apparatus" should be no longer used, and that the oxygen breathing apparatus should be regarded as primarily a fire-fighting device with possibilities for rescue work under certain conditions following mine fires and explosions. Mr. Robert Strachan of Fernie considered the use of the "Pulmotor" should be discontinued, and thought that life could more probably be saved by ordinary methods of artificial respiration. Mr. Strachan pointed out that where accidents had occurred from the use of oxygen apparatus, these had occurred not from failure of the device, but from improper use or lack of training. He thought it would be advisable, and would lead to good results, if the mines departments of the various provinces could get together on this matter of training and standardization of apparatus.

The Part that the Coalfield of the West should play in Canadian National Development.

Mr. F. W. Gray read a paper with the foregoing title, which was presented as a follow-up of the paper on "Canada's Coal Supply" presented at the Toronto

Training with Oxygen Breathing Apparatus in the Smoke-Chamber of the Station of the Dominion Coal Co. at Glace Bay, in 1907.

Meeting of the Institute in March last (see C. M. Journal, page 228, issue 19th March 1920.) The speaker urged that his previous contention, namely, that Canada could be made completely self-supplying in bituminous coal had been borne out by the intervening events. The text of the paper will be given in a later issue of the "Journal".

Mr. W. J. Dick, General Manager of the Coal Sellers, Ltd., said that to those actually engaged in mining and selling coal in the West, the annual enlargement of the radius of western coal was encouraging. In past years the coal imports into the Fort William port of entry had run up to 500,000 tons of anthracite and 2,700,000 tons of bituminous coal, so that Western Canada had been importing annually 3¼ million tons of coal that could have been supplied from Canadian mines. Why was this so? In the first place, the railways themselves were the largest users of bituminous coal, and although Pennsylvania was far away, the long stretch of water carriage through the Great Lakes helped the American coal. The railways that transported coal from the mining districts in the States were built as coal-carrying roads, and the cost per ton mile on the Lake Erie roads were much smaller than coal carrying costs on the Canadian roads. We have not the traffic on Canadian railways to enable us to compete with the coal-carrying lines in the States. Considering the low rail rate and the low lake freight rate on American coal coming to Fort William, it was a natural thing, and it suited the operations of the railways, which sent the grain cars westwards loaded with coal. The change in recent years had been very marked. At one time, the Winnipeg Board of Trade had stated that if Winnipeg had to use western coal the people would freeze to death, not realising that all the population to the west of Winnipeg were using nothing else but western coal. Now eight per cent of coal consumed in Winnipeg is mined in the Canadian West. Coal had been sent to Port Arthur, and even to Dryden, Ont., and found to be all right in use.

In regard to the enlargement of the western market, Mr. Dick said that both Alberta and British Columbia would show much larger exports to the adjoining States of the Union in 1920 than ever before.

Mr. R. C. W. Lett, Colonization Agent of the Grand Trunk Pacific said that while the heat values in western coal were much higher than in the American coal, such as was now being received, the great trouble had been disintegration, and he asked what progress had been made in briquetting lignites.

Commissioner R. C. Wallace said that while adverse action towards western coal had been taken in the past by the Board of Trade, no such body in Winnipeg would take similar action in regard to western coal now. Dr. Wallace's statement met with sympathetic general applause.

Mr. George B. Saunders spoke with reference to Dr. Bone's new boiler designed to consume lignite. He had blueprints of this boiler, which he believed would quite revolutionize lignite consumption for power-raising purposes. The installation would be quite expensive, and suited for large power-plants. The principle of this boiler is the prior subjection of the lignite to the heat of waste gases, resulting in sufficient evolution of moisture to reduce the lignite practically to a bituminous coal content before it passes to the chain-grate on which combustion takes place. While the exact process is not as yet understood, Dr. Bone's device is stated to be thoroughly practicable and will shortly be placed on the Canadian market.

The Use of Powdered Coal in the Selkirk Rolling Mills.

Mr. H. A. Mackay, Chief Engineer of the Manitoba Bridge and Iron Works, read a carefully prepared paper on the experiences of the Manitoba Rolling Mills in developing the use of powdered western coal for the heating furnaces and the open-hearth plant of his Company at Selkirk. Mr. Mackay's paper was one of those rare occasions at technical meetings when the development of a new utilisation of raw material is outlined from its beginnings to a successful consummation, and the President of the Manitoba Bridge & Iron Company — who was present — and Mr. Mackay are to be congratulated on proving the entire suitability of a local coal for a local metallurgical industry — one of the first, and also one of the most important in the West.

The initial troubles with western coal in powdered form were apparently associated with the low fusibility of the ash, and this was of course more in evidence in the use of powdered fuel for open-hearth use than in the case of heating furnaces, because of the necessity to pass the waste gases, and their suspended ash, through the checkers.

The distinctive feature of the Selkirk pulverizing plant is the long rotary dryer. The length of this dryer, as was explained by Mr. Mackay, was largely accidental and resulting from the fact that the necessary part was in stock, but it has proved most satisfactory in use, and it had been found possible to dry and pulverize coal that was quite saturated with moisture.

Mr. Deacon said they had discovered only one or two coals that would give good results when powdered, and use in metallurgical processes introduced pro blems very different from those associated with the raising of steam. The question of ash deposition was not so important where it was not necessary to pass the flame and gases through checkers and flues. Mr. Deacon thought from his experience that the use of powdered fuel for central heating plants would develop in western cities.

President Whiteside referred to an incident in his experience fourteen years ago when it had been found possible to utilise washer refuse running 50 to 60 per cent in ash. The fusibility of the ash was often very important.

Mr. W. J. Dick referred to the growing use of pulverised coal in the State of Washington, and its use by the Pacific Coast Collieries. Nut coal from the Lethbridge district, running 34 per cent ash — due to mixture with a draw-slate that could not be separated from the nut — had been burned successfully without any change in boiler setting giving 80 per cent efficiency. The utilisation of high ash coal turned largely on the question of fusibility. With regard to central heating plants, the speaker mentioned the central heating plant of the University of Edmonton and that of the City of Brandon. At the present time the price of pipe was a deterrent to extension of the central heating idea.

Progress of the Lignite Utilization Board.

Mr. Lemy, representative of the Province of Manitoba on the Lignite Utilization Board, was asked by the Chairman to address the meeting. Mr. Lemy said that although the Board had been working for three years it had made no report, and had not been asked to.

The Board got out weekly reports of progress, and in that way kept each other in touch with all developments. The Board was constituted by Order-in-Council and instructed to investigate the suitability of lignite for domestic fuel and its preparation.

The Research Council seemed to have been under the impression that everything had been learned about lignite that could be learned, and handed over to the Board a mass of literature. The Board started its work, but with the exception of one or two articles, could find nothing of value and had to start from the ground up. They made up their minds that anything that was to be found out would have to be discovered by the Board's own exertions. The engineers went on a tour and visited every plant, and although great hopes were entertained that the problem had been solved elsewhere, the investigations disclosed that this was not so. Carbonizing was the essential part of the problem. The first thing was to devise a carbonizer. Lots of devices were seen, but none proved of value. The Board's engineers had now under erection a device that Mr. Lemy said would do the work required.

A long series of experiments were made with binders. Every possible substance was investigated. About sixteen formulaes for binders had been produced that gave satisfactory results. The waste of flour mills and sulphite pitch were promising materials. A briquette had been finally secured that would stand the most trying conditions, including the necessary ones of ability to stand transport, weathering, storage, strength of briquette, and behavior under the process of burning. The Board had not the slightest doubt as to the practicability of manufacturing satisfactory briquettes equal in quality to good anthracite. The Board had planned to have briquettes on the market this Summer, but deliveries of machinery had disappointed them. The plant is about half finished and is expected to be in operation about the end of February. Housing was one of the problems to be overcome, for which no provision had been made in the original estimates. Fifty or sixty employees will be required. Original estimates made in 1916 have proved too small for obvious reasons. Instead of $400,000, the sum of $600,000 will be required to finish the plant. For the same reasons, it is not unlikely the cost of the briquettes will be increased from the original estimate of $10 per ton to $13 per ton. Plant will have an initial capacity of one hundred tons daily. The plant is of an entirely experimental nature, and not intended to demonstrate manufacturing costs. No private property is involved in the process. Certain features could be patented, and the Board has patented the carbonnizer only. The cost has been that of developing a process, and not a plant, and plants which may later be erected will thereby be made possible.

The Smoker.

The Smoker was — for the Canadian Institute — a decorous affair, but extremely enjoyable. Messrs. Lett and Atwood showed moving pictures of water-powers of the West, and in particular of Manitoba. No person ventured to sing the Anthem — which is perhaps just as well — for Winnipeg that is.

TUESDAY MORNING. 26th OCTOBER 1920.

With Mr. W. J. Dick, a vice-president of the Insitute, in the Chair, the proceedings of the second day of the meeting were opened by a paper read by Mr. J. F. McColl of Calgary, on "Results of Recently Conducted Steaming Tests on Western Coals."

Mr. McColl, who is the Chief Engineer of Calgary, and introduced himself as "Two Bit McColl", (a cognomen earned through his predilection for moderately priced fuel) described his experiences in successfully utilising for steam-raising purposes Drumheller slack coal — largely considered a waste product — averaging 15 per cent moisture and 12 per cent ash, through using a special setting of a chain-grate stoker under an ordinary B. & W. boiler. The special feature of Mr. McColl's setting is the introduction of a secondary arch. The deflection of the flame by the arch throws it back towards the front of the boiler sufficiently to evaporate the moisture as the coal comes on to the grate from the feed-hopper. Mr. McColl said he had proved indubitably the practicability of using a low-grade western slack, and believed he was saving his employers $300 per day by consuming this low-priced inferior fuel in place of round coal sold at higher prices. The alterations to the standard boiler setting had cost some $300 each boiler, and would now cost more because of increased labor and material costs, but in any case would more than pay for themselves.

The Drumheller coal used analysed, approximately, moisture 15 per cent, ash 12 per cent, volatile 30 per cent, carbon 42 per cent, with 11,540 b.t.u's.

The Ogilvie Flour Mills had used satisfactorily a coal containing 16½ per cent moisture, 6.3 per cent ash, 33.4 per cent volatile and 43.8 per cent carbon, estimated to yield 9,960 b.t.u's.

Mr. McColl said he had no difficulty in burning high moisture coal, even when thoroughly saturated by melting snow or rain. He had burned Souris lignite, containing 30 per cent moisture without difficulty.

Mr. McColl mentioned that some of the western coal received, and received for testing purposes, to assist the missionary work of the representatives of the Province of Alberta, was poor quality, no care having been used in its selection, and little interest taken by the shippers. In some instances valuable standing in the competitive tests had been lost by pure indifference in the preparation of the coal samples, some of which had been taken from old dumps in Winnipeg itself.

President Whiteside said "coal is coal" and it is a matter of getting a proper setting of the boiler, proper firing, and proper adaptation of conditions to the quality of the coal attempted to be consumed. Mr. Whiteside said the present time was a crucial one in the use of western coal, and there was need for consolidation of interests, and cooperation in the grading of coal and its preparation for market.

The Mineral Resources of Alberta.

Dr. J. A. Allan, of the University of Alberta, and the author of a comprehensive report to the Government of Alberta on its mineral resources (see Journal of 15th October, page 841) spoke regarding this subject. Dr. Allan referred to Mr. Stirling, the Chief Inspector of Mines, who had been quite ill, but was now recovering, and said he had done a great work for the Institute in Alberta.

Dr. Allan described the geology of Alberta, and stressed the fact that a large part of the province was composed of the central plain containing the sedimentary rocks which held coal and oil and distinguished Alberta from the other provinces of Canada. The occurrences of coal were distinguished by extent, by numerous horizons of varying age, and by marked

differences in the original material and the method of deposition of the coal, and by differences also in the structure of the coal that had been caused by pressure and heat. Any anthracite found in the Province was a result of metamorphism, and there was no large area of true anthracite present. Some areas in Alberta plainly represented limited areas of swamp deposition, which accounted for the disappearance of a well-marked seam within a short distance.

Dr. Allan intimated that the University og Alberta was undertaking a comprehensive investigation of the origin and nature of Alberta coal, in which microscopic examination would play a large part, and said that a necessary preliminary to the full development of the great western coalfield was a fundamental knowledge of these matters.

In regard to oil, a general survey of the provincial occurrences was given by the speaker, who stated, what it is both pleasing and important to know, that the Imperial Oil Company was withholding nothing that it had learned by its borings and geological searching from the officers of the Province and the Geological Survey at Ottawa.

The importance of the oil strike at Fort Norman was that it is believed to be located on the edge of a large basin extending northwards that in all probability contained oil. Oil had been struck at Great Slave Lake, where a drill-hole is down 500 ft. The work has been discontinued until Spring, but indications are good. The oil is heavy, about 16 Baume.

With regard to the bitumen sands of the Athabaska River, Dr. Allan said there was the equivalent of 189 cubic miles of bituminous sands, which if a method could be found to concentrate and extract the oil, would last the World at present rates of consumption for one thousand years.

With regard to iron, the Province was singularly deficient in this material, but some excellent samples had come down from the McKenzie Basin.

Professor N. C. Pitcher, of the University of Alberta, was to have read a paper on the more efficient utilization of coal in Alberta, but had been prevented from coming to the meeting. It is expected that Professor Pitcher's paper will be included in a forthcoming issue of the Institute's Bulletin.

Problems in Connection with the Marketing of Western Coal.

Mr. D. King, of the Hargraves Coal Company, read a thoughtful and extremely helpful paper on the problems of marketing western coal. It is understood that Mr. King has always been sympathetically disposed towards the use of Canadian coal wherever and whenever possible, and his address, which was largely conceived from the viewpoint of a coal distributor, was one that apparently received, and was worthy to receive, the careful attention of western operators, many of whom were present to hear Mr. King.

Mr. King, considered the problems of marketing western fuel were few in number and easy to remove. First, prejudices against Canadian coal must be removed. The consumer must be educated and proof given that our coals compare favorably with imported coals. The operator should prove to the dealer that he is with him, and that there is profit in handling western coal. The preparation of coal for the market required more study, and the speaker urged fewer and better standardized sizes. Mr. King said the Government of Alberta had made a start in educating the public to the use and advantages of western coal, but is was only a start, and he urged its intensive continuance. To stop now would be to stop at the crucial moment.

The opportunity of the western coal miner is today unlike that of a few years ago. It is not a forced opportunity. The market was now in the operators hands to keep or to lose, to make or to mar. When American coal comes back, as it will, it would have to be met on a dollar for dollar basis. "Do not, gentlemen" said Mr. King, "be content with a general statement that western coal is as good as eastern coal. Make sure."

Mr. King said there were too many steam-coal sizes, which he thought must be an unnecessary and heavy expense to the operators, as it was to the dealers. The speaker urged the importance of having a good sales agent, a man who knew what he was talking about, and could be relied upon to make exact statements, and no more.

The concensus of the general discussion that followed Mr. King's paper, was that the present time offered a unique opportunity to gain a solid footing for western coal in the home markets, if the operators and the dealers would work cooperatively to that end.

Mr. J. R. Shanks, of Nordegg, Alt., suggested that the Alberta Government should obtain copies of Mr. King's paper for distribution among the coal producers.

Mr. Stutchbury, of Edmonton, who is a local representative of the Alberta Government in the forwarding of the sale of Alberta coal, said the Alberta Go-

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Taylorton, Saskatchewan.

One of the Oldest and Best Equipped Mines in the Souris Lignite Field.

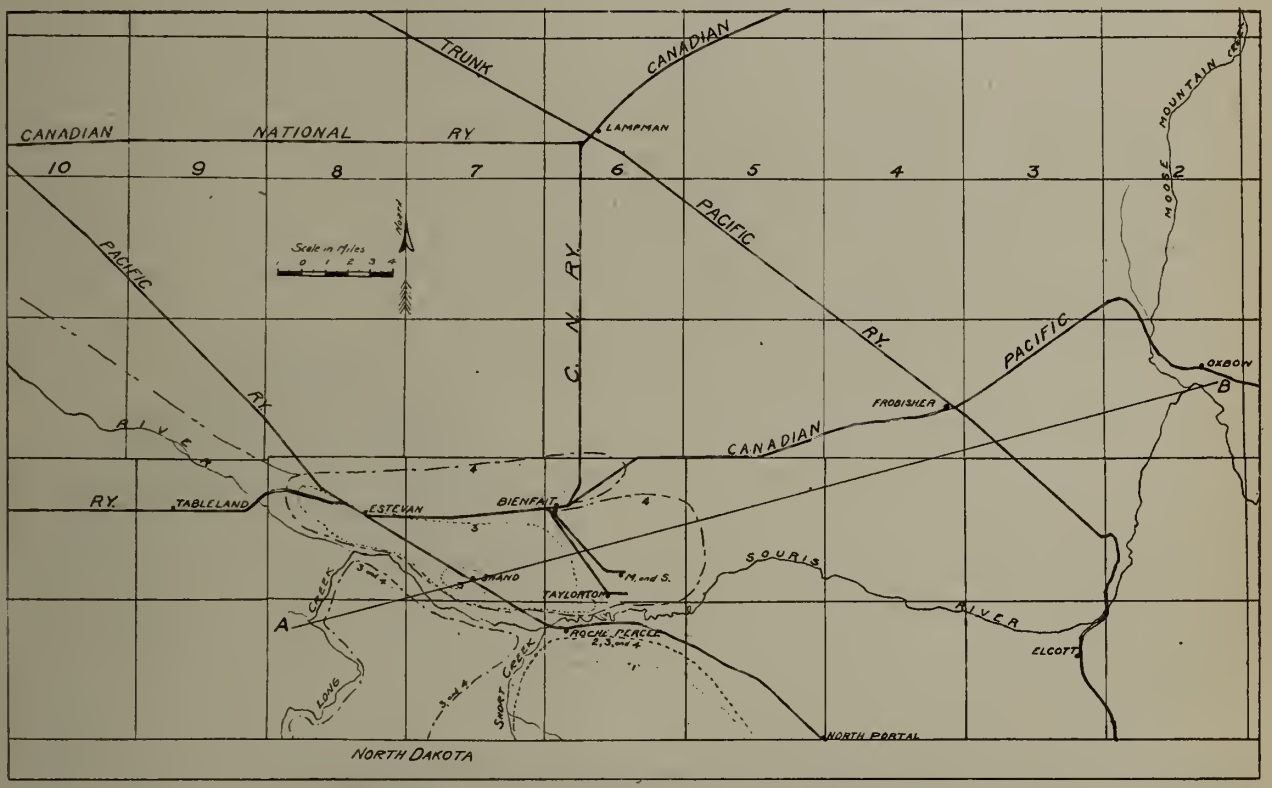
vernment was not discontinuing advertising, although they had temporarily discontinued the newspaper display advertisements through the grain-moving season. The Government was preparing for a four to five months campaign and demonstration in the burning of western coal for domestic purposes throughout the Winter. Mr. Stutchbury said it was the intention of the Alberta Government to lose no opportunity to press the sale of Alberta coal by advertising and educational work. The speaker said that Mr. King's remarks would be all the better received as he was well known as a "booster" for Canadian coal.

Mr. M. A. Daley, the Fuel Supervisor of the Northern Pacific Railway, was asked by the Chairman to address the meeting, as a gentlemen who had much experience both in the use and in the purchase of coal. Mr. Daley, who spoke as a citizen of the United States, congratulated the Institute on the importance of its work, and said that on such bodies rested the future of the British Empire. Mr. Daley said he supervised the purchase and use of some 2½ millions of tons of coal annually, and he realised the fundamental importance of coal, not only in transportation, but in everything else in civilized life. One of the greatest problems of the coal trade, the speaker suggested, was a better preparation of coal. He had known operators who actually did not know that it was in their own interest to sell a clean fuel.

Mr. Daley urged the opportunity for the utilisation of low-grade coal on railways. He instanced one locality in the United States where locomotives ran over an eight foot seam of coal, but actually went 600 to 1,000 miles to get a better grade of fuel. Pulverised coal on locomotives had yielded much better results than hand-firing. He had known of the use of lignite, containing 40 per cent of moisture, in powdered form, while slack, with 15 per cent moisture had been successfully used in the States. With regard to the difficulty occasioned by low fusibility of ash content in fuel, the difficulty referred to by previous speakers, namely the clogging of narrow flame passages and flues by honeycombs of ash, this had been overcome in a Milwaukee plant, where by the use of water-cooled tubes, interposed so as to meet the flame and fumes at the proper point, it had been found possible to precipitate the ash before it reached the flues.

TUESDAY AFTERNOON, OCTOBER 26th, 1920.

Tuesday afternoon's discussions and papers covered the metallic deposits of Northern Manitoba. The morning's session had been remarkable, for in listening to the papers descriptive of new methods of burning coal, and the obviously rapid development of a local technique, the impression could not be shaken off that those who were present were listening to the tale of the birth and infancy of what will some day be the greatest branch of the coal trade in Canada. In the afternoon, the meeting was no less remarkable, as one heard, as many did for the first time, of a new mineral area in the Middle West, only recently found, and indeed only recently suspected, which may very well compare some day with Northern Ontario and Northern British Columbia. There was a sense of being among pioneers of a new day in the West that gave the Winnipeg meeting a very distinctive tone, which was most in evidence in the juxtaposition of coal and metal papers in the sessions of Tuesday.



Map, Showing Position of the Estevan Taylorton Field, Saskatchewan. The Commercial Value of the Saskatchewan Lignites is now Firmly Established.

—Reproduced by Permission from the "Bulletin".

Gold Deposits of Herb Lake District, Manitoba.

(Dr. F. J. ALCOCK, Geological Survey.)

Dr. Alcock illustrated his remarks by a new map of of the Herb Lake District, which he has prepared in the field, and has been very recently issued by the Geological Survey. A memoir by Dr. Alcock is in the press, dealing with this district and should be available for distribution very shortly. A summary of Dr. Alcock's remarks follows:

Gold-bearing quartz was first found in the Herb Lake region in 1914, and active prospecting has continued ever since. Much development work has been done, and on one property, the Rex Mine, a mill has been erected and active mining carried on.

The area is reached from Mile 82 on the Hudson Bay Railway by train from The Pas fortnightly.

Although Palaeozoic rocks occur in the southern part of the district, the pre-Cambrian rocks are alone of significance in mineral content. The pre-Cambrian rocks fall into two main divisions, first granite and its differentiates, and an older complex of sediments and igneous rocks, much folded, and intruded and metamorphosed by the granite. The gold bearing veins are high-temperature deposits genetically related to the granite intrusions, which produced fractures in which during the later stages of the intrusion the gold was concentrated from solutions, and principally in the upper portions of the granite. During the long period intervening between the deposition of the minerals and the laying-down of the Ordovician dolomite, the upper part of the granite, containing the greatest concentration of gold and other minerals, was extensively denuded. Many valuable ore deposits were thus destroyed. Where the intrusions did not come near the surface, erosion uncovered only the irregular upper parts of the batholiths, parts which appear on a surface map as small stocks. These small granite stocks are the most favorable places for prospecting, and where wide areas of granite are now found the likelihood of mineral is smaller. Any area, however, where rocks of the pre-granite complex are exposed, may be underlain at no great depth by intrusive masses, and hence be mineralized. The Rex mine lies at a distance of over one mile from the nearest surface exposure of granite, and the Kiski veins at a distance of nearly three miles.

A description of the Herb Lake properties was given by Dr. Alcock, which included the Rex, the Northern Manitoba Group, the Kiski-Wekusko claims, the Elizabeth-Dauphin claims, the Bingo property, the McCafferty claims, Apex Group and other prospects not fully described.

"In conclusion," Dr. Alcock stated, "It may be stated that there are a number of properties which offer good possibilities of being worked at a profit. The high cost of labor and transportation has as yet hindered development. A possible solution is an amalgamation of several of the more important properties which lie close to one another on the east shore of Herb Lake. This would reduce the overhead cost of separate managements and decrease the actual cost of mining and milling by carrying on operations on a large scale."

Dr. Alcock also mentioned his explorations in the Seal River country. No rock was exposed, and the topography consisted of long ridges of terminal morain deposits, and the typical glaciated features of kettle holes, undrained lakes, and similar well-known aspects. The debris was entirely unsorted glacial material, no stratified gravels being noticed. There was of course no possibility of gold deposits in this country.

Mineral Deposits of Copper Lake, Man.

J. P. Gordon, whose high-grade gold discovery in the Copper Lake district aroused considerable interest some 18 months ago, contributed an address on the mineral deposits of that section.

Mr. Gordon described the geological formation of the Copper Lake district and the mineral occurrences. He outlined the development work which had been done on his properties, and stated that with transportation facilities he was satisfied that the district could supply a large tonnage of low grade ore of commercial value.

Dr. Wallace said a remarkable feature in connection with the quartz in the large vein described by Mr. Gordon was that it broke almost like calcite, with three cleavage planes, and was remarkably uniform. He attributed this to a series of stresses regularly distributed, but in discussing the matter with Mr. Gordon he had made some suggestions that Dr. Wallace thought would interest the meeting.

Mr. Gordon said he took a flat rock from the hanging-wall side of the vein, and on that formed a mould of plaster of paris. He applied heat to the stone under the plaster of paris, and cold above, with the result that the plaster broke in exactly the same way, so that he thought the quartz might have cooled more slowly on one side than the other, and that the peculiar cleavage was the result of this.

The Flin-Flon Ore Body.

Dr. Wallace described the Flin-Flon ore body, and showed on the lantern cross-sections of the shape of the lense as it appeared to be delimited by results of the plotting of diamond-drill holes. The deposit, which is interrupted by a prominent "horse" at the south end of the property that forms a prominent topographical feature of the area, has a known length of 2,593 feet, and has been proved to a depth of 900 feet for a length of 1,000 feet. The greatest width transverse to the dip is 400 ft., with a maximum width at the 900 ft.

The Roofed-Over Pit sunk on the rich gold-shoot on the "Red Rose" at Copper Lake, Man., which first called attention to this district.

(From the "Journal" of Oct. 1st, 1919).

level of 35 feet. Exclusive of the greenstone horses contained within the ore body, the tonnage of ore is estimated as a result of diamond drilling at 16,000,000 tons, making no allowance for continuation of the ore below the 900 ft. level, or possible ore at depth in the line of pitch at the south end of the ore-body. On the whole, the ore-body is most compact at the north end, and shows a tendency to finger with inclusions of country rock toward's the south end at depth.

The ore-body consists of solid sulphides, which occur in the centre and towards the hanging-wall, and are in places in direct contact with the hanging-wall. Disseminated ore occurs in greater quantity towards the foot-wall.

The minerals of the ore-body are, in order of importance, pyrite, sphalerite and chalcopyrite. Gold and silver values occur associated mainly with pyrite. Galena has been found in vugs in the otherwise unmineralized rock, but does not occur in quantity in the ore-body. Native copper is found in leaf form in the upper sulphite zone, and has been precipitated as a result of secondary processes.

While it might be expected that values in gold would increase, and values in copper and zinc would decrease in depth, no indications of any such variation has been noted to the depth at which diamond drilling has explored the property.

Dr. Wallace's paper is so full, and so little susceptible to condensation, that further extracts cannot be made at this time, and publication of the paper in full must be awaited.

DR. R. C. WALLACE.
Commissioner of Northern Manitoba.

Particular stress was laid on the question of transportation, and mention was made of the visit of members of the Manitoba Legislature and Winnipeg business men to the mine—elsewhere described in this issue. A railway 85 miles long was required to make development of the ore-body a commercial possibility.

The Rice Lake District, Manitoba.

Professor J. S. DeLury, of the University of Manitoba, described the Rice Lake area. Dealing with the general economic aspect, Prof. DeLury said this remained much as it was when Mr. Dresser looked into it, with the normal advance that the district had made since its discovery. The knowledge of the area was still being extended, and that by a very small body of prospectors. A surprisingly small number of persons were working in the district, considering its size, but the known mineralized belt was being continuously extended. He would lay special emphasis on the fact that it was still a prospectors' district. It is an area with many possibilities that has not been scratched, not more than one per cent of the area having been intensively prospected.

Prof. DeLury referred to the discovery of nickel-copper ore in norite of Sudbury type in the Bear River District, of which large samples were shown in the mineral exhibit in the Hotel.

Some interesting slides showing glacial action, sheared zones, flow evidences, and quartz outcrops were shown by the speaker.

Bear River Area, Manitoba.

A detailed and fully illustrated paper on the Bear River area had been prepared by Mr. R. J. Colony, but was not read owing to pressure of time. The paper was an important one, inasmuch as it describes an occurrence of copper-nickel, and publication in the Bulletin will be looked for.

Evening Session, Tuesday, 26th October.

In the evening Dr. Wallace gave an illustrated lecture on Northern Manitoba, which included some new historical facts in connection with a country which, as Dr. Wallace put it, contained relics of what is almost a forgotten civilization, and of the earliest Canadian explorers. Among other interesting photographs were notable views of old Fort Prince of Wales, with its 42 ft. thick walls; and also of the church at York Factory, which contains a fine stained-glass window presented by Lady Franklin in memory of her husband. This church stands on the river bank, which in the course of 50 years has been eroded until the church is in danger of falling into the river. There is also a library at York Factory containing unique specimens of early Canadiana, that call for preservation.

View of the Hudson Bay Railway, which is complete except for 92 miles of steel rails, were in the nature of new knowledge to many who heard Dr. Wallace and the actual extent of construction work accomplished in a difficult and desolate region is certainly little realised by the Canadian public. One photograph shown by the speaker revealed the terrific intensity of the storms that visit Hudson's Bay.

Wednesday Morning, 27th October.

Captain H. E. Knobel, of Port Arthur, read a paper on "The Use of Ontario Iron Ores for Canadian Furnaces." It is hoped to reproduce Captain Knobel's paper in full in a forthcoming issue, but mention should be made of two definite suggestions put forward to assist what is undoubtedly a necessary development in

Canada, and to relieve what cannot by any stretch of the imagination be considered a satisfactory condition, namely, that only five per cent of our blast furnace iron-ore charges are mined in Canada.

These suggestions are:

(a) A suitable bounty on all Canadian iron-ores mined and marketed without restriction, payable to the mine-owner.

(b) The installation, at some suitable point, of a concentrating unit, on a sufficient scale to make economic determinations in the beneficiation of jaspilite ores — this class of ore being most representative of the large reserves of low-grade ores available.

Mr. F. W. Gray, speaking as the Secretary of the Iron & Steel Section of the Institute, said that the section had not been active, and suggested that possibly the policy of sectionalizing the Institute was mistakenly conceived. He thought that the best way for any particular technical interest comprised in the Institute's activities to make itself felt was to contribute to the Institute's papers and be in attendance at the discussions. The Institute had a wide field to cover, and its activities were sufficiently sectionalized by geographical exigencies to make it doubtful whether further dissection of its activities was desirable. The suggestion to make a coal-mining section had not been pressed, largely, the speaker thought, because this fact had been realized when the proposal was analysed in the endeavour to work it out in practice.

Dr. Allan said that unfortunately Alberta contained little or no iron, so far as known, but in the Crow's Nest District there was a deposit of magnetite. It contained a considerable percentage of titanium. Newly detected occurrences of iron ore in the Peace River district had been reported, both hematite and limonite, but were very far from transportation. There was also a hematite occurrence of undetermined extent in the Mackenzie Basin.

Mining and Ore Transportation at the Mandy Mine.

Mr. G. R. Bancroft described the now famous transportation achievement of the Mandy Mine, made possible by the extraordinarily rich ore concentration at that property.

Dr. Allen said the Mandy Mine was the only copper producer in the Province, and said that Mr. Bancroft had been modest in describing the transportation of the ore in not telling the members of his own leading part in that achievement.

Mr. F. W. Gray said that the tale of the Mandy Mine had, to most persons outside of Manitoba, been chiefly responsible in spreading the fame of the northern mineral belt of that province; and that if Mr. Bancroft was to be credited with the transportation work, he was also to be credited with putting Manitoba before the public in a way that had called very general attention to the province.

In answer to a question, Mr. Bancroft said the cost of transportation had varied during the four years in which it had been carried on. The hauling of the ore to the head of navigation amounted to about $14.50 per ton. The steamboat costs had varied with the well-known vagaries of the Saskatchewan River, in which stream the water level was apt to vary quickly and within wide limits of depth. Including loading and unloading the cost had been about $5.13 per ton, labor and material only, and not allowing for depreciation and interest on equipment.

Non-Metallic Mineral Deposits of Manitoba.

Mr. D. C. McArthur read a quite exhaustive paper, including an unexpectedly long list of the non-metallic minerals of Manitoba. Prominent among these is good building stone, as may be seen from a visit to the new Parliament Buildings, built with Tyndall Quarry stone. These buildings are a noteworthy architectural achievement, and will become famous among Canadian architectural records as time goes on. This by the way.

Clay products, bentonite, gypsum, talc, oil, sodium-sulphate, garnetiferous sands, salt, bitumen were among the materials mentioned by Mr. McArthur as being found in commercial quantities in Manitoba.

A matter of some importance mentioned was that arrangements had been made to preserve and co-ordinate all the records of sinkings and borings done by the Government of Manitoba and also of Alberta.

Alloy Steels.

Mr. F. A. Fahrenwald was listed to speak on "Non-Corrosive Steels" with particular reference to reseaches into a possible non-corrosive metal for gun-barrels. Mr. Fahrenwald changed his subject, stating that his prepared paper would be presented through the Bulletin, and gave an illuminating talk of the general question of alloy steels. He showed a table of elements arranged in groups, and explained their family inter-relationships, which guide the metallurgist in his search for alloys designed to fit special purposes.

In connection with the corrosion of gun-barrels, this had been discovered to be occasioned by the alkaline residue of the primers used in detonation. Certain alloys were found to give resistance to corrosion, but also possessed undesirable physical qualities. After exhaustive experiments, iron-nickel and iron-chromium alloys were proved to give the best combination.

The speaker referred to an alloy which he had perfected for use in automobile pistons. The co-efficient of expansion differed from that of the cylinder case in such a manner that clearances between the piston and the cylinder could be reduced to a minimum, with the assurance that when the metals were heated the piston would not bind.

Alloys for resistance to high temperatures were also discussed, in particular the iron-chromium combination is being developed to fill a demand for moving parts required to operate under high temperatures and possess high physical strength. Such a metal would solve some of the problems met with in the utilisation of oil-shales. Aluminum, magnesium, cobalt and titanium were also mentioned as alloy metals. Titanium alloys were assuming considerable importance, and in this connection the mention of a titanium iron in the Crow's Nest District by Dr. Allan was interesting. Chromium, said Mr. Fahrenwald, was becoming a "king-pin" among alloy metals.

In answer to a question, the speaker said that cobalt could be sold for alloy purposes in larger quantities if produced at a lower cost. It was a desirable alloy for many purposes, but its cost was high.

Mr. Fahrenwald commented the provinces of Alberta and Saskatchewan in having scientific men so well represented in public affairs, and said that in new districts today the true pioneer was the scientist, and the greatest progress would be realized where this fact was recognised.

Excursion to Selkirk, Wednesday Afternoon.

The concluding afternoon of the meeting was occupied by a trip to the Rolling Mills of the Manitoba Bridge & Iron Works, and the open-hearth plant of this Company, and to the plant of the Manitoba Steel Foundries.

At the works of the Manitoba Bridge & Iron Company, the visitors were shown around by the President, Mr. Deacon, and Messrs. Mackay, Smith and other officials, and saw the plant for pulverizing coal, and the application of this fuel to the heating furnaces. The Rolling Mills were making bar and strip iron from rolled scrap. The open-hearth furnace, which is a McLain-Carter 15 ton furnace, was not in operation, being under repairs. A surprisingly large amount of scrap of excellent quality was observed in the stockyards, and was an evidence of the wear and tear in iron and steel structures and parts in the Middle West.

The plant of the Manitoba Steel Foundries is equipped with two Schneider electric furnaces, which were seen in operation, and the visitors saw a heat poured into the ladle, and from thence into the casting-boxes awaiting filling. The plant has its own motor-generator set for supplying current to the furnaces, which obviates any surge on the power company's lines. The power is supplied from the Lac du Bonnet site by the Winnipeg Electric Company.

The evidences of a local metallurgical industry at Winnipeg and the satisfactory utilisation of a local coal were the occasion of much congratulatory comment among the members of the Institute, who also appreciated the courtesy of the officials of both of the Selkirk enterprises in taking such a part in the proceedings of the meeting, and in arranging the afternoon's visit of inspection.

The Dinner.

The speakers at the First Annual Institute Dinner held in Winnipeg included Hon. Edward Brown, the Treasurer of the Province; Mayor Gray, of Winnipeg; Mr. J. A. Campbell, M.P., Mr. T. R. Deacon, President of the Manitoba Bridge & Iron Works, and Mr. H. A. Lovett, of Montreal, President of Coal Sellers, Limited. The President of the Institute, Mr. Whiteside, presided. About one hundred guests were present at the Dinner.

The speeches were rather more deliberate utterances than are usual at Institute dinners, and maintained a high order of excellence.

Mr. Brown handled the question of the ownership of natural resources in a very emphatic manner, stating that the stand taken by the Federal Cabinet was indefensible, amounting to flagrant injustice to the province. Mr. Brown's statements were indicative of a general feeling in Manitoba, and he announced that the Province intended to make one more attempt to gain what the people of Manitoba regarded as their inalienable heritage, and their rightful due according to all historical precedent and the practice of the British Empire.

Mayor Gray said he would like to see more British capital interested in mining in Manitoba, and referred to his participation in the recent trip to the Flin-Flon Mine.

Mr. J. A. Campbell — the Institute's sole representative in the Federal House at Ottawa—emphasized Mr. Brown's remarks in even stronger vein, remarking that every local recourse had been tried and that unusual means were demanded if Ottawa would not consent to give Manitoba control of its own things. He pointed out the detriment to mining advancement associated with the present indeterminate state of mining grants and regulations. He said Manitoba had a mining law, but did not own the mines. Ottawa owned the mines, but had no mining law, and between the two contradictory conditions mining was bedevilled and capital frightened away.

Mr. Deacon referred to the prior position of mining in every civilized country, and to the fact that it necessarily preceded agriculture. He read figures showing the growing excess of our imports over exports, and he pleaded for a decent regard for the rights of capital. Mr. Deacon proved himself an accomplished raconteur, as did also Mr. Howard of Taber, Alta.

Mr. H. A. Lovett spoke on development of western coal resources. The President's wide acquaintance with the membership of the Institute was revealed by his comments in introducing the speakers, and his nice discrimination in the Institute's traditional taste in stories was disclosed when he called upon a gentleman from Tabor, whose response to some extent made up for the omission of the anthem from the programme.

Those who organized the Winnipeg meeting have every reason to be proud of the attendance, the quality of the papers, the fullness of the discussions, and the assiduous manner in which the visitors took in every phase of the programme. The room provided by the Fort Garry Hotel was well suited for speaking, and well removed from first-floor distractions, and the speakers who presented papers had no reason to complain of lack of attention or lack of audience.

TORONTO COAL PRICES.

Toronto, Nov. 3. — Toronto coal dealers report that buyers are still holding off for lower prices and that the market is more or less on the skid. There is a possibility that the Interstate Commerce Commission in the United States may suspend the order requiring all open top cars at the mines which may have a tendency to stiffen the market. Transportation is slowing down somewhat and the coming of colder weather is not expected to help matters in this regard. Hard coal is quoted at $8 to $16 a ton at the mines. American funds. Mine run bituminous has taken another drop and is now quoted at from $10.50 to $11.50 f.o.b. Toronto. Smokeless coal is also down and is now quoted at $10.50 to $12.00.

PERSONALS.

Mr. J. B. Tyrrell has returned to Toronto from Newfoundland where he was examining mining properties.

Mr. A. G. Burrows of the staff of the Ontario Bureau of Mines has returned to Toronto after completing a geological survey of the Gowganda district.

Mr. H. H. Sutherland of Toronto is leaving for London, England, in connection with the financing of Davidson Consolidated Mines.

Mr. Robert Mond is visiting the Sudbury properties of the Mond Nickel company of which he is a director.

Dr. F. J. Alcock is on leave of absence from the Geological Survey. He will lecture during the winter in the Departments of Mineralogy and Geology at Queen's University, Kingston, Ontario.

Mr. T. J. Brown, who recently took the position of General Manager of the Inverness Coal & Railway Company, Cape Breton, has resigned. Mr. Brown passed through Montreal this week on his way to Toronto.

The Registration List at the Winnipeg Meeting

(Copied from the Register.)

J. W. Harris, Winnipeg.
Duncan McDonald, Calgary.
John R. McDonald, Edmonton.
Wm. Ellis, Three Hills, Alt.
Sam Troman, Lethbridge.
J. H. Hicks, Winnipeg.
C. R. Bancroft, Pas.
Robt. Graham, Pas.
W. P. Williams, Bellevue, Alt.
E. W. Jackson, Winnipeg.
G. B. Hall, Winnipeg.
E. A. Campbell, Winnipeg.
John A. Allan, Edmonton.
J. D. Perrin, Winnipeg.
Jas. A. Richards, Edmonton.
A. M. Stewart, Winnipeg.
L. S. Thompson, Winnipeg.
R. W. Hiebert, Winnipeg.
J. P. Gordon, Pas.
Robt. Strachan, Fernie.
R. C. W. Lett, Winnipeg.
C. E. Jeililin, Minneapolis.
Peter Davidson, Pas.
G. Murray, Pas.
John F. Sweeting, Winnipeg.
John C. Allan, Montreal.
W. J. Dick, Winnipeg.
S. Scott, Winnipeg.
W. W. Berridge, Winnipeg.
Thos. Boyer, Winnipeg.
C. H. Wildridge, Selkirk.
J. J. Broadhurst, Winnipeg.
Frank M. Oliver, Winnipeg.
L. B. Dukerson, Rutherford, N.J.
Charles Emmerson, Goy Marisquisga, Peru.
F. W. Gray, Ste. Annes, Que.
F. J. Alcock, Ottawa.
R. C. Wallace, Pas.
W. A. Johnston, Ottawa.
O. E. S. Whiteside, Coleman, Alt.
J. W. Holms, Winnipeg.
B. Westcott, Edmonton.
K. S. Campbell, Edmonton.
C. H. Bilson, Edmonton.
J. S. DeLury, Winnipeg.
J. A. Morrison, Winnipeg.
Jos. Myers, Winnipeg.
R. R. Rose, Montreal.
H. Stutchbury, Edmonton.
E. F. Pullin, Porquis Jnc., Ont.
Geo. H. McDonald, Denver.
J. F. McCall, Calgary.
A. E. Wilson, Calgary.
Donald Downie, Vancouver.
J. Moore Benson.
H. A. Mackay, Winnipeg.
E. M. Burwash, Winnipeg.
M. J. Cantell, Winnipeg.
Jno. R. Davidson, Winnipeg.
J. Charbonnier, Blairmore.
Theo. Kipp, Winnipeg.
J. Galloway, Winnipeg.
G. R. Pratt, Winnipeg.
Geo. B. Saunders, Winnipeg.
F. A. Fahrenwald, Cleveland, Ohio.
Mont. B. Morrow, Canmore, Alb.
M. A. Daly, St. Paul, Minn.
A. A. Millar, Taylorton, Sask.
J. Shanks, Nordegg.
Jno. R. Howard, Taber, Alt.
R. W. Riddell, Coleman.
W. L. Hamilton, Winnipeg.
E. H. Oliver, Edmonton.
G. J. Lovell, New York.
John S. Leitch, Winnipeg.
G. H. Porter, Winnipeg.
J. A. Campbell, Pas.
J. B. Baird, Winnipeg.
D. C. McArthur, Sifton.
W. J. Trethewey, Toronto.
H. N. Baker, Winnipeg.
W. J. Barries, Winnipeg.
Geo. Wood, Winnipeg.
C. H. Canklin, Winnipeg.
T. R. Deacon, Winnipeg.
C. A. Merrill, Winnipeg.

WINNIPEG MEETING, CANADIAN INSTITUTE OF MINING AND METALLURGY. OCTOBER 25th TO 28th, 1920.

Group of Attendants at the Meeting, Fort Garry Hotel.

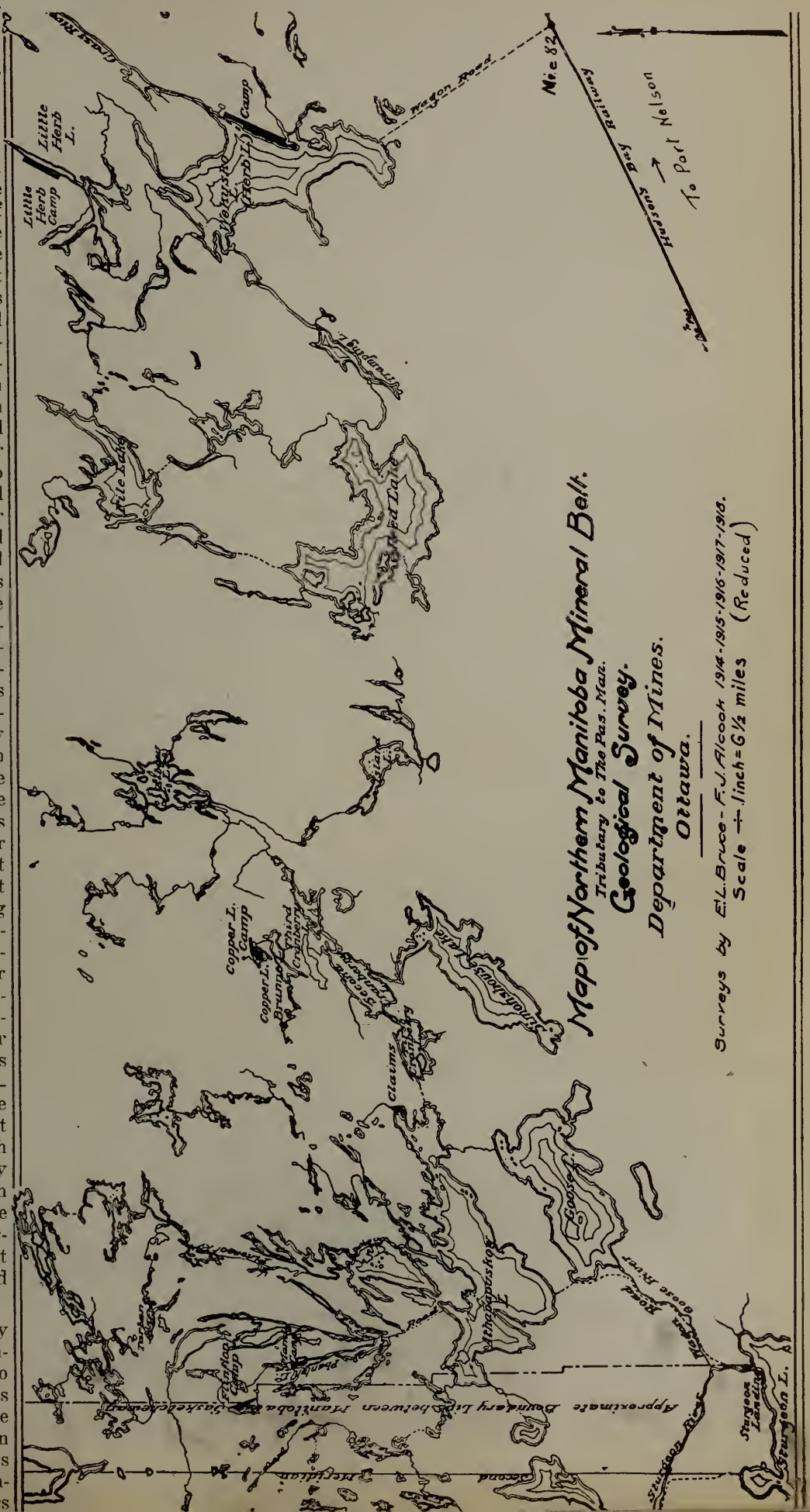
The gentleman witrout a hat is Mr. R. R. Rose, the efficient Assistant-Secretary of the Institute, and immediately above him is the President. Close by are Messrs. Fahrenwald, Stutchbury and DeLury. Dr. Allan is seated at the righthand of the stone bench, and to the right (standing) is Mr. Richards, Acting Chief-Inspector of Mines for Alberta. Others who may be picked out in the group are Messrs. Lovett, Shank, Howard, Gordon, Lett, Johnson, MacDonald, Williams, Saunders, Kipp, Westcott, Emmerson, McCall, etc.

VISIT OF THE MEMBERS OF THE LEGISLATURE OF MANITOBA TO THE FLIN FLON PROPERTY.

By R. C. WALLACE, Commissioner of North Manitoba.

In the early part of September there was carried out under the auspices of the Board of Trade of The Pas, an excursion which was successful in its completion as it was bold in its inception. The Pas Board of Trade has always shown itself alive to the needs of the country for which it is the central distributing point and the main business centre. Realizing as it did that during the next session of the House the question of the building of a railway to the Flin Flon property would in all probability come up for decision and realizing also that only by personal examination can a clear understanding be reached by those who have to deal with a situation such as this, they decided to invite the members of the Legislature and other prominent citizens of the Province to the property as their guests. The undertaking was particularly important for this reason as well that during the election this summer the Norris Government was returned not as a clear majority of the House but simply as the dominant unit in a house consisting of Norris supporters, Conservatives, Farmers, Independants and Labour Members. It will therefore be necessary in dealing with a business matter affecting the Province as a whole such as the completion of a railway to the Flin Flon property, that the matter be dealt with not in any sectional way but by a House which in all its sections realizes the importance of the undertaking in the development of the North Country and the Province.

Invitations were sent by the Board to all the members of the House and to other prominent citizens of the Province who were particularly interested in the North Country and its development. It was unfortunate that no members



which is now a fairly large unit in the House, found it possible to take part in the excursion. All other sections were well represented and Premier Norris and Hon. Dr. Thornton, Minister of Education, accompanied the party. Owing to an imperative engagement the Premier found it impossible to go further than Sturgeon Landing but the Minister of Education visited the property and represented the Government in the party. Mayor Gray, of Winnipeg; T. R. Deacon, President of the Manitoba Bridge and Iron Works; Gen. Dyer, of Minnedosa; P. A. Macdonald, Public Utility Commissioner; J. A. Macdonald, Publicity Commissioner; J. A. Campbell, M.P., and J. Paul, representing Canadian National Railways also accompanied the party. The Town of The Pas was represented by Acting-Mayor Bullock; the Board of Trade by President G. R. Bancroft, to whose energy and organization was due in no small measure the success which followed the undertaking.

The party left The Pas on the Ross Navigation Co.'s steamboat "Nipawin" on Sat. Sept. 4th., reached Sturgeon Landing (130 miles from The Pas) on Sept. 5th. They embarked in canoes for the sixty-mile canoe journey to the property that same evening and camped at Goose Creek that night. Arrangements had been made that the party be met by canoemen and gasoline engines belonging to mining men and prospectors in the district at Sturgeon Landing. Many of the mining men gave their services very freely in assisting the party in this way. On Monday, Sept. 6th., Goose Creek was crossed, the rapids of Rat Creek safely negotiated and camp was made on Monday evening on beautiful Lake Athapapuskow. The following day the Lake was crossed under very favourable conditions and the Mandy Mine was reached by nightfall and the party was taken over the property and shown the extent of the rich chalcopyrite lens which has now been mined and transported to Trail for smelting.

The following day the party were conducted to the Flin Flon property, this involving a walk of two miles over a wagon train after unloading from canoes. The greater part of the day was spent at the property and the underground workings fully investigated by all the members. They had an excellent opportunity of examining the extent of the ore body both at the 100 and 200' levels in the cross cuts and the impression which was created on discussing the matter with the engineers and others who were familiar with the property as a whole was very significant. In a short speech at the mine the Minister of Education stated that it had been difficult for him in the past to get the true perspective in connection with northern development as he had been unfamiliar with northern conditions. Now that that perspective had been obtained he would be relied on to further the interests of north country development in whatever way he could. Many other members of the party expressed themselves as appreciating for the first time fully the significance of development work in the north. After an excellent lunch provided by the Flin Flon Syndicate the party retraced their steps to the Mandy and re-embarked the following morning for Sturgeon Landing and The Pas. The writer was unable to accompany the party on the return trip owing to the necessity of investigating certain properties in the mining belt. He understands, however, that a certain amount of transportation difficulties had to be overcome, such as the stranding on the sand bar in Cumberland Lake and the breaking of a propellor shaft in the Saskatchewan River. Such difficulties did not damp the enthusiasm of the members of the party who expressed themselves in a public function at The Pas before leaving the Town, as one and all enthusiastic for the development of a country which could show the possibility of wealth such as they had seen uncovered in the Flin Flon ore body.

The initiative and enthusiasm of the Board of Trade and the citizens of The Pas will be appreciated the more when it is realized that the party numbered on arriving at the Flin Flon property some seventy members and that the total cost (all of which was subscribed by the members of the Board and their friends) was more than $3,500.00. J. E. Hammell, who represented the owners of the property was indefatigable in assisting the undertaking by every means in his power.

THE FLIN FLON ORE BODY FROM THE SOUTH.
No. 2 Shaft can be seen over the end of the ore body to the left.

Northern Ontario Letter

THE SILVER MINES.

The Cobalt Field.

The past week has been marked in mining circles by considerable criticism of an Order-in-Council passed on October 13th, declaring all patented mining claims forfeited on that date on which a certain provincial tax of five cents per acre had not been paid, and declaring these claims open for re-staking on or after noon of the 28th October.

Owners of important properties declare they were totally unaware of the existence of such a tax, having received not the slightest intimation of it from the Government.

On the other hand, the Ontario Department of Mines declares the fact was advertised in the press some months ago, and the claims were all recently listed in the Ontario Gazette. The Department states also that notice was sent in all cases where the address of the owner was available.

The fact is, however, that included in the forfeited claims was the Teck-Hughes Gold Mines, The Hudson-Kirkland, Lang-Caswell and Ontario Solid Silver Mines, all properties considered to be in strong hands. Indeed, the Teck-Hughes, a steady gold producer valued at many hundred of thousands of dollars, became forfeited over a mere tax of something like $5.50.

A veritable avalanche of criticism swept through the press of Ontario, especially Cobalt and Toronto on the morning of the 28th, and caused the Department to take serious notice of the unprecedent situation. As a consequence, at 11.30, just thirty minutes before the Order was to go into effect, the Teck-Hughes and Kirkland Hudson were withdrawn from staking. It was a little later on the same day that another Order withdrew the Ontario Solid Silver Mines from staking.

In the meantime stakers were on the ground in each case, armed with anything from a pick handle to a telegraph pole, and all participating in the restaking of these valuable properties. Men swarmed around the boundaries of the Teck-Hughes mine bent upon staking out this big gold producer already proven. In their ears was the continual rumbling of the big modern mill steadily grinding out the yellow metal, and each staker conjured up visions of great personal wealth. It was accordingly a cruel moment for these men when it became known that the Government had withdrawn the property from re-staking.

The Lang Caswell mine, in Lorrain, is one of the properties listed as forfeited and still listed among those not withdrawn.

Operations at the Cobalt mines are below normal due to shortage of power, but wet weather has now set in and relief is looked for shortly. Some of the mines have been obliged to close down at intervals, accordingly as regulated by the amount of power available.

Announcement is made that one of the veins on the Lumsden property of the Cambnrn Silver Mines Company in which rich silver occurrences have been discovered, has been found to carry silver in every round of shots over the last fifty feet of drifting done. It is now intended to concentrate effort on the work of stoping on this vein.

The Coniagas Mines, Ltd., closed its fiscal year on Monday of this week, and is understood to have experienced very satisfactory prosperity. Outpnt is said to amount to close to the previous year's figures, and the company was enabled to disburse 12½ p.c. in dividends, or some $500,000. The annual statement is now in course of preparation and is expected to be issued early in December.

Arrangements have been made to explore a part of the Chambers-Ferland mine through a shaft on the Right of Way Mines. Cross-cutting has been undertaken at a depth of 385 feet, for the purpose of cutting through an area of conglomerate formation lying between the Nipissing and the La Rose Mines. This piece of territory is believed to offer considerable promise, and the present plan is to carry out all reasonable work in determining its value. The work commenced about October 5th, and already upwards of 130 feet of cross-cutting has been done.

Accidental fire destroyed the shaft house on the La Rose mine, the property on which silver was first discovered in Cobalt. Miners working underground were brought to surface through another shaft, with no loss or injury to the men.

In South Lorrain.

The mill on the Keeley mine has been completed, and trial runs were made during the past week. According to official figures, the ore reserves as of the end of August on the Keeley were estimated to contain 400,000 ounces of silver as well as a large quantity of cobalt which it is hoped may be marketed at a profit. This official advice is taken to indicate the Keeley has taken a place among the regular silver producers of this country. The new mill is fitted with 20 stamps with corresponding equipment. The ore in sight is largely the result of less than one year's operation.

Preparations are being made to commence work on the Haileybury Silver and the Haileybury-Frontier properties, situated in the vicinity of the Keeley. These properties are to be worked for the cobalt metal contained in the known veins.

Elk Lake.

Negotiations are still pending for the White Reserve mine at Maple Mountain. It was stated this week that something definite would be known within the next week or two as to whether the control is actually to be taken over by English interests, or not.

Chas. Dalby, superintendent of the Anvil Lake Silver Mines is now on the ground making arrangements to commence work. This property was formerly known as the Rubicon, and has some very promising silver showings at surface.

Ore shipments during the week ended October 29th from the Cobalt field amounted to more than three quarters of a million pounds, made up of a total of twelve cars. A feature of the week was the large number of shippers, eight different consignees being recorded.

The Nipissing was the leader with four cars containing 284,674 pounds, as shown in the following summary:—

Shipper.	Cars.	Pds.
Nipissing	1	284,679
Temiskaming	1	106,857
McKinley-Darragh	1	94,496
Mining Corp.	1	66,938
Dominion Reduction.	1	65,000
O'Brien	1	64,033
Coniagas	1	60,619
H. F. Strong	2	34,643
Totals	12	777,265

THE GOLD MINES.

The condemnation of the McFadden gold bill calculated to pay a premium of $10 an ounce on new gold produced within the United States has been announced by the American Bankers' Association. The announcement has not conveyed any surprise to the gold mine operators in this part of Canada. Indeed, these operators have repeatedly stated they did not consider such a measure feasible. This stand was also taken by Sir Thos. White from the beginning when the bonus on gold was first mooted.

Cornish miners for relief of the mines of Porcupine are a reality. Confirmation has been obtained in connection with last week's report in the "Mining Journal" that several score miners were en route over the Atlantic on their way to the Dome Mines. It is also learned that early reports are entirely correct in respect to this company ordering a large number of additional machines with which to be prepared to receive and employ these new miners.

The Hollinger Consolidated Gold Mines is said to be treating an average of about 1,600 tons of ore daily and with prospects of being able to employ additional stamps and increase tonnage before the end of the year. The equipment available and only awaiting the desired number of workmen, is adequate to treat an average of over 3,000 tons of ore daily. This would be at the rate of over one million tons annually, and in view of the ore reserves being estimated to contain an average of $9.09 per ton would indicate a possible output at the rate of over $9,000,000 annually. This illustrates the importance of present indicated improvement in the supply of labor, although the point should be kept in mind that the process of securing a full supply of men may spread over several months, and the increase over the present rate of output will in all brobability be brought about gradually.

Arrangements have now been completed for the distribution of 76,667 shares of Dome Mines, which have been paid to the Dome Extension Mines, Ltd. for the properties and assets of that company. Each shareholder is asked to send in his shares for transfer and is entitled to one share of Dome for each thirty shares of Dome Extension. Shareholders will also receive 25 cents on each share of Big Dome issued to them. This payment is equal to the dividend declared by the Dome Mines Co., payable October 20th. The Trusts and Guarantee Co., Ltd., are the transfer agents.

It is learned officially that the estimates place a value of over $1,250,000 on the ore in sight on the Porcupine V. N. T. Mines. Ore is estimated to amount to 130,000 tons, and the grade is not far under $10 per ton. The plans of the company are to increase the mill to perhaps a capacity of 200 tons daily soon after work is resumed. Development work will be continued to a depth of 900 feet, the present shaft being already down to the 600-ft level at which point commercial ore is in evidence over several feet in width.

The Kirkland Lake Field.

During the month of September, according to the regular monthly report of manager R. C. Coffey, the Lake Shore mine poduced $40.150. This compares with $35,261 during the preceding month. In September, 1,480 tons of ore was treated, an average of $27.12 being recovered from each ton treated, comparing with the former average of between $24 and $25. Total output to date from this mine, equipped with only a 60-ton mill, now amounts to $1,051,730. The work of deepening the main shaft is progressing, and was reported to be 72 feet below the 400-ft level at the end of September. The objective is a depth of 800 feet, and the plan is to open up development levels at the 600 as well as 800-ft level.

High grade ore is being developed at the 500-ft level of the Kirkland Lake Gold Mines. Good results are also being met with on this property at the 900-ft level. Average mill heads are now such as would indicate a very substantial margin of net profit.

At a meeting of the shareholders of the Hunton-Kirkland, held in Haileybury, October 28th, a by-law was passed authorizing an increase of 1,000,000 shares in the capitalization. This raises the capital from $1,500,000 to $2,500,000, the added shares being for the purpose of financing extensive underground operations as well as to be used at such time as a mill is required. It is believed likely that it will not be necessary to issue the full amount. However, such will be available with which to meet any contingency. At the meeting, it was announced that at a depth of about 70 feet, some high grade ore is in evidence, and the outlook in regard to the physical condition of the mine is considered favorable.

In a statement to the shareholders of the Ontario-Kirkland Gold Mines, president Frank Huth states that the work is proceeding on the new 100-ton mill which is expected to be in operation before September 1st, 1921. Development work on the 300 and 450 feet levels is showing satisfactory results, and a new shaft is projected at the mill site to the 450 feet level to serve as a main hoisting shaft.

On the Argonaut mine, at Beaverhouse Lake, work of extending the shaft below the 200-ft level has commenced. It is planned to carry this work to a depth of 500 feet.

In the meantime, the small mill is being operated, a gold brick valued at $4,000 having just been sent out.

With the completion of the Wright-Hargreaves mill within the next two months, and with the installation of a new mill on the Ontario-Kirkland by September, next, the combined milling capacity of the plants in the Kirkland Lake field will amount to about 730 tons daily, capable of treating over a quarter of a million tons of ore yearly. Ore is estimated to average about $13.50, and the indicated output when operating at full capacity is estimated at the rate of $3,000,000 annually by that time.

With the price of material steadily declining, and with indications of the labor supply increasing the outlook for the gold mines is more favorable than for several years.

METAL QUOTATIONS.

Fair prices for Ingot Metals in Montreal, November 5th, 1920. (In less than carload lots).

	Cents per lb.
Copper, electro	20
Copper casting	19½
Tin	49
Lead	8¼
Zinc	9
Aluminum	35
Antimony	8¼

TORONTO MINING STOCKS.

Following are average quotations for active gold, silver and oil stocks on the Standard Mining Exchange for week ending October 30th 1920 :

	High	Low	Last
SILVER			
Adanac Silver Mines, Ltd.	2½	2	2¼
Beaver Consolidated	38	37½	37½
Chambers-Ferland	4½	3	3
Coniagas	2.39	2.37	2.39
Crown Reserve	25	20	22
Gifford	1¾	1¼	1¼
Hargraves	2	2	2
Kerr Lake	3.40	3.40	3.40
La Rose	30	28½	28½
McKin.-Dar.-Savage	49½	49	49
Mining Corp. of Can.	1.73	1.67	1.70
Nipissing	9.50	9.35	9.40
Ophir	2	2	2
Peterson Lake	11½	11	11½
Silver Leaf	2⅜	2¼	2¼
Trethewey	28	23¾	24½
GOLD.			
Boston Creek Mines	15¼	15	15
Dome Extension	43	42	42½
Dome Lake	4⅜	4	4
Dome Mines	13.00	12.50	12.50
Gold Reef	3⅜	3¼	3⅜
Hollinger Cons.	5.60	5.50	5.50
Keora	16½	15½	16
Kirkland Lake	45	42	42
Lake Shore M. Ltd.	1.05	1.05	1.05
McIntyre	2.02	1.94	1.94
Newray Mines, Ltd.	5¼	5	5
Porcupine Crown	23	23	23
Porcupine Tisdale	1	1	1
Schumacher	21	20	20
Porcupine V. N. T.	24½	23½	23½
Teck-Hughes	6	5¼	6
Thompson Krist	7½	7	7
West Dome	6½	5½	5¾
Wasapika Gold M. Ltd.	9¾	9¾	9¾
OIL.			
Vacuum G.	29	27½	28

TORONTO NOTES.

According to Deputy Minister of Mines, Thomas Gibson, about ninety per cent of the mining claims in New Ontario that have been forfeited by reason of non-payment of taxes have been voluntarily abandoned as not worth working. Many of the remainder were speculative claims. Justification for withdrawal from staking at the eleventh hour of several claims lies in the fact that much development work might have been lost to the province had the order-in-Council not been passed. It is stated that most of the properties forfeited that are worth anything have already been restaked by their original owners. In the opinion of some of the mining men from the North, mining in that country was given a severe check by the action of the Government in selling the claims for non-payment of taxes without directly notifying the owners.

The special meeting of the Black Lake Asbestos shareholders called for last week was called off as a result of a temporary injunction obtained by the Toronto shareholders. This week the injuction was sustained in the court, it being held that the dissentients were justified in their objections. As matters now stand it will be necessary for the Montreal interests to begin all over again if they still desire to call a special meeting with the object of ousting the present board. In the meantime the bondholders committee has not been inactive, and it is expected that further developments will be announced in another week. What these may be is not known, but it is understood that drastic steps are contemplated, and as the existing income bonds are virtually first mortgages, since the redemption of bonds take precedence, it is understood that the income bondholders consider themselves in a strong position.

At the annual meeting of the North Davidson Mines, Limited, held at the head office of the company in the Royal Bank Building, Toronto, the President, R. T. Jeffery told the shareholders that the results from development and exploration had been exceedingly gratifying and that they had every reason to feel enthusiastic over the prospect. The following officers were elected: R. T. Jeffery, Toronto, President, J. Johnston, Ottawa, Vice-President: Directors, L. G. Harris, J. J. Jeffery, Thomas Cain, Toronto. The financial statement submitted showed that $73,256 had been expended in development, plant etc., up to September 30, 1920.

Mr. Jeffery stated that when the property was purchased the directors regarded it as one of great promise. Diamond drilling brought results which were far beyond their expectations. Veins of great width were cut and the assays disclosed values higher than the average of some of the best mines in the camp. A complete mining plant was purchased in Nova Scotia and shipped to the property and the road from the railway put into shape.

A shaft was sunk away from the ore body with the idea of cross-cutting to pick it up at a depth of 250 feet, where a large body of ore had been proved to exist by the diamond drills. At the depth of 52 feet a vein four feet wide cut where the ore was liberally sprinkled with free gold. Samples taken at random and containing no visible gold assayed over $400 to the ton, according to Mr. Jeffery's statement.

Prince George, B. C.

There is a possibility that one or more of the same type of giant gold dredges that have been operating in the State of California will be constructed and turned loose on the gold bearing gravels of the Fraser River and of the historic creeks and gulches of the Cariboo District. A party of operators from the United States, one of whom represents the Yuba Manufacturing Co., of Marysville, Cal., have been visiting Prince George for the purpose of investigating conditions and forming an estimate of the prospects of success attending the proposed venture. This part of British Columbia would seem to offer a promising opportunity for these monsters of the alluvial fields as it is a virgin territory for operation on such a scale and there is no doubt that the sands and gravels carry values. Years ago, as an aftermath of the Cariboo gold excitement, several small dredges were installed on the Fraser River and elsewhere. The remains of these still may be seen in the river and on the banks just below the town of Quesnelle. There is a dredge on the Quesnelle river and one was taken up stream beyond Fort George to the Little Smoky River, while it lies a derelict today.

Mineral Exhibit

WINNIPEG MEETING, C.I.M.&M.

(Specimens assembled and arranged by Mr. L. G. Thompson, University of Manitoba).

NORTHERN MANITOBA METALLICS.

Flin Flon Ore-Body.—Collection of Rock and Ore Types.

1.—Hornblende schist, carbonate gangue, leached quartz-porphry, talc schist from footwall, andesitic porphry.

2.—Banded solid sulphide, containing gold, silver, copper and zinc.
Ore of disseminated type, containing large cubical crystals of iron pyrite.
Grey schist, with disseminated sulphides.

3.—Leaf copper—very beautiful frond-like specimen.

NOTE.—This collection was representative of all the typical rocks and ore types of the Flin Flon deposit.

Gold Ore specimens from Rice Lake District.—Extension Mine. Pan Extension Mine, from 120 ft. level. Shuniah Mining Company, Long Lake area. Deep Rock Gold Mines. Commonwealth group, Gold Lake area. Pendennis Gold Mining and Reduction Co. September Morn and Bruce claims. Martin Mining Company. Wolverine Gold Mines. Montcalm Mining Co. Gold Pan Mine, White Dove Mining Co., Long Lake. Kingfisher Mining and Development Co., Long Lake.

Gold Ore specimens from Herb Lake District.—Cabin and Caribou Claims, Little Herb L. Northern Manitoba M. and D. Co., Herb Lake, Bingo Mine, Herb Lake. Red Rose property. Copper Lake.

GOLD BULLION SPECIMENS.

1.—**Northern Manitoba Mining and Dev. Co., Herb. Lake.**—53 3-10 ozs. gold, obtained from 30 tons of ore. Concentrates showed value of $1,260.00 per ton of ore, $7.80 per ton of tailings and had 20 tons of tailings.

2.—**Bingo Mine.**—3 1-2 ozs. from 1-2 ton of ore, being average sample of ore, for milling test.

Mandy Mine.—Rock and Ore types.—High grade copper ore, and low-grade sulphides, with specimens of accompanying rocks.

Chalcopyrite.—Le Vasseur claim. N. E. arm of schist Lake, Pas. Baker-Patton property. Rosen property (specimens of molybdenite, cobalt bloom, copper ore). Bear Lake, 3rd Cranberry Lake, Pas.

Nickel-copper Ore.—Bear River, Manitoba. (Several large specimens with norite specimen accompanying.)

Tungsten Ore.—Scheelite. Falcon Lake, Ingolf, Man.

Molybdenite.—Falcon Lake (large crystals).

Manitoba Non-Metallics.—Mottled Limestone from Tyndall. Quarry.—Rough and dressed specimens. Selenite and Gypsum. Manitoba Gypsum Co., Gypsumville, Man. Clay Products.—Larivier hard shale. Morden soft shale. Red and dark buff bricks, vitrified brick, vitrified pipe and hollow tile, made from mixtures of above shales, by Reliance Clay Products Co.

Miscellaneous Exhibits from points west of Manitoba.

Oil.—Fort Norman. Great Slave Lake. Okotoks — crude, and gasolene from natural gas.. Peace River—McArthur No. 2 well series of oil and distillates, Southern Alberta Oil Co., No. 1 well.

Bitumen, from Athabaska Tar Sands.

Salt.—Salt River, Alberta.

Salt—Solar Evaporation Salt, Senlac, Sask.

Talc.—Alberta B. C. Boundary.

Mica.—Upper Peace River

Sands.—Black Gold carying sands, North Saskatchewan River, Edmonton, and Garnet Sands same locality. Black sand, carrying gold and platinum from Peace River.

Sodium-Sulphate.—Crystals from Fusilier, Sask.

Bentonite.—Rosedale, Alt.

Bog Iron.—N. Saskatchewan River.

Magnetite shale.—Barmis, Alt.

Iron Ore—Mackenzie River.

Alabaster and gypsum.—Peace River.

Magnetite, from Atikokan Mine, Ont.

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British Columbia Letter

Victoria, B.C.

One hundred and four residents of the coal mining centres of the Province of British Columbia are availing themselves of the correspondence course established by the Government for their benefit. These coal miners are studying all branches of coal mining, from the most elementary to the most advanced, the latter covering the technical knowledge required of the holder of a Mine Manager's Certificate. The different districts are represented in this Correspondent School as follows: South Wellington, 3; Nanaimo, 21; Cassidy. 5; Cumberland, 32; Vancouver, 1; Britannia Beach, 1; Merritt, 14; Princeton, 4; Coalmont, 4; Fernie, 10; Michel, 4; and Corbin, 5.

The discovery of coal in the centre of the City of Vancouver has been reported. While driving a tunnel beneath one of the chief traffic arteries of the community, workmen struck a seam of coal about 18 inches wide. For some weeks the men have been taking home a sackful each night. They report that it is of good quality, burning brightly and furnishing good heat. These fortunate laborers at least appear to have solved the fuel problem for the winter.

Peace and industry once more reigns in the Crow's Nest Pass District of British Columbia. The same condition prevails, in practically the same degree, in the coal mining fields of the Province of Alberta. Strife for the moment is at an end and it should not be long before the collieries of Coal Creek, Michel, as well as those of Alberta, are on a normal basis as to production. It cannot be said what result of the comparatively short walk-out has been except that it would appear that the One Big Union has been worsted and that the Agreement now obtaining between the U. M. W. of A. and the Operators is likely to be amended in such a way as will remove any ground the former organization may have for dissatisfaction and at the same time be acceptable to the Operators.

The Government's Mine Rescue Station at Fernie is being enlarged to accommodate more adequately the apparatus with which it is equipped and for the training of the miners in its use. This Station is provided with about as complete a line of appliances for mine rescue work as can be procured. There are six sets of Gibbs apparatus, one pulmotor, one oxygen inhaler and six sets of Draeger Apparatus, together with the necessary spare parts, etc. The Draeger apparatus is being replaced by a more modern instrument. The Fernie Station was the first in British Columbia and one of the first in the Northwest to be provided with the Gibbs type of breathing apparatus. The government also maintains at a high state of efficiency stations at Nanaimo, Cumberland and Merritt. That at Nanaimo has been outfitted with six sets of the Paul apparatus and four sets of the Gibbs; that of Cumberland is equipped with the Draeger apparatus of the 1917 model but this shortly will be replaced with the modern type, and that of Merritt, which recently was taken over by the Provincial Department of Mines, has six sets of the Draeger and four sets of the Gibbs.

T. A. Link, geologist who has been conducting an exploration of the far northern country with a view to the determination of its oil possibilities, reports from Edmonton, Alberta, that a large oil field, extend-

EXTENDED

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ing from Fort Norman to the Arctic Coast, has been discovered. He is quoted as stating that the season's work has absolutely proved the existence of an enormous body of oil-bearing rock in the Mackenzie territory.

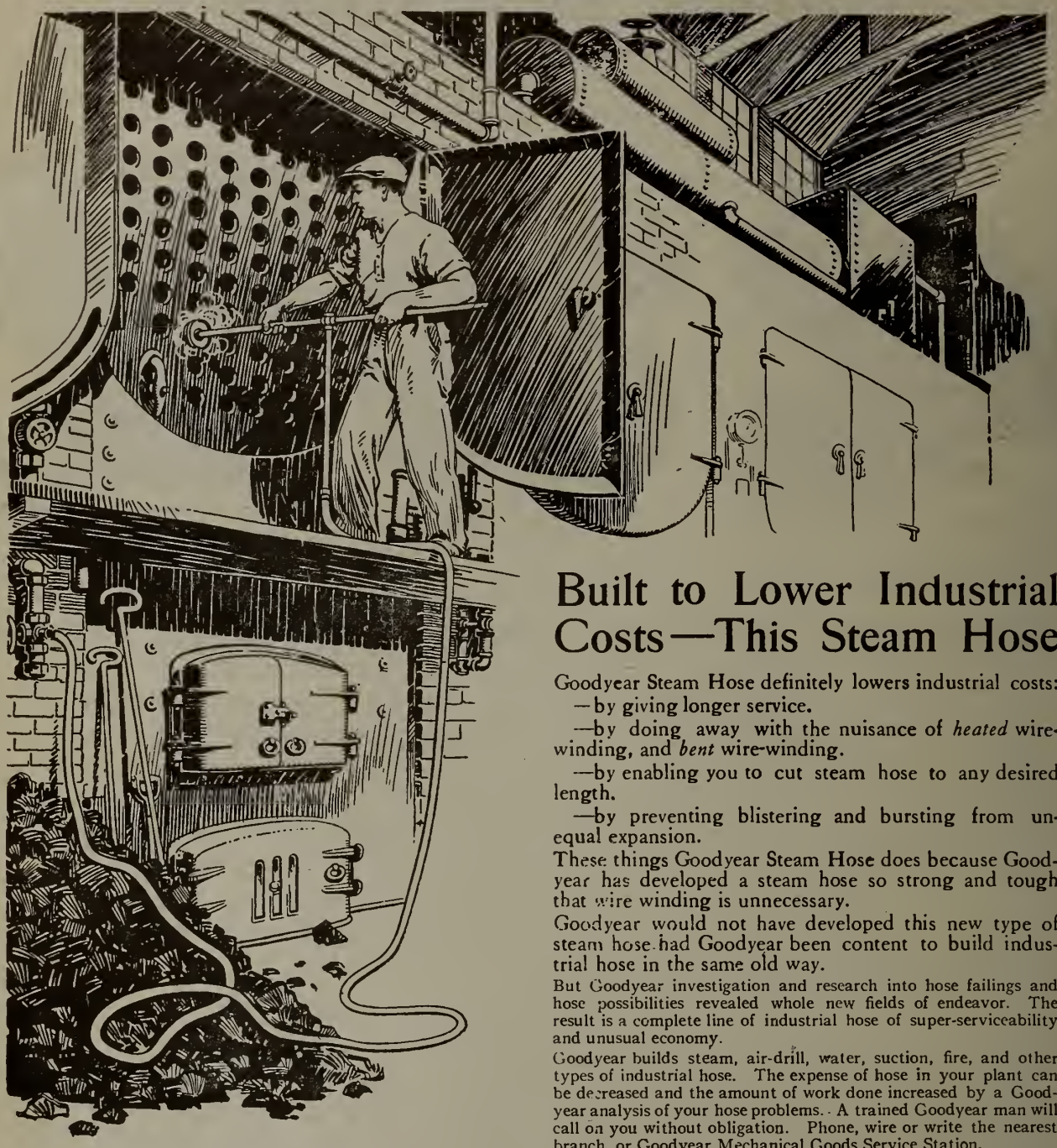
S. G. Benson, a prospector, just returned from a season's work on Portland Canal prospects, refers optimistically to the Blue Bird and Nest Egg Groups of Mineral Claims on the Salmon River section. Several veins have been uncovered from which samples have been taken that give very high assay returns. Mr. Benson and his partner have been prospecting this particular country for years, confident that their perseverance would be rewarded, but it was not until last year that they found the mineral. This was due to the fact that a glacier, which has been receding about two hundred feet each year, formerly covered the outcrops. It is the intention to begin tunnelling next season. On the Lucky Boy Group in the same locality it is said that a vein has been found about sixty feet in width and carrying values as high as $400 to the ton, the average being estimated at $120 to the ton. It is stated that the galena from this property is the cleanest seen in the country so far, there being no zinc shown so far. Considerable development has been done but next year permanent camps will be established. A tunnel will be driven into the hillside about fifty feet from which a shaft will be sunk an equal distance, this being followed by cross-cutting. This property is situated between the Premier Mine and the town of Stewart. Much is expected, too, of the New York Group of Claims, also in the Salmon River region. The results of recent work is reported to have been so satisfactory that arrangements are being made for the expenditure of a considerable sum on development. Owners of the White Mouse, also, have been encouraged and are understood to be planning the installation of mine plant for the further facilitation of the operation of the property.

Alice Arm, B. C.

The Esperanza Group of Mineral Claims, Alice Arm, has been taken over by a syndicate of Vancouver businessmen. The consideration is said to have been $75,000 which nets the owner, Petro Salina, a comfortable profit which will be appreciated when it is stated that he acquired the property some years ago at a Sheriff's sale for $200. Recent development work has been encouraging in its results it being stated that a considerable body of high grade silver ore has been uncovered.

Princeton, B. C.

Active mining operations have been started by the Canada Copper Corporation at Copper Mountain and Allenby, the power line from Bonnington Falls and the railway to the mine both having been completed. The power has been turned on and the trains are running. Thus starts an industry which in its initiation has involved the expenditure of approximately $7,000,000. The first train of ore moved to the concentrator at Allenby on October 19 and shipments are being increased daily. The force of men employed gradually is being increased and it is expected that



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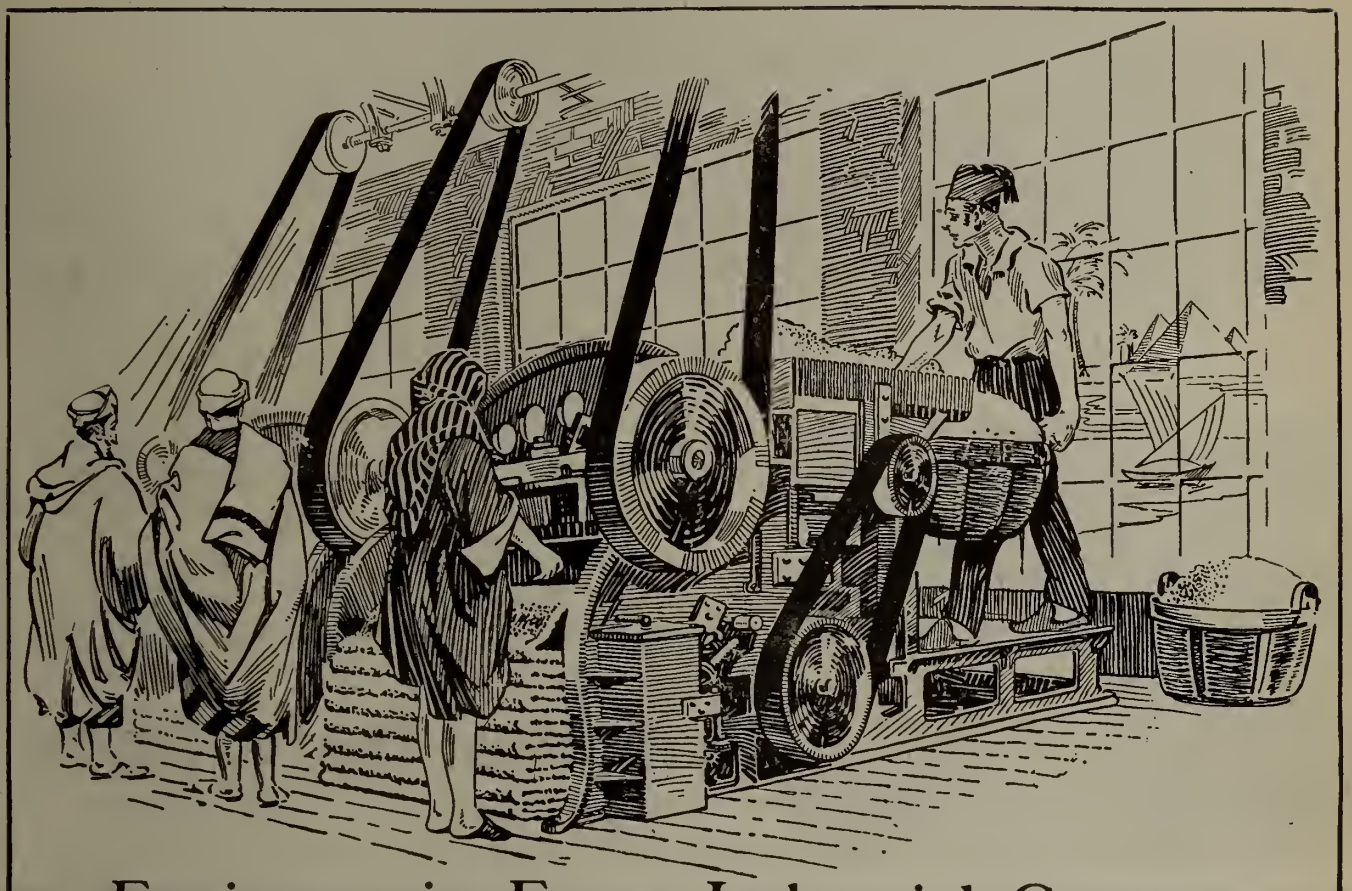

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the daily shipment will be brought to 2,000 tons as soon as the plant is brought to a capacity production.

Anyox, B. C.

The Ecstall Copper Property, for several years bonded by the Granby Consolidated Mining & Smelting Co. which did much drilling and other development, has returned to the original owner, the Company's option having been allowed to lapse. The General Manager of the Company is quoted as saying that the property no doubt would be worked eventually but not for the copper. Sulphur and iron are found in the ore but its copper content is not as high as in the product of the Hidden Creek Mines.

Trail, B. C.

Ore receipts at the Trail Smelter of the Consolidated Mining and Smelting Company for the first week of October totalled 8,133 tons. For the week ending October 14th they were 7,900 tons. This brings the total for the year to 267,768 tons as compared with 266,543 tons at the same date last year. The year 1919 started well but declined in its closing months because of the strike at the Sullivan Mine. The same reason gave 1920 a bad start, which handicap was accentuated by the suspension of Rossland shipments for a while in the Spring and Summer and the tie-up in the Slocan District. When the Kimberley trouble died out and the Sullivan hit its strike, on a larger scale than before, and the Rossland shipments resumed, 1920 started overhauling 1919 at a rapid rate, until this month the record of the previous year was passed.

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EDITORIAL

MORE WORKERS FOR THE MINES.

The number of workmen available for the mines in Canada is becoming more adequate than for some years past. The rate of immigration into Canada is being accelerated, and, what is equally effective from the Canadian viewpoint, the flow of immigrants into the United States is becoming very large. Reports of unemployment in the large cities of Canada are being heard. The International Nickel Company is curtailing its working forces at Sudbury, and, presumably following the closing of ancient tin mines in Cornwall, miners from that county are coming to work in the mines of Northern Ontario. A bad fishing season is bringing about a resumption of the long-interrupted influx of men from Newfoundland to the Nova Scotia mines. Accentuating these scattered tendencies is the approach of winter, which curtails many mining operations, and also provides an inducement to seek underground employment.

There is also a feeling abroad that an era of uninterrupted and highly paid employment is drawing to a close, and that leaner times are coming. Such conditions bring about increased individual production and lessened unit costs. It is only by greatly lessened unit costs of production that even an approximation to existing wage schedules in Canada can be maintained.

That we need production in Canada a little observation will prove. New Zealand butter is sold in Nova Scotia as "our prime Bluenose butter"; New Zealand lamb is sold in Montreal as "Best Spring Lamb" and is cooked by Pennsylvania coal in a stove made from United States ore and served on a platter that came from Europe, or Japan maybe. It is eaten with a Sheffield or Connecticut blade, and the platter is washed with soap from Chicago. Why?

"APPROPRIATE LEASING UNITS."

The latest issue of the Press Bulletin of the U. S. Geological Survey contains the following pregnant little announcement, namely: "Under the new mineral-" leasing law it is incumbent upon the Geological Sur-" vey, Department of the Interior, to determine the " geologic structure of producing oil or gas fields, " and to divide the coal, phosphate and oil-shale lands " of the public domain into **appropriate** leasing units."

There is much condensed wisdom in this little note As a concrete example of the trouble that follows from dividing the public domain into **inappropriate** leasing units there might be adduced the case of the submarine coal leases in Nova Scotia, where a complete ignoring of technical considerations and the entire neglect of all geological limitations has led to inextricable confusion.

Similarly lamentable results are occurring in inland coalfields, as may be gathered from a recent report of the Chief Inspector of Mines for Alberta, who has stated that in mining 47,000,000 tons of coal an area containing 100,000,000 tons had been broken up in such fashion that some 30,000,000 tons "is lost beyond any chance of recovery."

The application of the new principle enunciated in the foregoing announcement to Canadian oil, gas and oil-shale fields does not require to be emphasised. The desirability of extracting oil, gas and oil-shale from virgin areas under conditions that would be dictated by geological and technical considerations, and not by accidental, geometrical and man-made boundaries that have no relevance to the physical boundaries of the deposit to be won, is sufficiently obvious.

The desirability of leasing mineral deposits in "appropriate leasing units" is nevertheless one that has occurred to our legislators only at infrequent intervals, and usually after the damage has been done.

SHAKING FAITH IN TITLES TO CLAIMS.

The acreage tax on mining claims in Ontario is not considered a serions burden by mine operators, but the Mines Department is evidently determined that payment of the tax must not be neglected. Recently a number of companies have found their titles to property in jeopardy because of failure to pay the tax. In some cases the companies are notified by the Department when the taxes are due; but apparently the onus is on the companies and lack of notification is not accepted as sufficient reason for delay in payment. In

some cases officers of companies have been notified only after it is too late to permit them to comply with the regulations and then their money is refused. This is obviously not the intention of the Mining Act; but the Department is technically right in its position. The furore caused by the throwing open of claims may serve to call the attention of claim holders to the necessity for paying taxes; but the mode of procedure is not one that will make mining in Ontario a popular enterprise. To put titles in jeopardy for such slight cause is not good business for the Province.

Title to property is something that should not be trifled with. It is true that harsh measures have to be used sometimes to present misuse of privileges granted under the Mining Act; but the exacting of penalties that are so unreasonable as the threatened action of the Department of Mines should not be permitted.—R. E. H.

ASSOCIATED GOLDFIELDS.

It has been courteously suggested to the Editor that a statement of our Northern Ontario correspondent made in the "Journal" of 22nd October relating to an examination of the properties of Associated Goldfields by Mr. Clifford Smith of Toronto reflects unfairly upon him inasmuch as it pre-supposes some disclosure of confidential information We hasten to dissociate the "Journal" from any such manifestly impossible supposition.

A reference to our correspondent's note does not disclose any statement sufficiently positive to imply anything more than an intelligent guess, but it would have been better had no attempt been made to anticipate the nature of any report that might be made, and, in doing so, we believe our correspondent did not realise the difficult position in which even a surmise of the contents of a confidential report may place a professional man, whose etiquette will not permit of him defending himself until such time as his principals consent to publication.

The management and the prospects of the Associated Goldfields Mining Company have received attention in the public prints to an extent that is to be deprecated, but with the result that what should be the purely private concern of the shareholders has assumed a phase of public interest that will not permit complete silence on the part of this paper.

We considered it under these circumstances to be a proper proceeding in a recent issue to call attention to the fact that if the statements made in the last annual report to the shareholders were correct it should be simple to demonstrate their accuracy. In the employment of Dr. H. C. Cooke in the Spring of this year, and in the later employment of an experienced mining engineer to report on the operating of the property in the light of the ascertained geological facts, the policy of the Directors calls for the completest approval, more especially if, as is presumed, the reports are eventually given to the shareholders. Not until this is done will it be possible to know whether or not the faith of the shareholders has been justified.

ECHOES OF THE WINNIPEG MEETING.

The Winnipeg "Free Press" reported the proceedings of the Institute meeting fully and ably, and gave a publicity to the event that was much appreciated by the members.

Arrangements had been made from which it was confidently expected that Messrs. Dresser, Neilly, Russel and Brown would have been present at the Winnipeg gathering, but at the last moment an evil concatenation of happenings prevented the attendance of any one of them.

The color scheme at one of the tables at the Annual Dinner at Winnipeg was much admired. There was a red red Rose, a Manitoba Brown, two shades of Gray, and a Whiteside, whose chief characteristic is that he is all white and no "side" at all. No wonder the Deacon felt himself in the pink of condition.

The suggestion is made, in order to prevent a time-honored custom from falling into a never-sufficiently-to-be-deplored desuetude, that Major MacDonald, or Major Brock, or both together, should record the anthem of the Institute on a phonograph cylinder for use at Institute dinners in a less vociferous age that is apparently upon us. It is rather a pity, however, that the anthem is not more tuneful and less declamatory.

CORRECTION.

A reader kindly draws attention to the statement in editorial comment in the issue of 29th October, which gives the annual importation of petroleum into Canada as being 450,000,000 barrels, which was compared with the domestic yield of 240,000 barrels. The first figure should, of course, have been 450,000,000 gallons, or at 31.5 gallons to the barrel, approximately equivalent to 14,300,000 barrels. The figures are quoted from the Preliminary Report on Mineral Production of the Mines Branch at Ottawa.

"COAL" AT SHELBURNE, ONT.

A syndicate, composed of Mr. H. A. Chamberlain of Shelburne, Ont., and Mr. L. H. Leale, broker, of Toronto and associates, is reported by the "Financial Post" to have undertaken to prove by diamond drilling whether or not coal is present in the vicinity of Shelburne. Lumps brought up from the well-shaft in which the original discovery of a black material was made, are stated, upon analysis, to be a good grade of anthracite.

The possibility of finding coal in the neighbourhood of Shelburne is of the slightest description, and, if it were found, could indicate but one thing, namely, that the geological mapping of the district is incorrect.

The Part of the Coalfield of the West in Canadian National Development

A Paper prepared for Presentation at the Second Annual Western Meeting of the Canadian Institute of Mining & Metallurgy, October 25th to 28th, 1920, Winnipeg.

By F. W. GRAY.

At the Toronto Meeting of the Institute in March last, the writer developed the argument that Canada could become self-supplying in bituminous coal.

The events of the Summer have gone far to establish the necessity, if not the soundness of this aim. We have read on the one hand the statement of the Minister of Railways that Nova Scotia coal should be brought to Ontario, and we have seen, on the other hand, the greatest extension eastward of the use of western coal yet recorded in Canada, accompanied—under emergent conditions it is true—by definite proposals for the forwarding of Alberta coal to Ontario.

Existing Fuel Situation is Unrepresentative.

The present bituminous situation is not representative. In Nova Scotia the existing output does not represent the capacity of the mines. Neither is the transportation deficiency to be considered representative that has brought about a coal supply emergency in those districts of North America that lie furthest removed from the great central coalfield of Pennsylvania and Virginia.

These are post-war conditions of limited duration.

The western coalfields have been so slightly and so recently developed that a statement of existing production is interesting only as a contemporary record, and has no bearing on the future.

What then is the outlook for making Canada self-supplying in bituminous coal, and what in particular the role of the western coalfield?

Bridging the Gap between our Bituminous Fields.

There is no doubt as to the presence within the borders of Canada of sufficient bituminous coal to supply not only our present population, but also that of the future, whatever it may be. Unfortunately a gap of 2,000 miles intervenes between the eastern coalfield and the beginning of the Saskatchewan lignites along the international border.

This gap can be bridged, if we adopt a national policy on coal supply, but not immediately. Two things are eminently required to achieve this end:

(a) An extension of the Great Lakes waterways that will enable Nova Scotia coal to enter Lake Ontario by water carriage without breaking bulk.

(b) Adoption by the railways of a comprehensive programme for the annually increasing transport of coal from the western coalfield, as a permanent feature of traffic.

The following tables are self-explanatory, and show the existing and possible production of bituminous coal in Canada, with existing mine openings and colliery equipment, and the very substantial improvement that even full utilization of existing development would bring about.

The total possible production estimated in Table 2 is, curiously enough, what the total production of Canada should have been in 1920, had the curve of rising coal production before the war continued uninterrupted.

Table 1

BITUMINOUS COAL

Present Output Position of Canadian Coal Mines, showing their ability to supply Home Markets, within proved economically transportation distances

Short Tons W = Western Mines E = Eastern "

Province	Consumption	Production	Surplus for extra-provincial use	Deficit necessary to be Imported	Present Source of Supply of the Deficit	
					Canadian Mines	United States Mines
Nova Scotia & P.E. Island	4,300,000	5,800,000	1,500,000		-	-
New Brunswick	1,000,000	200,000	-	800,000	(E) 800,000	-
Quebec	4,000,000	-	-	4,000,000	-	4,000,000
Ontario	11,000,000	-	-	11,000,000	-	11,000,000
Manitoba	3,000,000	-	-	3,000,000		
Saskatchewan	1,500,000	400,000	-	1,100,000	2,200,000 (W)	1,900,000
Alberta	3,300,000	5,500,000	2,200,000	-		
B. Columbia	1,800,000	2,500,000	700,000	-		
Totals	29,900,000	14,400,000	4,500,000	19,900,000	3,000,000	16,900,000

Leaving for Export from Canada in 1920

Nova Scotia	700,000
British Columbia	700,000
Tons	1,400,000

Table 2 — **BITUMINOUS COAL**

Possible Ability of Canadian Coal Mines at Maximum Capacity of existing Openings to Supply Home Markets within proved Economically Possible Transportation Distances. Short Tons. W = Western Mines, E = Eastern "

Province	Consumption	Maximum Possible Production existing mines	Surplus for extra-provincial use	Deficit necessary to be Imported	Source of Supply: Canadian Mines	Source of Supply: United States Mines
Nova Scotia (incl. P.E.Is.)	4,300,000	8,000,000	3,700,000	–	–	–
New Brunswick	1,000,000	250,000	–	750,000	750,000(E)	–
Quebec	4,000,000	–	–	4,000,000	2,900,000(E)	1,100,000
Ontario	11,000,000	–	–	11,000,000	–	11,000,000
Manitoba	3,000,000	–	–	3,000,000		
Saskatchewan	1,500,000	450,000	–	1,050,000	4,050,000 (W)	–
Alberta	3,300,000	9,000,000	5,700,000	–		
B. Columbia	1,800,000	3,000,000	1,200,000	–	–	–
Totals	29,900,000	20,700,000	10,700,000	19,800,000	7,700,000	12,100,000

Leaving for Export from Canada:

Alberta	1,650,000
British Columbia	1,200,000
Tons	2,850,000

The objective of the Canadian coal miner is of course to limit the importation of United States coal to the smallest area possible. The extent of this area depends on the radius of distribution of Nova Scotia coal in the East, and on the radius of western coal east of Calgary and Edmonton.

The difference between the East and the West is that the coal resources of Nova Scotia are not large, while those of the western coalfield are as large as it is desired to make them.

In the case of Nova Scotia, there is distinctly a limit to the quantity of coal that can be mined annually, and this quantity cannot probably much exceed 10 million tons.

The limits to production from the western fields are set by availability of labor and money, by distance and markets, but not by the available quantity of coal.

Table 3 — *Change possible in Canadian Coal Trade Balance by full utilization of existing Collieries*

	Present	Possible
Canadian Consumption	29,900,000	29,900,000
Canadian Production	14,400,000	20,700,000
	15,500,000	9,200,000
Necessary to Import	16,900,000	12,100,000
Available for Export	1,400,000	2,900,000
Net Deficit	15,500,000	9,200,000

Showing possible lowering of coal debit balance by 6,300,000 tons, or, say, a value of $30,000,000 per annum on the basis of 1920.

Our Coal Salvation comes from the West.

Canada's salvation in coal supply must therefore come from the West, and the vision of western coal miners, when considering the future, should be as wide as the possible markets, and detached from present-day conditions, for these are very ephemeral, and very different from the conditions that are to come.

It is evident that at this time the domestic requirements of the four provinces west of Fort William do not require any enlargement of existing collieries, these being already more than sufficient to supply the home demand to the entire supplanting of United States coal by the native product.

An Export Market for Western Coal.

An export market is therefore desirable, and the statistics of the Ottawa Mine Branch disclose substantial beginnings of coal export, both in Alberta and in British Columbia.

	1917	1918	1919
Alberta.			
Exported to the U.S.	90,239	137,765	121,264
British Columbia.			
Exported to U. S. ..	845,128	842,986	852,704
Other countries	42,796	65,427	
	978,163	1,041,178	973,968

The exports of 1920 will in all probability be larger than in any previous year. British Columbia, in particular, has found entirely new markets.

There is very little good coal on the Pacific Slope of this continent, except in Vancouver Island and British Columbia, and the whole Pacific Slope should provide a market for British Columbia coal, not excluding South America.

An inspection of the map will show that the better-

grade bituminous coals which are found at high elevations in the Rocky Mountains are relatively near to the Pacific Slope, being only one-third the distance from, say the Crow's Nest Pass, to Winnipeg.

Coal is an article that in the future, because of its relative scarcity, will stand much longer rail-hauls to a shipping port than has hitherto been considered reasonably economically possible, and Alberta coal is not much further from tidewater than is West Virginia coal from Atlantic ports. The position of the port of Vancouver has been much improved by the regular use of the Panama Canal route, and the projected port improvements are fully justified at Vancouver, being indeed undertaken rather too far behind those of Seattle.

The coal deposits of the West are so large, and the world need for coal so pressing, that it may well turn out that an export trade in coal will precede the development of the western coalfield for the purpose of providing fuel for local manufacturing industries, and, because it has hitherto been unusual, the possibility of rail-hauling western coal for export shipment at Vancouver, and at Prince Rupert, is not thereby lessened.

The markets held by the British collieries hitherto, such as South America, the Levant and Scandinavia, are being rapidly lost to them by the unreasonableness of the miners' demands and the diminishing productivity of the remaining coal seams. United States coal is rapidly supplanting British coal in markets previously exclusively supplied from Britain.

It might be suggested that the position of the Alberta collieries with reference to Vancouver, and those of Northern British Columbia with reference to Prince Rupert, is not dissimilar to the relation of West Virginia collieries to Atlantic ports—as previously mentioned—and the opportunity to enter British markets is open to any coalfield in North America that can get its coal to tidewater within commercial limits of cost of rail-haul.

The Western Coalfield An Assurance of National Independence.

No country, however, achieves lasting prosperity or national permanence from mere export of raw material, and while the search for an export market is suggested as an immediate requirement for the healthy development of the western coalfield, the real role of

I like to be friendly, Jack, but for the love of Mike, get some man-sized tools!
TRANSPORTATION
TRANSPORTATION
BRITISH COL COAL FIELDS 76 billion
PRAIRIE COAL FIELDS 1,132 billion Tons
CANADA
U.S.
UNCLE SAM'S COAL BIN
LAKE ONTARIO
LAKE ERIE
NOVA SCOTIA COAL FIELD 9¾ billion Tons
L.G. McKerracher

"THE INTERESTING FUNCTION OF ALLOTTMENT OF FUEL SUPPLIES"

"Canada being the most distant market, the most indirect to reach, the last applicant at the final source "of coal fuel, will in all probability witness in future years many a recurrence of the situation of 1917- "1918. When the united demand is moderate and production going well, Canada will be supplied, but when "the demand is heavy and production low, Canada will again be a participant at the interesting func- "tion of allotment of fuel supplies; a fact which must inevitably be a detriment to her economic and "social development." (From an article contributed to the "Journal", April 2nd 1920, by a writer in the United States)

this field will be played when, in the inevitable course of events, it has become the site of industries, metallurgical, chemical, ceramic and textile, based upon bituminous coal.

Then, and only then, will the West rise to its full dignity as a pillar of Canadian nationhood and the most stable guarantee of our political permanence as an independent people. But for the coalfield of the West, Canada would sooner or later be compelled to subscribe to that political ascendancy and tutelage which is the certain outcome of economic subserviency, and inseparable from dependence on another nation for so essential a commodity as coal.

The coalfield of the East has assisted and will continue to assist in relieving our national fuel inadequacy, but its extent is too small to build a nation on.

The coalfield of the West is fortunately not small, but worthy to be called large, even in comparison with the generous fuel resources possessed by the United States.

In advocating maximum independence of the United States in the coal supply of Canada, it is perhaps necessary in order to avoid misapprehension, to emphasise that this advocacy is based upon no unfriendly or envious feeling. As between individuals, so between nations, dependence involves Canada in other peoples' affairs, places us in the position of the poor relation who is blamed for the sins of the family, but dare not express his mind because his allowance may be cut off.

A restoration of our international coal balance-sheet to the fifty-fifty basis of previous years would go a long way to restore Canadian self-respect, to bring our dollar nearer parity, and to remove the inhibition on our freedom to talk and act nationally without the repressive dread of a coal shortage.

This is where the West will serve this nation most effectually, for it possesses in greatest abundance that article without which no modern nation can survive except on sufferance.

Anthracite Supply not Considered Vital.

No consideration is given in the foregoing remarks to anthracite supply. Where bituminous coal is available in Canada, from Canadian mines, anthracite can be dispensed with, at the sacrifice of convenience, and its use under these circumstances, however desirable, is nevertheless a luxury.

The Fuel Role of the West a Predominating One.

There is another consideration. The entire mineral production of Canada in 1919 was valued at 173 million dollars. The value of our imports of coal, iron and steel, and petroleum, totalled 273 million dollars.

The West, containing as it does 99.3 per cent of Canadian coal resources, and apparently containing some oil also, must assist in our national fuel problem correspondingly to its fuel resources, or default in its share of national development. This is the part that the West must take.

NEW MAP OF HERB LAKE DISTRICT, MANITOBA

A new map is issued by the Geological Survey, Publication No. 1801, on a scale of 2 miles to one inch, compiled by Dr. F. J. Alcock, to accompany a memoir prepared by him on the Herb Lake (Wekusko Lake) and Reed Lake Region. The map is a geological one, and shows the relation of the district to the north of Mile 82 on the Hudson Bay Railway.

Visit of the Members of Manitoba Legislature to the Flin Flon Mine

(see Dr. R. C. Wallace's description in the "Journal" of Nov. 5th 1920.

The First Camp—Goose River

A Group taken at the Flin Flon. Thos. Creighton, discoverer of the property seated in centre.

Some members of the Party at the No. 1 Shaft.

NATURAL GAS ASSOCIATION OF CANADA HOLDS SECOND ANNUAL CONVENTION.

The second annual convention of the Natural Gas and Petroleum Association of Canada was held at Chatham, Ontario, on October 15, with a registered attendance at the afternoon session of 76 members and 36 guests. The convention was the most successful in the history of the association. Throughout the proceedings the chair was occupied by President C. E. Steele, of Port Colborne, Ontario.

Reports were presented covering the work of the past year. For the board of directors Secretary-Treasurer S. A. Morse reported a uniform decline in gas production but a growing inclination on the part of the public to pay more adequate prices. The membership of the association showed a substantial increase, the lists showing 107 active, 5 associate and 28 company members, a total of 140, being an increase of 22 active, 3 associate and 10 company members since the last meeting. The association had a cash balance of $1,043.81.

Reports were presented, for the Laws and Legislation committee by Major E. F. Sweet, of Brantford; for the publicity committee by H. R. Davis, of Buffalo, N.Y., and for the committee on constitution and by-laws by Gordon Wickett of Windsor.

The following officers were chosen for 1920-21:

President, C. E. Steele, Port Colborne, (re-elected).

First Vice-President, A. M. McQueen, Imperial Oil, Ltd., Toronto, (re-elected).

Second Vice-President, T. P. Pinckard, Windsor, (re-elected).

Secretary-Treasurer, S. A. Morse, Chatham, (re-elected).

Directors: H. R. Davis, Buffalo, N.Y., (unexpired term); J. B. Williams, Sarnia, (unexpired term); P. S. Coate, Chatham, (re-elected); P. A. Little, Buffalo, N.Y.; R. L. Pattinson, Chatham; H. B. Pearson, Calgary, Alta.

F. W. James, manager of the Union Natural Gas Company of Chatham gave a comprehensive paper on "The Natural Gas Industry," dealing with the various essentials in the successful operation of a natural gas field from the first leasing to the delivery of the gas to the customer.

A feature elucidated in the discussion was the development by the Union Natural Gas Company of a double-engine antomotive plant for deep drilling, using natural gas as fuel.

Samuel S. Wyer, of Columbia, Ohio, gave "A Talk on Natural Gas" pointing out that the age of large-volume, low-priced gas sales was past, and that the future of the industry depended on efficient and economical use of the product. The one way to secure this was by advancing the price to a figure that would make saving worth while; which would in turn facilitate the development of low volume, low pressure wells and make profitable the extraction of gas from old wells that could not be profitably operated under present conditions. He urged education of the consumer in the efficient use of natural gas. Following the talk, an extended discussion took place, Mr. Wyer answering questions by many members.

Harry J. Hoover, president of the Natural Gas Association of America, spoke on "Percentage of Consumers Not Bearing their Just Proportion of Costs" citing figures to show that in a composite compilation of returns for 447,441 customers, 227,262 or 68 per cent were served at a loss. If the 19,823 largest consumers were cut off, the companies represented would break even but operate without a profit. Of his own company's consumers this summer, numbering 123,423 in all, 114,692 or 92 per cent represented a financial loss for each of the summer months of $52,874.89. Such figures should be presented to regulatory and price-fixing boards, and to the public. He urged publicity as a step toward a better understanding with consumers.

At 6 p.m. a banquet was held, a musical program being also given, followed by an evening business session, at which Mr. D. A. Coste read a paper by his brother, Dr. Eugene Coste, on "Petroleum and Coals, Compared in their Nature, Mode of Occurrence and Origin." Informal talks were given by E. S. Estlin, natural gas commissioner for Ontario, Dr. M. Y. Williams, of the Geological Survey of Canada, and others. The next annual convention will be held at Niagara Falls, Ontario, in October, 1921.

THE NOVA SCOTIA COLLIERIES.

Labor & Wages.

Matters have made little progress since the notes in the issue of the 22nd October. The conference between the miners' officials and representatives of the larger operators arranged by the Department of Labor was postponed owing to the inability of international union officials to attend from Indianapolis, but during the week ending November 6th conferences of a protracted character were in progress in Montreal for four days. Two of the union officials from Nova Scotia accompanied by Mr. John P. White from U. M. W. of A., headquarters represented the union members. Representatives of the Dominion Coal Company and the Nova Scotia Steel & Coal Co., and officers of the Department of Labor took part in the meetings, regarding which no information has been given out.

It is understood that the proposals made will be submitted by the union officials to the Wage Scale Committee, after which the attitude of the union will doubtless be declared.

It is generally recognised that economic conditions have undergone a complete change since the date of the deliberations of the Royal Commission, and that, in view of the decline in steel prices and the slowing-down of demand, any attempt by the coal companies to pay the full increase recommended by the Commission will result in curtailment of work at the steel plants, as the increased cost of fuel would rule the Nova Scotian plants out of the market. At the same time there has occurred a substantial lowering of commodity prices, and the downward tendency is undisputed. A forecast of a settlement is not possible at the time of writing, but it has become evident that the demands of the miners exceed the ability of the coal companies to pay, and the necessities of the case will make a compromise a likely ending.

Production.

The Dominion Coal Company's production, notwithstanding a number of accidents and other interruptions in October, shows a rising tendency, and reflects the employment of a larger proportion of face workers which it has recently been found possible to obtain.

Production of the Glace Bay collieries in October was 272,283 tons, comparing with 279,964 in October

1919, and 275,890 in October 1918.

A comparison of the production of the individual collieries during the past three months follows:

	August.	September.	October.
1	28,693	29,613	24,277
2	44,564.	42,313	45,357
4	25,537	27,786	24,717
5	7,939	8,383	9,243
6	19,980	21,793	24,233
9	19,541	21,008	22,009
10	10,317	9,704	11,992
11	14,634	14,433	14,834
12	14,520	8,162	12,842
14	15,939	18,169	19,693
15	9,066	9,030	7,949
16	13,078	14,578	13,614
17	2,540	2,738	2,392
21	13,442	15,049	16,485
22	16,898	17,439	17,294
24	3,979	4,444	5,652
	260,667	264,712	272,283

Noticeable in these figures of production is the increasing production of the Emery collieries, Nos. 10, 11 and 24, now contributing twelve per cent of the output, and the large outputs coming from the Birch Grove collieries, Nos. 21 and 22. The contribution of the Phalen Seam at forty per cent is probably the lowest in the history of the Company, and from now on will be a steadily diminishing quantity, except as it is maintained by the contribution of the Lingan Seam collieries, Nos. 15 and 16 on the Waterford side, which is the continuation of the Phalen Seam from the Glace Bay area.

Indications are that the production of the Glace Bay collieries for 1920—if no serious interruption of work occurs between now and the year-end, will reach 3,220,000 tons, which will compare with 3,087,638 tons in 1919 and 3,271,755 tons in 1918.

The mines of the Nova Scotia Steel & Coal produced 50,800 tons in October. The output would have been larger but for an accident by which two of the best respected miners in the district lost their lives. The production for the year will probably reach 620,000 tons, which will be the best annual production for Scotia since 1914. This Company has not suffered anything like such a decline in production as the Dominion Coal Company. Comparing 1920 with 1913 the Dominion output shows a decline of approximately 32 per cent. Scotia output shows a decline of 24 per cent.

The Indian Cove Coal Co. at Sydney Mines has increased its output from 5,000 tons annually to 50,000 tons approximately in 1920. The Tom Pit is now producing 240 tons of coal daily, and has recently been equipped with an air-compressor and coal-cutter.

The discovery of a seam of coal at Inverness Colliery overlying the seam which has been extensively worked there is reported. Many attempts have been made to locate this upper seam but unsuccessfully, it being known locally as the "Thirteen Foot Seam". The seam is now being worked.

CANADIAN OIL SHALE INDUSTRY LOOMING.

ALEXANDER GRAY.

After a quarter of a century religiously devoted to the demonstration of their extent and varied contents, the Oil Shales of New Brunswick are about to be practically and profitably employed.

It is understood a plant is being designed. The Anglo-Persian Oil Company, through the D'Arcy Exploration Company, are said to contemplate a forward movement; so Canada in due course may rival the Scotch oil-shale industry.

Something like $600,000, it is stated, was expended in the preliminary investigation and demonstration of these shales, much of it by Canadians who were "prophets without honor in their own country." The further capital needed for the undertaking had to come from oversea. Oil operators accustomed to puncture strata and busy themselves drawing cheques against pipe line receipts, could not see where New Brunswick shales had a chance. Money there was and is for "gusher" country—before production is far advanced—but New Brunswick shales and their owners went a'begging. They were altogether commercial-lacked glamor—manufacturing oils, wax, ammonia, and other characteristic contents of such shales, was too methodical.

So situated they can be steam-shoveled, known to consist of hundreds of millions of tons, offering gasoline, illuminating fuel and lubricating oils, paraffin wax, sulphate of ammonia and coke, these New Brunswick shales had to await responsive outside capital. That an initial plant is likely to be installed in the no distant future presages the development of another very important resource. Mr. Mathew Lodge, of Moncton ,and Sir William Mackenzie, therefore, who continued steadfast in their conviction that their shales ultimately would be the basis of an industry, are to be congratulated. Year-in-and-year-out, Mr. Lodge "ploughed the lonely furrow." When construction work is advanced and as results are obtained, interest in the shales will increase.

The contention of the larger oil interests all along has been that oil shales have not arrived. Labor, they claimed, and the cost of mining, retorting and distilling processes, precluded profits. It was easier to tap strata, let the oil flow into tanks or pipe lines and bank the proceeds, notwithstanding the example set by Scotland with its shales. Only at long-drawn-out intervals have the shales of Colorado, Utah, Wyoming, and elsewhere, been mentioned as auxiliary sources of certain supplies of oils. Just as soon as shales were suggested, the oil experts laid away the ghost by decreeing that shales were out of the question. Something "labor-cheap," as Director Smith of the United States Geological Survey expressed it—that would pump coin into the coffers of companies or individuals, was preferable. Mark Requa, an outstanding authority, even now asserts that oil shales are a "dernier resort." Professor Alderson, of Colorado, is more affirmative. Generally, the expert judgment is that oil shales are a rear or second line of economic defence. Consequently it devolves upon Canada to take the lead in making its shales an active force in the attack upon its poorly-protected oil position. So irksome has the oil situation become, great oil corporations and adventurous smaller companies, are exploring in Canada's Northwest—with more of disappointment, as yet, than of success. The Fort Norman Well brought in by the Imperial Oil field party, is auspicious, but it is 1,200 miles from the near-

est railway, in a latitude where there is a short season for what water transportation is available. It cannot be immediately helpful, however, "scientifically of much value" as president Stillman, of Imperial Oil Company puts it.

Apart from Ontario's production, Canada cannot upon a further domestic supply of oil until more is known of the Northwest development and the New Brunswick shales are being dealt with in quantity. The Fort Norman country may form a base of supply. Pipe lines costing fifty million dollars are not to be lightly undertaken. If the Anglo-Persian Oil Company, therefore, meet with success, and go ahead, as it is alleged they will, the twenty-five year effort of Messrs. Lodge and Mackenzie should be amply rewarded.

Fortunately, repeated drillings over large sections, and bulk tests, have satisfied international authorities as to the exceptional richness of the New Brunswick shales. There is no disputing this point, that Messrs. Lodge and Mackenzie established their excellence. They sought and obtained the judgment of Prof. N. S. Shaler, of Harvard University; they interested Dr. R. W. Ells, who made tests of these shales in Scotland; they consulted Dr. Charles Baskerville, of the College of the City of New York, and they induced the Imperial Government to send Dr. Boverton Redwood and assistants, who retorted and distilled some of the shales. Dr. Marshall Hall, Sperry Hunt, and a number of noted scientists in turn passed upon the shales. Dr. Hall roughly estimated the tonnage indicated over a large outcropping area, although a small portion of the one hundred and ninety-two square miles held by Messrs. Lodge and Mackenzie interests, at 150,000,000 tons. In recent years the holders of these areas have seen them drilled to a depth of 1,500 feet, indicating much more than Dr. Hall at the time cared to project. Taking the shales he had in hand as a basis, Dr. C. S. Lomax, of New York, gave estimates on a plant with a daily capacity of 1,500 long tons, equal to 547,500 tons per annum; and he presented a possible production of 32.7 imperial gallons per ton of shale, or 18,000,000 imperial gallons per annum of crude oil which, when refined, would provide 2,137,500 imperial gallons of gasoline, 7,961,500 imperial gallons of illuminating oil; 2,666,000 imperial gallons of lubricating oil; 6,120,000 lbs. of paraffin wax; 13,687 tons of sulphate of ammonia, and 1,530 tons of coke. The 32.7 gallons of crude oil and 65 lbs. of sulphate of ammonia were believed to be conservative.

Mined as these deposits can be mined, and treated by proven processes ,it is likely that New Brunswick is on the eve of more than was foreseen by those who have scoffed at Messrs. Lodge and Mackenzie. English capital is undemonstrative, and its technical representatives are reticent, but the shale industry is gathering momentum.

A good grade of coal is being mined at the junction of the Healy and Nenana Rivers, Alaska. The mine, which is operated by the Healey River Coal Corporation, is close to the Alaskan Railway near Fairbanks and a tramway is used to deliver the coal at the railway tracks. Some large seams in the Healey River section are to be explored.

THE INDIAN HEAD IRON ORE DEPOSIT.—PORT AU PORT, NEWFOUNDLAND.

By a Correspondent.

Newspapers have recently published more or less sensational and absurd reports of the discovery of an iron ore deposit at Port au Port, Newfoundland. These reports are absurd insofar as the price at which the claim is said to have changed hands, is fabulous, while the truth is that the ownership has not really changed hands at all; and sensational insofar as the stressed immensity of the deposit has not yet been proven.

The existence of iron in this locality has been known ever since a road was built through there about 25 years ago, or at least the Dominion Iron & Steel Company were first made aware of it at that time. Nobody seems to have become interested in its possibilities until 1913 when an American lady tourist summering at a resort nearby, brought a drill crew there. But rumor says that these men never used the drill as they apparently failed to locate the ore and anyway their efforts came to nothing.

Within the past few months the Dominion Steel Corporation have been investigating the property. They have had some prospectors at work during the past summer and latterly have had a mining camp built and a regular gang employed. During the summer too, some well known geologists have visited Indian Head in the corporation's interests, and have made very satisfactory reports. Indications encourage the belief that a very large body of workable ore is there, and there are millions of tons in sight along the outcrop alone. The outcrop runs across the main road from Stephenville Crossing to Port au Port, extending half a mile north and three quarters of a mile south of this road.

The rocks of the vicinity are of pre-Cambrian age and are generally metamorphosed, as are most of the rocks in the island, although in this case there is some evidence of sedimentary deposition. These rocks are said to be, in many respects, like the pre-Cambrian rocks of the Adirondacks, N.Y. In the northern prolongation of Indian Head, they consist of: granites, syenites, diorites, pyroxenites, anorthites, basalt, pegmatites and metalliferous bodies. The more acid members of the series, the granites and pegmatites, frequently exhibit their intrusive nature; while the more basic one shew no evidence of that and occupy banded areas. The typical textures, structures, and mineral composition of all the rocks are those of the normal kind although many of them are changed by metamorphism. Certain parallel structures along which the mineral is aligned could be accounted for on the supposition that after cooling, tremendous vertical and lateral pressure re-melted the rock to a viscous state during which there was a re-arrangement of the minerals. Many of the rocks for this reason are gneiss. Parallel with the sheeting and flow-gneiss are granites and syenites, and with these are associated bands and lenses of magnetite and hematite which may be granular or massive in structure. The heavier particles of metallic iron disseminated through the adjacent rocks would tend to separate out while the matrix was still molten and the bands and lenses may have been formed by magmatic segregation. Both magnetite and hematite is found and the deposit is not unlike the great iron-ore deposits of Norway and Sweden.

Indian Head, the Laurentian mass in which this potentially immense metallic body is found, is shaped like a wedge running nearly North and South, thirty

miles in length and four miles in width, lying between two large areas of Carboniferous rock, with its southern extremity jutting out into the waters of St. Georges Bay.

The rocks shew evidence of movement after the close of the pre-Cambrian period, probably at the end of the Ordovician and again at the end of the Carboniferous. Since the mass was first formed and elevated, erosion has been going on, and the glaciers of Pleistocene times have helped to reduce what was once probably a conspicuous mountain peak, to more or less of a low tableland.

The out-crop opened up by the summer's work, shews for 2 miles an uninterrupted belt of magnetite and hematite varying in thickness from 3 to 9 feet. Occasional faults occur with a slight displacement of the ore-body to a higher or a lower level. This belt dips about N. 10 E., at an angle of about 33 degrees. How far the iron body extends beneath the overlying mountain is what the Dominion Steel Corporation is now endeavouring to ascertain, but it promises to compare with any great iron-ore body of like nature found in the world today. The quality of this ore is all that could be desired, giving a very high percentage of iron and being remarkably free from impurities. Its composition it said to be very like that of Swedish iron-ores.

The accessibility of this deposit adds much to its value. It is 5 miles from the main line of the Reid Newfoundland Company's railroad, and 12 miles in a direct line from Port au Port. A short railroad to this spacious harbour would present no difficulties in the building and would provide splendid shipping facilities, abundant cheap wharfage area with deep water close inshore, and the railroad would be down-grade for loaded trains, when there was a grade, as the mine is four or five hundred feet above sea-level.

TORONTO NOTES.

Mr. J. B. Tyrrell, Mining Engineer, who has just returned to Toronto from six weeks spent in the Western part of Newfoundland, where he examined various mining properties for interests he represents, states that the geological conditions are similar in Newfoundland to those of Northern Ontario. Along the shores there are numerous outcrops that have been worked in part, and although they have gold and copper, very few of them are being worked at the present time and in most cases if they have been worked in the past, little can be learned as to what has been done on them, as the maps and reports have been disregarded, and the whole investigation has to be started over again. If any one owns a mining property he wants to sell it, but he wants the buyer to take all the trouble and expense of finding out what it is worth, and there is practically no information available.

The Nova Scotia Steel Company is investigating the iron-ore deposit on the west coast, which contains some very excellent showings, but whether the deposits are large enough to be profitable has not yet been determined. Coal is now being developed along the line of the Reid-Newfoundland railway and it is not at all improbable, says Mr. Tyrrell, that the railways will be able to obtain a local supply of coal at half the cost that it is now obtained for from the Sydney mines or such other sources from which the supply is being obtained. The cod-fishing in Newfoundland has not been good this year, and many men are looking for employment, so that labor for mining work or in the bush is fairly plentiful.

The withdrawal by the Ontario Government of mining claims in Northern Ontario from restaking has caused a stir among mining in Toronto and in the industry generally. One local promotor points to the fact that several years ago he sold certain parcels of mining lands in Northern Ontario to an English Financier for $10,000 who naturally would not see the official notice in the Ontario Gazette advising the owners of the Government's intention to forfeit the unworked properties. In the opinion of a good many of the mining fraternity the situation is bound to prove a black eye for the industry as far as British investors in Canadian mining enterprises is concerned.

During the past few days Tom Magladery, member for Temiskaming has brought to Toronto the protests of the prospectors in his district against the Government's discrimination in favor of the wealthy mining companies. He reports that there is a furore in the north country on the part of the small claim owners who have worked several years on the properties, only to lose them now for the non-payment of a few dollars in taxes, while the wealthy companies are protected. Some of the protests are voiced by James Hyland, the well-known Cobalt engineer, who says:

"It is the rawest deal ever attempted and carried out in any civilized community. What would be the opinion of the farmers of this country if a similar law was enacted, and if the farmer one day found that his whole farm was confiscated because he had failed to pay a tax of possibly $4 to $10 of which he was unaware."

It is stated that the Teck-Hughes claims were restaked, despite the Government's order, by one prospector who hired all the automobiles and available conveyances in the north country so that nobody could beat him to the recording office. He now demands payment of his expenses from the Government.

The mining claims affected by the Government's order were advertised to be forfeited on October 15th unless the assessment were paid by that date. They were to be thrown open for re-staking on October 28th. It was on the latter date that the Cabinet passed the order-in-Council which saved eleven of them, including the Teck-Hughes and Kirkland Lake-Hudson Bay claims, from being restaked. But they had been forfeited on the previous date. The mining Act does not cover such a situation as that now extant, except to place certain arbitary powers in the Minister. Hon. Harry Mills, Minister of Mines is consulting the mining commissioner now as to the process of restoring the property to original owners.

TORONTO COAL PRICES.

Toronto, November 11.—Coal trade conditions show little change but the closing of navigation is expected to produce a slight easing off in the hard coal situation. Bituminous coal, mine run, is quoted at $10.50 to $11.50, f.o.b. Toronto, with slack slightly easier. Smokeless is quoted at $10.50 to $11.50. Buyers continue to hold off and it appears as if the only factor that would stimulate the market would be cold weather. Hard coal is still quoted at from $8 to $16.00 at the mines.

The Kirkland Lake Proprietary, 1919, Ltd.

Ambitious Scheme to Merge Several Mines in the Kirkland Lake Field.

(By J. A. McRAE, Cobalt).

The photograph shown in this article as being the Tough-Oakes Mine, of Kirkland Lake, really constitutes a general view of the leading properties which are either already merged or being negotiated for by the Kirkland Lake Proprietary, 1919, Ltd.

The view is taken from the Wright-Hargreaves mine, looking east. On the immediate foreground, the little group of buildings are those of the Sylvanite property which lies directly between the Wright-Hargreaves and the Tough-Oakes. In the upper left corner is the 120-ton mill on the Tough-Oakes Mine itself. The upper central buildings are also on the Tough-Oakes, while the shaft house as shown to the right is located on the Burnside mine.

Objects of Incorporation.

The Kirkland Lake Proprietary, 1919, was incorporated last year for the purpose of acquiring the assets and undertakings of the English Tough-Oakes, Ontario Tough-Oakes, Burnside Gold Mines, Sylvanite Gold Mines, Aladdin-Cobalt and Sudbury Syndicate. With the exception of the Aladdin-Cobalt which owns the Chambers-Ferland silver mine at Cobalt, the various companies all have their property situated in the Kirkland Lake field, the greater part being shown in this photograph.

THE TOUGH-OAKES MINE WITH ADJACENT PROPERTIES.

This large acreage not only lies along the strike of the main auriferous zone which has won for Kirkland Lake an important place in the gold mining industry of Canada, but on all three of the properties here shown a good deal of commercial ore has already been opened up. Indeed, it was on the Tough-Oakes that the first successful mining operations were undertaken in the Kirkland Lake district, this property developing to a point where gold was being produced at the rate of over $600,000 annually. It was only due to more or less bitter and sustained litigation that the mine became inactive while the contending factions battled for control.

Success is Indicated.

Official advice tends to show that the big merger is gradually working out to a successful conclusion, the possible exception apparently being the Sylvanite. As to the question of this property being brought into line, more or less controversy is heard. An interview with one faction encourages the belief that this property will eventually be included. Discussion of the matter with other parties discourages this thought. For these reasons, the question of the Sylvanite becoming a part of the new Proprietary is left for the future to determine.

In relation to the future plans of the Kirkland Lake Proprietary, 1919, very little if any, really definite information is available in Canada. In fact, practically nothing seems to be known on this side of the Atlantic with regard to what time a re-opening of the enterprise may be looked for and the extent of the work to be expected. Men closely and vitally identified with the enterprise and who reside in Northern Ontario share this dearth of authentic advice in common with the public in general.

A Commendable Scheme.

Regardless of this, however, careful observers are free to admit that this scheme of consolidation is one of the most ambitious ever undertake in the Kirkland Lake field, and may be second in importance to the consolidation some years ago of the Hollinger properties, as well as the holdings which now constitute the McIntyre-Porcupine. It is pointed out especially for the readers of this journal, that provided the consolidation plan can be worked out in such a manner as to create harmony between the various interests involved, the great mass of work and vast amount of worry and details to contend with will have been well worth while.

For instance, with such an acreage available on which to develop ore and to carry on extensive exploration work, and with a first class mining and milling plant already on the property the future possibilities of establishing a mining enterprise of leading importance is considered exceptionally good. Also, the operation of these properties under one management, with the elimination of the costly practise of maintaining managerial staffs for each of the several properties alone offers promise of the cost of operation being greatly reduced, as compared with what has been the case where each property was worked individually.

It is obvious, of course, that a great deal of work lies ahead. The present scattered nature of the work, as well as scattered buildings has suggested to the new control that effort must be directed toward centralizing buildings as well as operations. To centralize the buildings will be to minimize the heating cost during winter, while to centralize the mining operations will tend to reduce costs of work.

Some Future Indications.

The progress already made in the merging scheme would indicate the likelihood of everything being in shape for general resumption of work in the early spring least, with the possible exception of the Sylvanite. Factors in support of this and which may explain lack of general and definite information during the past

year, include the fact that the ending of the current year is likely to be marked by certain changes in the directorate of some of the companies involved, with a quite general revision toward electing boards with such views as may assure harmony.

Therefore, apart from the comment heard in regard to lack of definite information as to future plans, the ambitious scheme briefly outlined is believed to be commendable and seems to be calculated to serve the best interests of all concerned.

THE INTERNATIONAL NICKEL CO.

One furnace at Sudbury is to be closed down, following a decision to reduce the monthly production of nickel matte from 4,000 tons to 3,000 tons. About 300 employees will be rendered unnecessary, but the reduction will not affect the Company's regular staff.

It is announced that the Company will build a mill to manufacture Monel Metal in various shapes. The mill will be situated in Huntington, West Virginia, and will cost $3,000,000. The great variety of uses to which this non-corroding and physically strong natural alloy is now put is shown by the new monthly publication of the International Nickel Company, the "Inco" a copy of which can be obtained on request.

There is a great and growing demand for a metal that will retain its properties of non-corrosiveness and physical strength when placed under conditions of high temperature, exposure to acid fumes and physical stresses, such as are met with in new developments of the extraction and use of oil-fuel, particularly shale-oils, and Monel Metal, together with other varieties of the nickel-cobalt-chromium alloy group, is daily extending its uses.

Recent rapid lessening of the automobile demand has caused a slackness in nickel demand, which, added to the as yet uncompleted process of diverting nickel from the uses of war to those of peace, accounts for the lessened activity at Sudbury.

If the directors of the International Nickel Co. could have seen their way to add a rolling mill to the Port Colborne Refinery it would have been a judicious and not necessarily uneconomic decision. Presumably fuel costs have been a deciding consideration, but it is desirable, from the Canadian point of view, that more of the final processes of nickel utilisation should be carried on in Canada.

USES OF PEAT.

Devotees of the automobile and motor boat will be glad to know that successful experiments have been made in Sweden in extracting wood alcohol from peat. The process as reported by the commercial attache at Copenhagen, Denmark, is described in a report on peat in 1919 recently issued by the United States Geological Survey, Department of the Interior. Interesting instances of the uses of peat as a fuel are given in this report. A coastwise steamship company of Norway, for example, during the coal shortage, was enabled by the use of peat fuel to keep up its full sailing schedule.

Peat is used also in making up fertilizers and in preparing concentrated food for stock. Last year 69,197 tons of peat, valued at $705,532, was produced in the United States. This was a decided decrease from the production of 1918, although the peat deposits in this country are extensive.

This report may be obtained upon application to the Director, United States Geological Survey, Washington, D. C.

Our Northern Ontario Letter

THE SILVER MINES.

The Cobalt Field.

Wet weather which set in at the beginning of November is steadily causing the water to rise in the rivers and lakes of this part of Northern Ontario. As a consequence some hope is promised at the time of writing in respect to an improved supply of hydro-electric energy.

The new wage scale at the Cobalt mines went into general effect November 1st, and is believed likely to have a stabilizing influence on the workers. The increase of the flat rate in pay to a point equal to the former rate plus the high price of silver bonus, has eliminated the uneasiness always present at times when quotations for silver showed a tendency to decline.

An outstanding factor in connection with the silver mining industry of this district is a very considerable improvement in the efficiency of the workers. This improvement has become pronounced during the past week or so, and the reason seems to be that the supply of labor has suddenly improved and is now adequate to meet the full demand. There are instances on record where one man is performing nearly as much work, and with apparently no undue effort, as was done not long ago by two men. This may assist operating costs, and to some extent make up for the lower price of silver. Provided the increased efficiency becomes general, it is obvious the effect would be equally as favorable as though silver intself advanced in price.

Cyril W. Knight, Ontario Government Geologist, will suspend his field work in Cobalt this month, and will resume in the spring at the point where he left off. In view of the importance of the work, and on account of it being extended over another year, thus causing delay in the final report, it is hoped to encourage the Department to issue a brief summary this fall, covering in a preliminary way the result of the work to date.

The McKinley-Darragh has closed down its oil flotation plant as is the usual custom during winter months. This equipment will again be employed following the Spring break-up. The reason for Winter curtailment is due to the difficulty attending the pumping of tailings from the bed of Cobalt Lake during cold weather.

Stoping operations on the Camburn Mines, formerly the Lumsden, are being carried on. The richer parts of the vein are being sorted out and bagged preparatory to subsequent shipment. Some of the ore runs about 2,000 ounces of silver to the ton.

Owing to delays caused by shortage of power, the cross-cut work on the Kerr Lake mine has not advanced as quickly as expected, and as a consequence it will perhaps be some little time before development work proves the importance of the high grade veins found at surface some weeks ago. Work is proceeding steadily, though slowly, and the composition of the veins together with the nature of their occurrence leaves little doubt but that they will be found to be important.

Official advice estimates the silver content at 400,000 ounces in the ore now in sight on the Keeley Silver Mines. This reserve has been built up as a result of development work of a considerable less than a year. In view of the property having formerly been considered of only prospective merit, the success achieved seems to offer reason for believing considerable work may be encouraged in all the more promising parts of the

South Lorrain silver area. As stated last week in the "Journal", the new 20-stamp mill has been completed and was then being tried out. Just as soon as the power situation adjusts itself, the entire plant will be utilized to full capacity.

On the Ruby Silver Mine in the south-eastern part of the township of Bucke, the operators are still meeting with encouragement and expect to be able to make comparatively regular shipments of ore. The work is being conducted only on a moderate scale, as yet.

The Lang-Caswell mine in Lorrain was restaked October 28th by J. C. O'Donald of Haileybury. The property was among those listed as forfeited on account of the non-payment of a provincial tax of five cents an acre, a procedure on the part of the Ontario Department of Mines that has aroused quite general resentment in all parts of the country.

Letters to the "Journal's" correspondent from the United States from interests whose property was involved in the general listing of forfeitures openly declare a loss of confidence in Ontario mining laws. It is believed in Northern Ontario that the affair has caused very great injury to the general effort to encourage foreign capital to enter this field.

Gowganda and Elk Lake.

A. G. Burrows, Ontario Government Geologist, has prepared a report on the Gowganda Silver Area, the entire summary being presented in the 29th annual report of the Ontario Department of Mines. The report deals with the leading properties, and estimates production to date at approximately 5,430,152 fine ounces of silver. Output reached its highest point in 1917 with 1,064,635 ounces. The second highest year was in 1919 when 722,564 ounces were produced.

The Burrows report goes into considerable detail when dealing with the leading property the Miller Lake-O'Brien. The details presented, also, seem to refute former reports that the O'Brien interests practised the policy of being uncommunicative in regard to the property and the occurrence of the ore. The opposite appears to now be the case in the light of the report just submitted by Mr. Burrows.

Work on the Cane Silver Mines is proceeding, and silver values are said to persist to the depth so far reached namely about 25 feet.

Elk Lake prospectors endeavored to re-stake the Cane township claims of the Ontario Solid Silver Mines, at noon on October 28th, but found the Department had withdrawn the group from forfeiture before the designated hour.

Ore and Bullion Shipments.

During the week ended November 5th, four Cobalt companies shipped an aggregate of seven cars containing 609,115 pounds of ore. The Nipissing headed the list with four cars, while the feature of the report is the appearance of the Bailey Mines for the first time.

Following is a summary :

Shipper	Cars	Pds.
Nipissing	4	325,786
La Rose	1	109,992
Bailey	1	87,116
McKinley-Darragh	1	86,221
Totals	7	609,115

THE GOLD MINES.

The Porcupine Field.

A brief financial statement issued by the Dome Mines for the five months beginning March 31st and ending August 31st, shows a net profit of $198,000, an amount equal to 49 cents a share, or at the rate of close to 12 p.c. a year on the company's 400,000 issued shares, of $10 par value each. A feature of the statement is the large amount written off for depletion, depreciation and taxes. This amounted to $307,849 and is at the rate of $738,800 a year. Such liberal allowances are pointed to as a policy which tends to minimize the profit, and that with a less liberal writing-off, the percentage of net profit could easily have been shown to be a good deal higher than 12 p.c. Development work at the mine is proceeding satisfactorily, although low water on the Temagami River has conveyed a threat of a shortage of electric energy. The arrival of wet weather may now avoid this difficulty.

Ore reserves on the Porcupine V. N. T. Mines are officially estimated at 130,000 tons, and believed to contain about $1,250,000. This has been placed in sight as a result of development work to a depth of 600 feet. The plan of future operations is to continue the main shaft to a depth of 900 or 1,000 feet, and to so enlarge the scope of work as to make it advisable to enlarge the present 100-ton mill to 150 tons daily, with the ultimate object of doubling the capacity. Work is to resume just as soon as the terms of the recent underwriting agreement are concluded whereby a block of treasury stock, amounting to 200,000 shares at 30 cents per share is taken up. This will provide the company with funds estimated to be adequate to place the enterprise on a self-supporting basis.

Negotiations for the Davidson Consolidated control are still pending. H. H. Sutherland, of the firm of F. C. Sutherland & Company, is now on his way to England in connection with the deal. The plan is to dispose of the entire undertaking to certain English interests who are already heavily interested.

Kirkland Lake Field.

It is officially announced that high grade ore has been found on the Ontario-Kirkland property, at a point west of a fault encountered in the earlier stages of work at the 450-ft level of this property. Assays taken on ore from the first round show a gold content of $73 to the ton. The find is considered to be important, and the result of work at this point during the next few weeks may have considerable bearing on the general merit of not only the Ontario-Kirkland, but all other properties lying in its vicinity and along the southern belt of mineralization.

In this southern belt are the Ontario-Kirkland, Canadian-Kirkland and the Hunton-Kirkland, the latter of which is also developing rich ore in its underground workings.

Just as soon as the temporary shortage of electric power becomes adjusted, a general increase in work is expected at the leading mines of the Kirkland Lake field. The Teck-Hughes is planning to add another shift of workers, and increase its tonnage to over 3,000 tons monthly. The Kirkland Lake Gold Mines is also planning to increase the amount of ore going through its mill, while the Wright-Hargreaves will join the producing mines early in the new year.

Arrangements are being made to prepare for a campaign of exploration work on the Vindicator Gold Mines. This is made up of two promising mining claims lying adjacent to the Wright-Hargreaves and the Lake Shore Mines on the North. The Vindicator is controlled by interests already involved in the leading mining operations of the Kirkland Lake district.

On the Lake Shore, the main shaft has reached a depth of 500 feet. The objective is a depth of 800

feet. Heretofore, work on this property has been confined chiefly to the 200 and 400-ft levels, sufficient ore being developed at these levels to keep the present mill operating for a number of years. The most remarkable feature has been the high grade nature of the ore, and the maintaining of average mill heads of over $25 per ton. Interest is unusually keen in connection with the prospects of duplicating these favorable results at great depth, and the work of extending the shaft to a lower horizon is regarded to be among the most important and interesting developments under way in this field.

At the end of the current calendar year, a change is indicated as likely to occur in the directorates of certain of the companies involved in the merger by which the English Tough-Oakes, Burnside, Sudbury Syndicate, Ontario Tough-Oakes, Aladdin-Cobalt and possibly the Sylvanite will be brought under the control of the Kirkland Lake Proprietary, 1919, Ltd.

A geological report has just been issued by the Ontario Bureau of Mines, dealing with the geology on the Argonaut Gold Mine, at Beaverhouse Lake. The report was prepared by Cyril W. Knight and contains much useful and interesting data. It seems to place the Argonaut in a favorable light. Since the notes were gathered on which the report was based, considerable underground work has been done and a quite large tonnage of ore blocked out. Work centered largely at the 200-ft. level, and has recently been extended by starting the shaft to deeper levels, the 500-ft being the objective.

British Columbia Letter

Victoria B. C.

A Provincial Election will take place on December first. Much interest is taken in questions relating to the mining industry. Under the administration of the past four years, during which time Mr. Sloan has been the Minister of Mines, improvement of the mining law has been given much attention, and among the more important matters dealt with are the division of the Province into Mineral Survey Districts, with a Mining Engineer in charge of each district ; the expenditure of public money on aid to the construction of mining roads and trails, the financial assistance of experimental work in the treatment of the magnetite ores of British Columbia, and the passage of legislation making it possible to control the sale of mining stocks so as to safeguard the investor against fraud.

Other forms of aid that are being pressed upon the provincial government include several requests from the Cranbrook Prospectors Association, who ask for a customs ore-sampling plant in the Kootenays, for powder for prospectors at cost, plus transportation charges, and for still further aid to mining roads and trails. They also suggest an annual or semi-annual conference of representatives of the prospectors and mining men and the Minister of Mines with regard to matters affecting the industry. Some of these requests are reasonable and will doubtless be so regarded by the Government.

For some years the ownership of the most promising molybdenum properties of British Columbia, which are situated in the Alice Arm District. has been the subject of litigation. Because of the legal tangle these deposits, referred to as favorable by George Clothier, resident mining engineer, were permitted to remain undeveloped and unproductive during the war, the period when the mineral was much in demand and the prices high.

The issue now appears to have been settled, at any rate it is closed as far as the Supreme Court of British Columbia is concerned. The action is known as Stewart vs. the Molybednum Mining and Reduction Company Ltd., and Chief Justice Hunter, who finds for the Company, says in his judgment ;

"I think that the plaintiff Hayes had no right of action against the Company . As to the other plaintiff, I am of the opinion that the Conundrum Claim (one of the claims of the group) lapsed on June 13th, 1915 and was not revived by the Exemption Act, 1915. The Conundrum ground was re-located and recorded by Riel and his associates, who conveyed it to the Company, but the Plaintiff rests his action mainly on the Agreement of August 19th, 1915, by which the co-owners of the Conundrum and Hayes, the owner of the Blackwell, agreed to sell these claims for $35,000 to Riel."

Later on the Chief Justice says :

"Moreover it appears to me that the action of Riel in locating and dealing with the new claims was acquiesced in by the plaintiff and this view is strongly corroborated by the giving of the subsequent Agreement to Riel pending the litigation.

"At any rate the Plaintiff stood by while large sums of money were expended on the ground without notifying either the Stilwells or the Company that he had any claim against them or it and the principle applies that if a man is silent when in fairness he ought to speak he must remain silent when in fairness he ought not to speak."

Vancouver B. C. :

The suits predicted with reference to the Engineer Mine, of Atlin B.C., one of the best known lode-gold propositions of the Province, are before the courts. W. L. Goodwin, and eleven other prospectors, have taken out a lis pendens to prevent the sale of the property until their claims can be brought before a Grand Jury, is being suggested that a sale for $3,000,000 to Cobalt interests is in negotiation. Mr. Goodwin and his associates assert in effect that they, and not the estate of the late Captain Alexander, are the lawful owners of the mine. Twenty years ago, it is declared they staked the claims now known as the Engineer Group and Capt. Alexander, it is alleged, staked over them, altering the lines and making the eleven claims which afterwards were known as the Engineer Claims. It is, therefore, set up that their property was fraudulently "jumped" and recorded and that Grown Grants were wrongfully issued to the Alexander party. The second action against the estate of Captain Alexander is bronght by W. Pellard Grant, of Vancouver, who claims a one-fifth interest in the Mine and affirms that documents in his possession will prove that Capt. Alexander was his trustee for the one-fifth interest in the Mine referred to. Mr. Grant states that one of the business matters bringing Capt. Alexander South when he met death through the foundering of the S. S. Sophia was to arrange for the transfer to him of this interest.

The Canadian Advisory Council for Scientific and Industrial Research has made an appropriation to permit an investigation and the carrying out of experiments in the treatment of the silver-lead-zinc ores

of British Columbia. Mr. Horace Freeman, Chemical and metallurgical engineer, and secretary of the British Columbia Branch of the Council, states that the grant is sufficient to cover the first twelve months work. Mr. Freeman will begin his researches immediately and is hopeful of finding an economic method for the handling of the complex sulphide ores of the Province, particularly its eastern districts. Mr. Freeman is responsible for a formula, now in use at Niagara Falls, for the making of cyanide from atmospheric nitrogen and the product is in use in gold and silver extraction in the United States and Canada. The Plant at the Falls was erected under his supervision. He also initiated at Vancouver research work that led to the preparation and use of hydro-cyanic gas for fumigation, now utilized for the fumigation of citrus trees in California.

The Liberator Mining Co., owners of the Emancipation Mine, near Hope B. C., are proceeding with the development of this property with satisfactory results. Edwin T. Hodge, under whose supervision the work is being conducted, is very optimistic. Considerable has been spent in the installation of a Compressor Plant, and an Assay Office. A tunnel is being driven at the rate of about 10 feet a day with the object of cross-cutting five high grade ore shoots which are shown in the old workings situated at a higher level. There is said to be a large tonnage of low grade milling ore already in sight with prospects of enough of the high grade to pay for development until the Company is in a position to undertake the treatment of the first mentioned.

The Northwest Mining Convention is to be held from February 28th to March 5th, 1921, at Spokane Wn. Preparations already are being made by the mining men of the City of Spokane.

Grand Forks B. C. :

Diamond drilling on the Gloucester Group and the G. H. Claim of the Franklin Camp, near Grand Forks, which has been in progress for some months under the direction and the supervision of the Provincial Department of Mines has ceased. The contractors have decided that it will be impossible to continue during the Winter, but P. B. Freeland, government mining engineer, is looking forward to seeing the work taken up again in the Spring. A total of 2,888 feet of drilling was done in the Camp, most of it on the two properties mentioned, although some work was done on the Mountain Lion Claims. No statement has been made as yet as to the results of the work.

Princeton, B. C.

That a vein of platinum, four inches wide and thirty feet long and in a seven foot ledge of serpentine rock, exists at the headwaters of the Tulameen River is the assertion of Robert Stevenson, one of British Columbia's pioneer prospectors, who is one of the few remaining to take part in the gold stampede of the '60's into the Cariboo and who continues hale and hearty at the age of 82 years. This find was made, Mr. Stevenson states, in 1877 and ever since, year after year, he has kept the claim alive. With platinum at 50 cents an ounce he did not pay special attention to the development of the property but in recent years he has been active in the endeavor to reach the mineral which, it appears, has been covered first by a fall of timber and next by a landslide. Now, however, he asserts that the vein is almost in sight and he has taken a gang of men with him to finish the work. He is confident that his goal will be reached this year or early in 1921 and, with a store of platinum at his command, worth approximately $100 an ounce, anticipates that his old age will not be without those comforts with which an active life should be rewarded.

Trout Lake, B. C.

In the development of their property in the Lardeau District near Trout Lake the Mansfield Mining Company has uncovered a large vein of silver-lead ore. It was encountered at a depth of 350 feet, according to M. R. Leahy, the manager, and is low grade, assay returns being about $12 a ton. The Company contemplates the installation of a Concentrator.

Nelson, B. C.

The Millie Mack, a property situated on the Arrow Lakes, is being worked up by H. E. Foster and some 50 tons of high grade ore is ready for shipment. This is one of the oldest shippers of the district and its ore is silver-gold, with the silver returns running high.

Hazelton, B. C.

J. D. Galloway, resident mining engineer for the northeast mineral survey district of the Province, recently inspected the Babine Bonansa property of J. Cronin. He states that Mr. Cronin has opened up a promising vein as a result of the tunnel work in progress for some time. It has been decided to continue drifting on the vein by hand until the arrival of machinery. Owing to the recent rains the roads into the section are in bad conditions and it is difficult to get supplies but the government has men out making repairs.

Stewart, B. C.

The Premier Mining Co. plans to ship a considerable tonnage of ore from the Salmon River District, Portland Canal, this winter over the snow. Other properties, under development in the same localitl, also are preparing to make shipments in the same way. Prospects in the Tide Lake region have caused some excitement because of high returns in silver given by samples sent out for assay. These are narrow veins but the richness of the ore is unusual even for this district. Preparations have been made to work the Hercules Group all Winter. Considerable valuable ore was taken from the Silver Tip Group where a camp was established under the direction of P. W. Racoy during the summer. The Algunican Syndicate in its development of the Spider Group has installed an internal combustion engine for the operation of the air compressor and the tunnel now has been driven 600 feet. Both the United States Government and the Government of British Columbia have done much read work in the district this year and the district has been made more accessible for mining operations as well as for prospecting.

Dawson, Y. T.

With reference to the Maye Silver Camp, some 200 miles from Dawson City, Lt.-Col. Alfred Thompson, M. P. for the district, states that he will ask the Dominion Government to build a road into the discoveries, provide either wireless or ordinary telegraph communication, and instal an assay office. Col. Thompson anticipates that the development of the silver deposits will bring the Yukon into prominence again as a mining centre and will assure Dawson that permanence which the placer industry fails to do.

Juneau, Alaska.

A property which gives promise of developing into an important gold producer has been recorded and now is being opened up on Chicago Island. Work is being continued throughout the Winter by the Falcon Mining Company. A tunnel has been driven for 220 feet and it is said that the showings are so encouraging that the owners are looking forward to commencing shipment in a short time and are confident of the success of the enterprise.

THE COAL MINES.

After the storm of October in the coal mining camps of Alberta and eastern British Columbia the collieries have settled back into normal conditions. Most of the mines are operating as near to capacity as the availability of labor permits. It is reported that in the Crow's Nest Field there has been some dissatisfaction among some of the men because of charges of discrimination in the re-engagement of those who went on strike but these are minor troubles not expected to develop into anything serious. All through Alberta and British Columbia coal is being brought to the surface and shipped probably in as large quantities as ever before in the history of the industry in western Canada. It would appear, therefore, that there is no cause for apprehension on the score of lack of fuel for domestic and industrial use in this section of the northwest during the winter.

The demand for British Columbia coal outside of the Province continues. One of the latest export orders to be accepted is for 7,500 tons to be delivered at Auckland, New Zealand, and it is stated that the Steamer Waihora has been chartered to carry it. The call for Vancouver Island coal for the mercantile traffic of the Pacific also is increasing; in short there is no lack of market for the product of these collieries, rather the difficulty of the operators is to get it out in sufficient quantities.

A short time ago a syndicate of businessmen undertook the re-opening of workings, known as the new East Wellington Slope, on property adjoining the Jingle Pot Mine, recently closed down because of exhaustion. There are several hundred acres of coal bearing land in the particular area in question and good prospects for the development of a first-class mine. The operators, however, met with a setback at the start, one of the coal miners being seriously burned. Open lights were in use. It is understood that the Inspection Branch of the Department of Mines has insisted on the use of Safety Lamps in future. This is being given as the reason for the cessation of operations. According to report, however, the work has been closed down only temporarily.

That the Canadian Collieries (D) Ltd., owners of large areas of coal bearing lands on Vancouver Island, are contemplating opening up new sections is indicated by drilling work that is in progress at Sable River, near Union Bay. A number of holes have been driven and the results are said to have been quite satisfactory in some cases. Similar explorations are being carried on in other districts and word of the Company's plans with regard to the opening of the new mines is being awaited with interest.

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PRECAUTIONS DESIGNED TO SECURE GREATER SAFETY IN BRITISH COLUMBIA COAL MINES.

Early in 1917 there occurred an explosion in No. 3 Mine, Coal Creek, Crow's Nest Pass Coal Company, which caused the death of thirty-four coal miners.

The newly appointed Minister of Mines. Mr. Sloan, immediately got to work and, with the assistance of Mr. George Wilkinson, shortly before appointed Chief Inspector of Mines, formulated a comprehensive and sweeping policy for the improvement of working conditions in the Crow's Nest Pass Coal Fields as well as in other active coal fields of the Province.

Some of the improvements introduced in connection with the mines of the Crow's Nest Pass District, and which reduced to a minimum the danger to the underground worker in this section, may be summarized as follows:

(a) Cleaning out of the main haulage roads and treating them with second burned ashes.

(b) Installation of rock dust barriers at the District Entrances in order to localize the effect of an explosion should one occur.

(c) Installation of a water sprinkling system to permit the constant use of water at the working faces.

(d) The improvement of the condition of the airways and the increasing of ventilation through the underground workings, thus reducing materially the percentage of gas in the return airways.

The Rice Report on "Bumps" at Crow's Nest Pass Collieries.

It was at the time that this work was under consideration and being initiated that the report of Prof. George S. Rice, of the American Bureau of Mines, who had been deputed to make an investigation of conditions in the Crow's Nest Pass Coal Field, with particular reference to the seismic disturbances common to the district known as "bumps," came to hand.

The findings of Prof. Rice are contained in detail in a special report issued by the Bureau of Mines in 1917, which is available to the public on application. He declared, it may be stated, that the Crow's Nest Coal Field proper was the most gaseous in the world, and made a number of recommendations on which the Department of Mines acted and others which were made the subject of research and consideration.

One was that, if less coal was taken out in initial operations, leaving a large proportion for removal when in retreat, there would be less likelihood of "bumps" taking place. Another was that rash and top coal should be taken down as mining proceeded.

Reduction of Gas Content in Mine Air Necessary.

Professor Rice laid stress on the large flow of gas in the Crow's Nest Mines and one of the first actions of George Wilkinson, Chief Inspector of Mines, who had the benefit of the cordial co-operation of the Crow's Nest Pass Coal Co., in this and other work undertaken in the same direction, was to institute experiments as to the bearing of the breaking of coal on the gas flow.

His tests of the mine air, taken over a long period, both while the mine was active and inactive, indicated that there was little relationship between the breaking of coal and the volume of gas given off, the coal of the region being saturated with gas as a sponge may be with water, which it is continually bleeding.

The reduction of the percentage of gas in the underground workings of the Crow's Nest Pass Mines was the chief problem with which the Minister of Mines and officials of the Department of Mines had to grapple. To make conditions safe for the miners it was of first importance that this should be solved and the Chief Inspector, backed by his Minister and assisted by the management of the Company, set to work to accomplish it.

The enlargement of the system of ventilation, both in respect of the volume of fresh air forced into the mines and in the improvement of the facilities for its free distribution underground, was the best method, in the opinion of Mr. Wilkinson, to keep the percentage of gas down to well within the safety zone. This line of action was adopted, special attention being paid, in working out the details, to providing more "splits" than usually are considered necessary and reducing the number of working places in each "split."

As soon as this plan was given effect, underground conditions became much more satisfactory, particularly in regard to the percentage of gas in the return airways of the mines.

Confirmation of these gratifying results is contained in the report for 1918 of Andrew Strachan, Senior Mines Inspector, who says:

"The percentage of methane in the various air-currents is fairly low, as shown by the Burrell Gas Detector, only in four cases rising above 1 per cent namely, South level split, No. 3 mine; No. 1 South; North Split, No. 1 East; and the incline split, B. North, of Coal Creek Mines."

With further reference to the question of the gas content of mine air, a problem, as has been stated, to the solution of which intensive consideration was given because of its bearing on the safety of the lives of the miners, it was decided that a rule should be applied to all the collieries of the Province requiring that the men be withdrawn as soon as the mine air in any working place showed a percentage of 2.5 methane or greater. This regulation was a part of the Act amending the "Coal Mines Regulation Act" which was enacted by the Provincial Legislature early in 1919. It has been the law since then and undoubtedly the additional safeguard it furnishes the miners is understood and appreciated.

Researches in Relative Sgnificance of "Gas-Caps."

For convenience in establishing when this percentage of gas is present it was found, as a result of months of research, involving of many analyses of mine air and their comparison with gas caps on safety lamps, that a 5/16 inch gas cap in the Coal Creek Mine equals the 2.5 percentage fixed as the point at which the men must be withdrawn. In the Coast and Nicola Districts these investigations proved that a ½ inch cap equalled 2.53 per cent of gas in the air. An illustrated report, giving this important information in brief form, was published and circulated among those known to be interested. There are still some copies available which will be gladly forwarded on application to any who may care to know more of this work.

Treating of Coal Dust.

The coal dust menace was another phase of coal mining in the Crow's Nest that had to be taken into account. Next to the reduction of gas percentages it was the most serious of the department's problems. It was to eliminate the danger that previously has always threatened from this source that it was decided that the main haulage roads would have to be cleaned out and treated with second burned ashes and that it would be necessary to instal a water sprinkling system that would permit of the use of water at the working faces. Both these innovations have had the effect of keeping

the underground workings comparatively free of coal dust. The inflammability of this material is a matter of such common knowledge, and it is so clear that its presence must constitute an added danger where there is possibility of an explosion, that the value of the improvements scarcely need further emphasis.

Rock Dust Barriers.

Having done everything that appeared practical to safeguard the workers in a general way, the Chief Inspector of Mines decided that if, in the face of all these precautionary measures, an outbreak were to occur, such steps would be taken as would be likely to confine its effect to the district of its origin. Hence the placing of Rock Dust Barriers at the District Entrances. These are so adjusted that, in the event any disturbance within the area of a Mine District, a curtain of rock dust is precipitated into the air and the advancing flames probably would be smothered before reaching other sections of the mine or at least so far checked as to give the miners an opportunity to escape.

Flame Lamps Displaced by Electric Lamps.

Another move along the lines of "safety first" was the displacement by the Edison Electric Lamp of all forms or types of flame lamps heretofore used in the Crow's Nest Pass Field. Before the Wolf Safety Lamp was used and, while in its time it was about the last word as an instrument for providing safe coal-mine ilumination, the development of the electric lamp admittedly has given to the collieries something safer and as dependable.

This insistence on the use of nothing but the best type of safety Lamp wherever the slightest possibility of danger existed was applied, not only to Eastern British Columbia, but to all the Province. When the Coal Mines Regulation Act was amended in 1919 it provided for the introduction of an approved Safety Lamp "in any mine where the air current in the return airway from any ventilating District in the mine is found normally to contain more than one-half of one per cent of inflammable gas."

The acquirement of the Burrell Gas Detector was another step forward. This was first put into use in the Crow's Nest District but it since has been furnished all Provincial Inspectors of Mines for the facilitation of the discharge of their duties. A modern instrument approved by the United States Bureau of Mines for the quick and accurate analysis of mine air it has proved very useful in the experiments carried on by the department. It has proved, in fact, indispensable for the quick determination of the percentage of gas in mine air and has filled a much felt want as previously it has been necessary to send samples to Ottawa for analysis, which meant a wait of several weeks for the returns.

Regulations as to Winding Ropes.

In discussing generally additional safeguards drawn around the coal mining industry in this Province through the 1919 amendment to the Coal Mines Regulation Act reference should be made to the stringent regulations introduced relative to cables or ropes used in the mines for the conveying of miners and other employees. Attention was directed to this matter, as one requiring special action, through the accident which occurred in Protection Shaft, Canadian Western Fuel Co., on September 10th, 1918. Following a very searching inquest, which resulted in a verdict that the cause was a defective cable, Mr. Sloan ordered a special inquiry to be held at which expert testimony was given. The cable, the breaking of which was responsible

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for the accident, was taken by William Fleet Robertson, Provincial Mineralogist, to an eastern laboratory to be tested. Mr. Robertson's report is a matter of record and the outcome was the amendment of the Act to provide that "every winding rope shall be given a bath in hot oil before being installed. Every winding rope shall be recapped at intervals of not more than six months—and that no winding-rope which has been in use for more than TWO YEARS or which has been spliced shall be used for raising or lowering persons." The latter point is especially notable because in no other part of the world is the winding rope granted so short life in the interests of safety. The period granted in Great Britain is three and one half years. Another amendment bearing on the maintenance at a high state of safety and efficiency of mine conveyances is that providing that "all cage-chains in general use shall be annealed once at least in every six months, and detaching hooks shall be cleaned and refitted once in every three months."

Another change of importance, also in the interests of safety, is that which gives a clear statutory definition of the duties of a Fireboss in a coal mine. The stipulation is made that this official shall not be assigned a district of such size as to prevent him from carrying out his inspection duties in a thorough manner. Further it is set out that "every Fireman shall devote his whole time to his inspection duties except where the duties assigned to or undertaken by him in addition to his inspection duties are not such as to prevent him carrying out his inspection duties in a thorough manner." This amendment was designed to do away with the complaint that Firebosses frequently were required to attend to a multitude of duties in addition to their inspection responsibilities with the result that the latter were apt to be neglected. Often Inspectors of Mines, in censuring Firebosses, were given the reply that they had so much work to do that possibly matters at the working face were being neglected. The continuance of such a condition could not be tolerated, hence the amendment with its terms so lucid and detailed as to be beyond misunderstanding.

The establishment of a Minimum Wage Board is another of the provisions of the 1919 amendment to the Coal Mines Regulation Act. It became effective on the 1st of July last and since the organization of the Board has been in progress and is expected shortly to be completed so that it may make an early start on its duties. There will be three members, one appointed by the Coal Mine Operators, another selected by the Coal Miners, and the other being the Chief Inspector of Mines, who shall act as Chairman.

Under the Act this Board has power to define Coal Districts within which to carry on investigations as to wages paid on which to base judgment as to the equity of the schedules of pay found to be in force.

The statement is frankly made that it is hoped that the effect of the activities of this Board will be to remove from the coal mines of the Province those Orientals now employed. For years the presence of this form of labor in some of the coal mines of the Province has been the subject of critical comment and it has been his object to find a means of effectually ridding the collieries of these unfair competitors of the white wage earner. The Minimum Wage Board should be able to do this as well as, through its inquiries and work, so keeping in touch with operations in the different coal mining fields as to assure the constant maintenance of a satisfactory standard in respect of wages.

TORONTO MINING STOCK.

Following are average quotations for active gold, silver and oil stocks, on the Standard Mining Exchange for week ending 6th November 1920.

	High	Low	Last
SILVER			
Adanac Silver Mines, Ltd...	2¼	1⅞	1⅞
Beaver Consolidated	39½	37½	39½
Crown Reserve	22	22	22
Foster	½	½	½
Great Northern	2	2	2
Hargraves	3	3	3
*La Rose	26	26	26
McKin.-Dar.-Savage..	49½	47	47
Mining Corp. of Can.	1.70	1.65	1.67
Nipissing	9.75	9.50	9.50
Ophir	1⅞	1¾	1⅞
Peterson Lake	11½	11½	11½
Temiskaming	32¾	32	32¾
Trethewey	27½	24	27¼
GOLD			
Apex	1⅞	1¾	1⅞
Atlas	10	10	10
Dome Extension	45	42¼	45
Dome Mines	14.10	12.75	14.00
Gold Reef	3⅜	3⅛	3⅛
Hollinger Cons.	5.65	5.50	5.60
Hunton Kirkl'd G.M.	10	10	10
Keora	16½	16	16
Kirkland Lake	44	39	43½
Lake Shore M. Ltd.	1.08	1.04	1.08
McIntyre	1.96	1.92	1.94
Moneta	10	10	10
Newray Mines, Ltd...	5	5	5
Porcupine Crown	23	22	23
Porc. Gold...EX.R...	1	1	1
Porcupine V.N.T.	23	22½	23
Preston East Dome	2½	2½	2½
Thompson Krist	7	6¾	6¾
West Dome	5⅞	5½	5⅞
West Tree Mines Ltd.	4½	4	4
Wasapika Gold M. Ltd...	10½	9¾	10½
OILS.			
Rockwood Oil, Gas	3½		
Vacuum G.	30	27½	28

*Odd lot

METAL QUOTATIONS.

Fair prices for Ingot Metals in Montreal Nov. 10th, 1920. (In less than carload lots).

	Cents per lb.
Copper, electro	19½
Copper casting	19
Tin	46½
Lead	8
Zinc	9
Aluminum	34
Antimony	8¼

PERSONAL

Mr. G. R. Airth, Managing Director of the Anglo-French Exploration Company, of London, Eng., has arrived in Toronto and is the guest of Mr. John B. Tyrrell, Mining Engineer, Confederation Life Building.

EARLY BIRDS AT THE WINNIPEG MEETING OF THE C. I. M. & M.
(What the President said will never be known).

This group was taken by the camera man of the Winnipeg "Free Press". Names of those included are as follows: Back row, left to right — G. R. Bancroft, superintendent of transportation, Mandy Mine, Northern Manitoba; C. Emerson, late coal manager for the Cerro de Pesso Mine, Peru. Front row—Dr. J. A. Allan, professor of geology, Alberta University; Prof. J. S. De Lury, geological department, Manitoba University; President O. E. S. Whiteside, manager International Coal company, Coleman, Alta.; F. W. Gray, editor of the Canadian Mining Journal, Montreal; R. R. Rose, acting- secretary of the Canadian Mining Institute; R. C. W. Lett, industrial and colonization agent, C. N. R., Winnipeg; B. Westcott, immigration agent C. N. R., Edmonton; Dr. E. M. Burwash, geological department, Alberta University.

"THE TIN DEPOSITS OF VIRGINIA, U.S.A."

To the Editor of the
"Canadian Mining Journal".

Concerning Mr. Alex. Gray's difference of opinion on the merits of "The Tin Deposits of Virginia" published in the Journal of October 8th, page 816, I desire to state that I fear that Mr. Gray has drawn the conclusions on the merits of the tin deposits of Virginia from his unprofitable mining venture in this section some fifteen years ago. The publication of the state and U. S. Geological Surveys presents the matter in a more "roseate" manner than I did in my article yet Mr. Gray thinks his experience "will serve to negative the roseate presentation of Mr. Haney"? This section offers superior advantages for profitable tin mining and compares favorably to the deposits of Cornwall. Eng.

Yours truly,
Geer, Va. MARSHALL HANEY.

The following item is taken from a well-known newspaper :

"Globular Salts Discovery.

Just as Regina Beach, 40 miles north of here and famed as a prairie summer resort, was retiring for its winter nap, the citizens of that village have been brought to life with thrills of excitement.

Globular salts have been located, and a rush has developed. Every available inch of ground is being staked by prospectors, and every hour people are arriving to join the fortune that for years remained unstated the salts were worth $60 a ton, later this figure was cut to $5 per ton, but still the excitement grows despite the drastic reduction."

Page the pale shade of Johann Rudolf Glauber. They may be different at Regina Beach, but the usual reaction to decahydrated sodium sulphate is not characterised by thrills of excitement.

The development of the plans of the Coalmont Coal and Coke Company is proceeding satisfactorily. The aerial tramway and electric light and power plant should be completed this year, or at least early in the new year, at the present rate of progress. Four of the tramway cables are stretched and the buckets and other equipment is on the ground. Two large marine boilers will supply power for the electric plant, which will be housed in a new building of pressed brick and steel. Light and power is to be furnished both for the mine plant and for the town. A water system is to be installed.

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We illustrate herewith two standard types of Electric Hoist. These are built to conform to all mining laws and regulations. We can make any variations you want in the details of these machines, and can also fit them with Depth Dial, if desired.

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ELECTRIC MINE HOIST, with Drum keyed fast to shaft, so it cannot revolve in either direction except the power is applied.

This type Hoist is made also for Steam Drive.

These Electric Hoists are now offered in 7 sizes, from 10 to 150 Horse Power, and with any diameter drum up to 48″.

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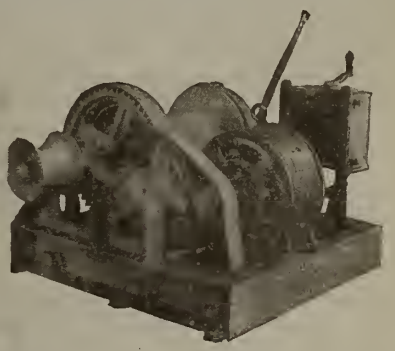

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ASBESTOS MINING NOTES.

(From our Thetford Correspondent.)

The production of asbestos at Thetford Mines, the most important asbestos producing district in the world, has received a serious set back owing to the strike in two mines operated by the Asbestos Corporation of Canada. Men doing ordinary labour demand an increase from a minimum of $4.00 per day to $4.50 per day. The Asbestos Corporation has not seen fit to grant this increase, with the result that their Thetford Mines plants have been idle for three weeks. The Company contends that they gave their employees a 25 per cent increase last March and that in accordance with other products there is a tendency to lower prices for asbestos in 1921. The Company therefore feels that they cannot grant this increase of 50c. per day for ordinary labour and a proportionate increase for skilled labour. The men who are organized under a local union refuse to return to work until such time as their increase is granted. The other mines are still operating. One company has met the men's demand and is paying $4.50 per day. Another company is paying $4.25 and still another company pays $4.00. Owing to a shortage of labour throughout the year, it is generally believed that production for 1920 will be considerably lower than the previous year. The present strike will, of course, lower the tonnage of asbestos crude and fibre for 1920. It is generally known that the demand for raw asbestos is far greater than the present supply and with a drop in production, one may reasonably expect higher prices.

One of the large companies in Thetford Mines has recently given a large contract for stripping to the Fraser Brace Company. It is understood that there is a considerable deposit of asbestos-bearing rock in this district, hitherto undeveloped, which has been prospected. The results obtained have evidently been good enough to warrant a large contract for stripping.

Hon. Geo. R. Smith, General Manager and Vice-President of the Bell Asbestos Mines has been recently confined to his bed, but we are glad to report that he is again attending to his business.

Sir John Carson, General Manager of the Consolidated Asbestos Limited is at present in England.

Mr. E. E. Spafford, Manager of the Quebec Asbestos Corporation, East Broughton, has taken a motor trip to New York. We trust he has escaped the snow storm that is prevalent at the mines.

We are just in receipt of the monthly Market letter issued by the Asbestos & Mineral Corporation, 17 Battery Place, New York, who are large Asbestos dealers. They predict higher prices for 1921, and advise the trade to stock up in advance.

Mr. C. Bindman, Secretary-Treasurer of the Canadian Crude Asbestos & Fibre Corporation Limited. Thetford Mines, will be in Montreal shortly.

Mr. T. H. Crabtree, Asbestos Inspector has just returned from a visit to England.

FLOTATION SAVED THE SITUATION.

To the Editor, "Canadian Mining Journal."

With Copper at 15 cents and every mineral industry languishing-cash customers being scarce and metal markets doleful it may not be amiss to emphasize what "Flotation" made possible, even in these "nothing-doing" days.

The very great value of the flotation process evolved under the aegis of Mr. John Ballot, of Minerals Separation, should find a larger appreciation and a clearer understanding during these times of falling prices, but high costs of production, than when metals were high and buyers plentiful. I believe I am safe in saying, without fear of intelligent fair-minded disproof, that if the use of flotation processes in general were to be discontinued to-day by "all users"—by licensees as well as by those who are said to be infringing or illegally using them—not one of the great sulphide-copper and zinc mines in Canada and the United States could afford to operate under prevailing conditions. Flotation—and flotation alone—is saving them, and making it possible for 90 per cent of that class of mine to live and keep men employed.

Regardless of controversy, and malversations, it is to the originators of flotation that other than precious metal mines survive and are earning profits. Defamation of flotation scientists and capitalists has obscured the facts. Quite recently recoveries by means of flotation have saved the situation at more than one Canadian metallurgical center—and it seems to be quite in order to enter of record these few words of commendation for the much-maligned who accomplished this.

Yours truly,

Montreal. ALEXANDER GRAY.

O. B. BUSH, PARLIAMENTARY CANDIDATE, ATLIN, B. C.

Mr. O. B. Bush, the well known mining man is to enter the election contest for the British Columbia parliament at the election to be held December 1st. Mr. Bush will contest the Atlin District. The people interested in the mining industry in the Atlin district are anxious that a practical mining man represent them, and have asked Mr. Bush to enter the contest, and he has consented to do so. Mr. Bush is a staunch supporter of the present government.

Being an active mine operator in the North, and prominent as the discover of the Premier Mine, Mr. Bush without doubt will be a good man to represent the district.

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EDITORIAL

A Permanent Tariff Commission Indicated

In this issue Mr. Alexander Gray discusses at some length the complex, unco-ordinated, in some respects contradictory, and in other respects exotic character of our mineral and metallurgical industries in Canada, which, it may as well be admitted, are disproportionate in their extension to the domestic production of the raw materials on which they subsist.

Our contributors's review pulls out the national skeleton to view, and emphasises the statements made by the retiring President of the Canadian Insitute of Mining & Metallurgy at the Toronto Meeting in March last, namely, that our mineral resources are very specialized and not inexhaustible, and that our possession of certain minerals of strategic value, such as nickel, asbestos and cobalt, should be utilised to enable Canada to drive a fair bargain with those nations which possess essential raw materials with which our country is meagrely or unevenly supplied.

Our bargaining position is bad, because in some important respects it is a mendicant position, but the application of a remedy is not simple. It calls for skilful and studied diagnosis. Snap judgments and emergent policies will not avail us. The policy of Protection—in its widest sense—has up to now proved the most effective medicine, but the tariff prescription requires skilful compounding. The enquiry which is now being made by a committee of the Cabinet, when completed; will be a record of symptoms, but a consultation is required for a decision regarding procedure. The tariff enquiry so far has revealed divergent and conflicting economic conditions, and the wishes of the East are not those of the West, nor are those of the Centre easily reconciled to either.

Nor is there any visible finality to the fiscal incongruities of Canada. Adjustment to environment is a first requisite to persistence of existence in a growing organism, and while the present enquiry is, in our opinion, a proper and a necessary proceeding at this juncture, it would seem that a permanently continuing process of enquiry and the indicated adjustment is required.

A permanent Tariff Commission, for advisory purposes, and not a legislative body, seems indicated.

Terms of Settlement of the British Strike

An inspection of the arrangement under which the British coal miners have gone back to work will reveal that it is not so much a settlement as a mutual agreement to work out a basis of co-operation, and it defers until the 31st of March 1921, or some previous date, the joint elaboration of a scheme for the regulation of wages in the industry "Having regard among other considerations, to the profits of the industry, and the principle upon which any surplus profits are to be dealt with." The text of the terms of settlement are quoted in extenso elsewhere in this issue.

An interesting feature of the agreement is the provision by which the coal-owners acquiesce in a variation of their profits as the wages of the miners are reduced or increased under the application of the sliding scale.

Things have moved very rapidly in Britain, and the return of the miners to work, which is a proceeding tantamount to defeat of the extremists among the leaders, should not obscure that fact that the question which the Mining Association and the Miners' Federation have undertaken to answer is the extent to which private ownership is permissible.

An enquiry into the disposal of "surplus" profits is not in principle to be distinguished from an enquiry into the right of the individual, or a combination of individuals, to possess ownership in profits, as the word "surplus" is not one that has hitherto been regarded

a definable in law, or existent in fact, in British jurisprudence.

The whole system of coal control in Britain is an extraordinary and emergent war measure, and, presumably, will some day be abrogated.

In attempting to control essential industries in the best interests of the nation, British statesmen have brought about a practical test, under constitutional procedure and without popular excitement, of political theories that could only have been so tested without the accompaniments of revolution and bloodshed under the whole-hearted agreement of the British nation to adopt virtually anything that seemed necessary to concentrate the country's energies upon prosecution of the war. One hidden danger has been plainly disclosed, namely, that the substitution of the State for the individual, or the corporation, as employer of labor in no wise lessens the danger of industrial strife, but it increases it dangerously, inasmuch as disputes which under the private employer were matters of internal policy, in which the State intervened only as little as possible, become, under State employment, indistinguishable from political revolution. This tendency of the socialistic or communistic state has often times been pointed out by far-sighted students of forms of government, but the war has brought about an actual demonstration that cannot fail to have a deterrent effect upon those whose enthusiasm for political innovations so often exceeds their ability to forecast the outcome of untried schemes of social changes.

The disturbing feature of the situation as it now exists, is that the the postponed question is still a political one, and not purely a matter of wages and hours of work.

In making the rate of wages paid to miners dependent upon the increase in the aggregate output of coal, the British Government has apparently confused two distinct issues, namely, that while a reduction of the unit cost of coal production can only be obtained by an increase in the individual rate of production, the value of the thing produced, for purposes of sale, is dependent upon the demand. Any attempt to frame a permanent basis of wages upon the fluctuation of aggregate production will fail, because it presumes an unchanging demand and an unchanging selling price, neither of which presumptions are justified.

The proposals so far put forward for satisfaction of the miners' desires and improvement of production have ignored the chief cause of the reduction in output, which is, in Britain, and elsewhere, a shortage of skilled workers at the face, and a superfluity of non-essential, non-productive employees in the auxiliary operations of handling, preparing and marketing the coal produced. A new generation of face workers must grow up, to replace those who are lost through war causes — death, disablement, and entry into other occupations — before the aggregate production of coal can climb back to pre-war figures. The chief problem of the colliery executive, and of those governments that have usurped the functions of the colliery executive, is to restore the balance between face-workers and auxiliary employees, between coal-getters and coal-handlers. Out of the preponderance of this last named class, who necessarily include the less responsible elements of the coal-mine workers, arises much of the difficulty that miners' leaders experience in these days in advocating moderate methods and recognition of the fact that the miner is not the only gooseberry on the communal bush.

CANADA AS A PRODUCER OF PETROLEUM.

The "Petroleum Times," of London, deprecates the exaggerated accounts of Canadian oil occurrences which appear in the daily press, and particularly a statement which describes the Fort Norman strike as indicating "the largest oilfield in the world."

"So far," states this comment, "there is nothing proved which has altered our opinion that the liquid-oil riches of Canada are very limited, and though some fairly decent oil-wells may be brought in round the Mackenzie River, it must not be imagined that Canada has the slightest hopes of ever becoming a great oil-producing country; at least, not until such time as its shale wealth is commercially developed."

We think our contemporary doth protest too much. "Not proven" is still the verdict upon Canadian oil occurrences, and it is yet too soon to conclude that Canada has "not the slightest hopes" of becoming an important oil producer.

In direct contradiction of the London opinion quoted may be mentioned the conclusion of Mr. G. C. Ommanney, Investigation Engineer of the Canadian Pacific Railway, which appears in the monthly review of progress published by this railway. Mr. Ommanney points out that in September there were 24 locations at which drilling for oil was in progress throughout western Canada, not including eight in the coastal district, and he contends that Canada will, in the comparatively near future, "become an important contributor to the world's oil supply." Mr. Ommanney's observations have at least the merit of closer acquantance with western oil possibilities than those of our London contemporary.

The officers of the Canadian Geological Survey have carefully outlined the possibilities of oil occurrence in the great plains, but their conclusions are necessarily incomplete because the surface exposures only incompletely indicate the nature of the rocks that lie below. Thorough and protracted prospecting by drilling is necessary to determine a number of stratigraphical unknowns, and this kind of prospecting is now taking place. The campaign of the Imperial Oil Company is establishing many things of "scientific value," to use Mr. Stillman's description of the Fort Norman find,

and the Company is, we understand, fully imparting this new information to the Canadian Geological Survey. It will still be some years before the potential western oil area is thoroughly tested, and, in the meantime, long-range prophecies, unaccompanied by reasoned argument, are out of order.

As to the oil-shale resources of Canada, these are very tangible assets, with no uncertainty attaching to them. Neglect of oil-shale utilisation is not confined to Canada alone. Canada had an oil-shale industry, with fair prospects, sixty years ago, but it was killed by the tapping of large petroleum flows in the United States. When petroleum ceases to become an unassailable competitor, as may well occur should a reduction in petroleum yield continue to be accompanied by an extension of the uses of petroleum, then, presumably, the distillation of oil-shales will be resumed in Canada.

DOMINION ROYALTY ON COPPER.

Mention was omitted from the report of the Winnipeg Meeting, contained in the issue of 5th November, of the text of the resolution passed regarding federal royalties on minerals, which has a particular bearing upon the operation of the Flin Flon ore-body, and is also linked up with the question of provincial ownership of natural resources that is at this time being energetically discussed in Manitoba.

The Resolution, after recital of existing regulations, read as follows:

"That this Convention strongly urges the Government of Canada to so amend said regulations as to set out specifically what are to be the royalties charged on the different minerals produced, and particularly that the time for which copper shall be exempt from royalty shall be extended for a period of ten years."

The Manitoba Government is finding itself in an impotent and embarrassing position because of its non-ownership of the natural resources over which it is charged with civil administration, and the demonstrated presence of mineral deposits in Northern Manitoba has interjected considerations that render it very desirable, from Manitoba's point of view, that the indeterminate status now existing in connection with mining lease laws, royalties, and mines regulation should be brought to an end.

Dr. W. H. COLLINS APPOINTED DIRECTOR OF THE GEOLOGICAL SURVEY.

Announcement is made by the Civil Service Commission, under date of 15 November, that Dr. W. H. Collins, who for a number of years has been a geologist of the Department of Mines, has been appointed director of the Geological Survey.

Dr. Collins has been a geologist in the Geological Survey branch of the Department of Mines for fifteen years. His work has largely been in the mineral fields of Northern Ontario and has been extremely valuable to the department. He was born near Owen Sound, Ont., and received his education at the State University of Wisconsin and the University of Toronto.

TEXT OF TERMS UPON WHICH BRITISH COAL MINERS VOTED TO END STRIKE.

The terms of settlement upon which the British coal miners took an inconclusive ballot, and on which they eventually returned to work, are as follows:—

1. Recognising that on the increased production of coal there depend not only the prosperity of all who are engaged in the coal industry, but also the welfare of the nation and the cost of life of the people, and having in view that this urgent need can only be met if the miners and mine owners throughout the country work together cordially for this common purpose; and further, having regard to the necessity of setting up machinery for regulating wages in the coal trade so as to get rid of the present anomalies and provide against future difficulties;

The Mining Association and the Miners' Federation solemnly pledge themselves to make every effort to achieve these objects.

To that end they shall:—

(a) Co-operate to the fullest extent to obtain increased output, and for this purpose will arrange to set up district committees and a National Committee.

(b) Proceed forthwith to prepare a scheme for submission to the Government at the earliest possible moment and not later than the 31st March for the regulation of wages in the industry, having regard, among other considerations, to the profits of the industry and to the principle upon which any surplus profits are to be dealt with.

2. Pending the preparation of the scheme referred to in 1 (b), wages shall be regulated on the following basis without prejudice to the ultimate scheme above mentioned:—

(a) An advance of 2s a shift to persons of 18 years of age and over, 1s to persons of 16 and 17 and 9d to persons under 16 will be paid from the date of resumption of work to the classes of colliery workers entitled to Sankey wage, and subject to the conditions under which Sankey wage is payable.

(b) For the purposes of this temporary arrangement the advance referred to shall be automatically adjusted on the basis set out below from the 3rd January, 1921, in the light of the results of the five weeks ending 18th December, 1920, and similarly from 31st January, and thereafter every four weeks on the results of the four weeks immediately following the last preceding test period, but the Christmas holiday week shall not be counted in any such period. And an adjustment will be made in those cases where the holiday period falls wholly or partly within the New Year week.

The basis on which the advance shall be adjusted is as follows:—

If the weekly averages of the proceeds of export coal during the test period are maintained at the weekly average of the proceeds of export coal during the September quarter the advance shall be 1s, 6d and 4½d respectively. If (after deduction of the cost of extra output), they exceed the September figure, an additional 6d, 3d and 2¼d respectively will be paid for every complete £288,000 of the excess.

(c) For this purpose the amount of export coal in each period shall be assumed to be the excess of the tonnage produced over the rate of 219,000,000 tons annually; the proceeds shall be calculated by multiplying that excess tonnage by the average f.o.b. price as shown in the Trade and Navigation accounts for the quarter ended 30th September, 1920; and the cost of extra output shall be taken as 15s per ton for each ton produced in excess of the rate of output for the quarter ended 30th September, 1920.

(d) As part of the settlement hereby concluded, the Government undertake to make an Order under section (3) of the Mining Industry Act which shall provide for the variation of the one-tenth share of the excess profits of the industry payable to the owners under the Coal Mines (Emergency) Act by the deduction therefrom or addition thereto of one-quarter of said tenth part for each 6d by which the men's advance is reduced or increased.

(e) The certificate of the Secretary for Mines as to the amount of the proceeds and the advances payable shall be accepted as final.

Russell J. Spry, mining engineer, formerly with the Eustis Mining Co., at Eustis, Que., is now located in Salt Lake City, Utah.

Canada's Complex Economic Mineral Problems Surveyed

Natural Resources Largely Unexploited, While Foreign Fuels, Iron, Steel and Other Products, are Being Imported.

ALEXANDER GRAY, Montreal.

"The big problem of the next twenty-five years is to advance and if possible energize the development of the natural resources of this Dominion. We are now in a position to challenge the world in competition if we only pursue sane and well-tried lines of policy and do not be misled into false ones."

In his speech at Kamloops, Prime Minister Meighen cast this ambitious and optimistic horoscope.

Partisans will disagree as to the methods to be employed to bring this about, for there is no denying the complexities and disconcerting incongruities in Canada's economic affairs.

Not only does the Premier reaffirm the Parable of the Talents and give precedence to the most certain sources of great working capital; his plea for more confidence and sanity has had reawakening influence.

Out of the maze of post-War adversity and perplexity, while Elder Statesmen overseas are floundering in frenzied finance, Mr. Meighen has argued the case for Canada with refreshing candour and admirable affirmativeness.

Canada is to have stronger diversified industrialism — is to place itself upon a constructively competitive basis-instead of "taking it lying down", in the parlance of the pugilist. If opulent and impoverished nations avail themselves of advantageous exchange to undersell Canadian producers, then Mr. Meighen proffers Canadian energies and resources, and Government support of them, as assured means of prosperity and expansion. In doing this, he is not unmindful of internal and external complications. Hereafter the "equal opportunity and fair trade" advocated by Sir Auckland Geddes is to have more of our own making in it.

Putting the House in Order.

Liquidation has proceeded apace. Frozen credits are being thawed out by drastic processes. Consumers of commodities went on strike. Canada under the new leadership at Ottawa has decided to raise more steam and move faster. Ways and means whereby it will obtain a larger participation in the world's marts are being devised. Whatever of tariff revision be given effect, sentiment is becoming aggressively favorable to the promotion of the coal trade, fostering of the iron and steel industries, of assisting mineral industries throughout. Specifically, a bounty is desired for iron-ore mined in Canada; a royalty or other form of first-aid for copper producers; the levy of added duties upon coal, copper, zinc and lead and their products, as well as the restriction of the foreign steel-products free-list. In justification of the comprehensive correctives for excessive importations and the unbalanced international exchange situation, the latter facilitating the offloading of surpluses in Canadian markets—Mr. Meighen enters the plea that Canada has enough and to spare in its own resources. It is all serene to those who find it convenient to underbid, or to dominate Canadian trade, but the tide of commerce is running too rapidly the wrong way. Were it not for the pulp and paper, asbestos exports and activity in the coal trade East and West, the protective programme would require enlargement rather than curtailment.

The American View.

There is all the more reason for altered policies because of recent utterances of a pessimistic nature. Mr. Vanderlip has proclaimed that the States are confronted by a period of unprecedented depression. Since there is no disputing that in the plenitude of counsel there is wisdom, and as international finance enters largely into Canadian matters, besides the remarks of Mr. Vanderlip no more informative précis has been presented than that issued by the Guaranty Trust Company of New York, as follows :

"During the half century preceding the war, a period representing the golden age of English industrial and trade development, a large and profitable British overseas commerce was developed. A low unit of cost in production was largely responsible for this growth. Germany, likewise producing at a comparatively low cost, developed a highly organized commercial system and made serious inroads into British commerce during the ten years just prior to the war. The United States, electing to operate upon a different standard of living, involving a higher wage cost, was unable to gain a position as a large exporter of manufactured goods, compared with Great Britain and Germany, except in those lines where our wider use of automatic machinery reduced the unit cost of production to a point that permitted competition with similar products manufactured on the lower European wage scale.

"Fortunately for the United States, the post-war period finds the condition decidedly altered. European labor costs have advanced tremendously until they now parallel, to a considerable degree, labor costs in this country. This change deprives Europe of one of her greatest foreign trade assets and improves, in like measure, the outlook for American foreign trade so far as competition in productive costs is concerned. Wages will, of course, vary, but a comparatively level situation seems assured."

Deprecating trade barriers, if international exchange is to be readjusted in order to unshackle commerce, and enable the United States to reap rewards without which its overplus production cannot find adequate markets, this trust corporation urges the broader policy, fiscal preparedness and a hundred per cent. efficiency.

While that ideal may not become universal—for obvious reasons, since overseas nations will not concede open markets,—and American industries insist upon the maintenance of protective principles, the thought uppermost in Canadian minds at the moment is: "What shall we do to be saved?"

Is it possible to obliterate trade barriers, to forthwith establish industrial fellowship, synchronizing with a League of Nations, that may not become a reality?

What the States Did.

Canada has been hesitant on the point whether it should become more self-reliant, self-contained, self-supporting, more exacting in behalf of its own industries, without jeopardizing its trading privileges. So complex are its problems that the decision to be rendered when the Tariff Commission makes recommendation, will be fraught with momentous consequences. Meanwhile, there is general acknowledgment that the Government at Ottawa must step on the accelerator.

Sentiment is divergent as it was years ago, when iconoclasts in the United States, low-tariff, and no-tariff advocates, execrated "Pig Iron" Kelley as the incarnation of corporate iniquity.

To those, the Apostle of pig iron was the architrave, as it were, of Protection running riot, before Dingley, McKinley, Payne or Penrose projected themselves into the arena and saw to it that the "trade barriers" the Guaranty Trust would abolish, were buttressed.

"Pig Iron" preached Production and Protection as the complement of each other, insisted that pig iron was the basic factor if the States were to have a steel industry commensurate with their vast iron-ore and coal deposits.

That was when Schwab was trundling a barrow, Gary was receptive toward fees in petty cash, Carnegie was propagating hard luck tales about the pauper labor of Europe, and Gates was at the throttle of a locomotive.

Needless to write; the "Pig Iron" Congressman was anathema to American Cobdenites; yet he was perennially returned to Congress from his Philadelphia district, and remained in Congress as the "Father of the House" until the "Last Post."

This all may be considered irrelevant and reminiscent, but the personality and his creed are recalled by the petitions for a bounty upon Canadian iron-ore, or upon pig-iron made from Canadian ore. Moreover, it might as well be admitted that behind the "Pig Iron" Congressman was the Laird of Skibo, the canny Carnegie, whose genius created the nucleus of the greatest of steel corporations.

Carnegie, too, was pilloried, along with Frick and Phipps, but it was that triumvirate which the assistance given to pig iron made possible. They made steel, began the movement whereby the ranges of Wisconsin, Michigan and Minnesota reverberated with blasts throughout the iron country. The coal fields of Pennsylvania, Ohio, West Virginia, Illinois and Indiana shared in the movement, which was later followed by developments in Tennessee and Alabama. So stupendous has been the progress since that "Pig Iron" Congressman was berated, that the States, although protecting what long ago ceased to be "infant industries", now would lower or wipe out "trade barriers", in order to secure a still larger portion of international business. In the circumstances, therefore, Canada is concerned with the following exhibit:

Contrasts In Credits and Debits.

In the aggregate, the $199,285,714 which the following table totalled in 1920 suggests more than surgery.

The sum of Canada's mineral output in 1919 was $173,000,000. What it will be in 1920 cannot alter the fact that the imports of coal and coal products, and iron-ore and its products, will greatly exceed in value the grand total f.o.b. worth of Canada's mineral production.

IMPORTS OF COAL AND METAL PRODUCTS INTO CANADA.

(Figures compiled by Dominion Bureau of Statistics.)

	Six Months ending September			
	1919		1920	
	Quantity	Value	Quantity	Value
	Ton	$	Ton	$
Coal and its Products.				
Coal—				
From U. K.	344	2,578	.....	.....
U. S.	8,829,347	31,839,153	9,093,182	48,759,066
O. C.	.....	.....	561	5,027
Total	8,829,691	31,841,731	9,093,743	48,764,093
Other Coal Products—				
From U K.	.....	4,555	.....	977
U. S.	.....	1,061,932	.....	3,121,673
Total	.....	1,166,487	.....	3,122,650
Total Coal and its Products	32,908,218	.....	51,886,743	
Iron and its products—				
Iron Ore—				
From U. S.	802,789,	2,865,859	1,087,474	4,030,906
N'f'l'd	244,574	263,671	245,407	333,492
Total	1,047,363	3,129,530	1,332,881	4,364,398
Other Iron Products—				
From U. K.	.....	3,112,511	.....	8,539,626
U. S.	.....	84.004,446	.....	126,897,637
O. C.	.....	210,480	.....	449,780
Total	.....	87,327,437	.....	135,887,043
Total Iron and its Products	90,456,967	.....	140,251,441	
Copper and its Products—				
From U. K.	.....	20,103	.....	134,531
U. S.	.....	3,335,647	.....	5,214,392
O. C.	.....	30,983	.....	57,092
Total	.....	3,386,733	.....	5,406,015
Lead and its Products—				
From U. K.	.....	23,300	.....	1,003,764
U. S.	.....	242,242	.....	248,393
O. C.	.....	38,005	.....	215,969
Total	.....	303,547	.....	1,468,126
Zinc and its Products—				
From U. K.	.....	1,532	.....	3,084
U. S.	.....	399,262	.....	259,236
O. C.	.....	.....	.....	11,069
Total	.....	400,794	.....	273,389

"Our country must reconstruct itself" is a cure prescribed in another sense by Calvin Coolidge, Vice-President-elect of the United States. Its domestic application is imperative.

Granting every claim as to limited domestic markets and the necessity of cultivating reciprocal trade relationships, no logical deduction can be formed other than that Canada has not learned to walk by itself, as did Kipling's metaphorical cat. The hiatus made manifest in the foregoing data constitutes "an aching void". "Keeping the home fires burning"—at this price—is more ominous than optimistic. "Living on Capital" may benefit individuals but the effect is to jeopardize a greater number. The imports exhibit is convincing evidence the country "must reconstruct itself" by promoting Home Industries while cultivating overseas and over-the-border trade on a more advan-

tageous bartering basis. Nor is it adequate that our exports showed a gain. Instability is in evidence, wherever industries are dependent upon such prime factors as coal, coke, iron and steel, and the agitation for the encouragement of iron-ore production is opportune. A lonesome satisfactory item is the 1,299,424 tons of coal exported in the half year, worth $9,103,196. Alberta is pushing its coal trade in the States. The 12,316 tons of iron ore exported valued at a paltry $60,845, is a rather pitiful contribution. There is no denying the reasonablesness of the aspiration voiced by Mr. Balmer Neilly when recently addressing the Empire Pressmen:

"We hope to develop our iron ore resources by means of beneficiation to the point where Ontario and Canada may depend upon our own resources in place of importing 95 per cent. of our iron ore and iron and steel products to the extent of some $180,000,000 as in 1918."

Generally speaking, Canada's total trade with the United States for the twelve months ended with September, was $1,462,213,748. This was an increase of about $300,000,000 over the preceding corresponding period. On the other hand, imports from the United States amounted to $919,367,989, an increase of $200,000,000. Exports from Canada to the States were approximately $542,845,759, an increase of not quite $100,000,000. In the period in review, Canada increased its imports while its exports decreased. The imports were $1,352,767,940, compared with $888,139,956 in 1919. Exports were $1,208,919,175, as against $1,210,541,387, in 1919. Clearly one-half of our total trade with the world was done with the United States. about two-third of our imports were from the United States, and nearly one-half of our exports were disposed of to the United States.

IRON AND COAL.

Weakest Links in the Chain.

Pittsburg "base" prices and the "Bessemer limit" may be meaningless terms to the laity. They are branded into our economic system. Apart from the huge iron deposits of our eastern seaboard, we have yet to find another iron-ore field of first magnitude, free from impurities or which do not require beneficiation. Here and there we have hematites; magnetites rather low in grade have presented themselvs; sulphur and phosphorous are too prevalent in some of these, and we have titaniferous ores awaiting economical processes and profitable uses. Exploration may supply the greater requirements. Meanwhile the "line of least resistance" has been followed, and the central provinces have no steel industry they can call their own.

In the six months ended June 30th, only 8.9 per cent. of the ores fed to Ontario furnaces were of domestic origin. Altogether 1,332,881 tons of iron-ore were imported, and we exported 12,316 tons.

Sydney and New Glasgow plants, and the iron and coal mines tributary thereto, have been handicapped by labor troubles, notwithstanding the exportations of coal in the six months ended with September, were a redeeming feature. Most of that coal went oversea, some of it across the border. Apart from Sydney and New Glasgow, all the steel mills obtained nearly all their coal from the States. The Algoma Steel Corporation was alone among its Ontario contemporaries in availing itself of what iron-ore in bulk it could muster from its own domestic mines. It used its own siderite from its Magpie Mine, where 100,000,000 tons have been determined by diamond drilling. Latterly the Algoma corporation does not appear to have drawn so steadily upon this siderite, but the three months ended September 30, notified gratifying tonnage results, as follows:

	1920	1919
Magpie Ore	32,210	67,420
Coke	142,593	65,998
Pig Iron	116,362	50,149
Steel Ingots	92,671	55,456

Doubtless imported iron-ores entered into this production. More Magpie ore might be availed of, and probably will be, when beneficiation practice is encouraged in some way. It was explained to the Tariff Commission that this siderite has an original iron content of 35 per cent, and sulphur content of one per cent. and more. To roast this ore in brick-lined kilns, raising the iron content to 50 per cent, and reduce the sulphur content to .16 per cent., using powdered coal, is an added cost at which patriotism shies. The cost of roasting in 1918, was $1.25 per ton; in 1919, it was $2.64 per ton; because of the advance in the price of coal, since one ton of raw ore makes only .7 ton of finished ore. Ostensibly that is why a bounty rather than a higher duty is sought, especially by the Algoma people. On the other hand, those without iron-ore ask for tariff protection, while Canada is seeking domestic ores of Bessemer grade. On the Pacific Coast conditions are identical with those in the central provinces, with the exception that a small tonnage of iron ore and coal is going to boundary States. The British Columbia Minister of Mines in his report for 1919 was obliged to admit that "so far there has been no metallic iron produced in British Columbia, but it has been strongly advocated in many quarters that the conditions are favorable for the establishment of an iron-smelting plant somewhere on the British Columbia coast. So far nothing definite has materialized, although there is apparently a prospect of such a plant being established. As is well known, there is on the Coast, in the aggregate, an adequate supply of magnetite, quite sufficiently free from impurities as to be within the "Bessemer limit" to supply such a plant."

Undoubtedly the situation is more than embarrassing for, aside from the work at the Magpie Mine and Moose Mountain, nothing of consequence is happening is the way of iron mining, between there and the Belle Isle section on the east, whereas what is going on in British Columbia is trifling, as yet. Diamond drilling in other sections of Ontario is understood to have disclosed considerable tonnages of satisfactory ore. "Pittsburg base prices", however, for the time being, removed the incentive for further territorial exploitation by individual companies or syndicates. With assistance given to iron miners or pig-iron producers, an element of impetus might be supplied. Otherwise, Canadian steel mills and fabricating plants in general have recourse to the States, as the imports for the six months ended with September reveal. Addressing the Tariff Commission, Mr. J. A. Hussey plainly put the situation when he said: "At the present time, it is admitted by all that iron and steel are the basic industries of Canada, depending, one might say almost wholly, on ore imported from the United States and elsewhere (Newfoundland). These importations inevitably have helped to turn trade balances against us, and trade balances are a matter which affect everyone in the country."

Our Coal Account.

Accentuating this is the Coal Account, amounting in the six months dealt with in the table of imports, to $51,886,743, for 32,908,218 tons, more than twice the quantity of coal mined altogether in Canada in any two years. Affiliated with the Maritime Provinces' iron-ores there is coal in abundance. Between there and Alberta and Saskatchewan, what coal there is has not as yet been utilized in steel and fabricating plants. This necessitates, or has necessitated, reliance upon imported coal, despite the fact that in one form or another there is about 1,200,000 million tons of coal of all kinds within the Dominion to go on with. Of this 2,000 million tons is semi-anthracitic; 283,000 million tons is bituminous, and 950,000 million tons, subbituminous and lignite. More of these fuels could be marketed even now, were railway freights readjusted, instead of consumers paying $50,000,000 to $75,000,000, plus exchange on New York, plus freight. Convenient markets—and natural markets—are available, without violating railway rights. Alberta's increasing output is demonstrating that. Concededly Ontario plants are between two stools. Coal is a commodity, dependent upon locality, quality and market. Of the coke produced in 1919 in British Columbia, about 10 per cent. was exported to the States, the remainder going to the smelters at Trail and the Boundary District. But in that year the output of coke decreased about 51 per cent. Coal production in that province fell off about 6.5 per cent. For that matter the coal and coke output there has fluctuated somewhat on a dead level since 1908, 1914 and 1915 reflecting special depression following on the outbreak of the War. Nor have the Maritime Provinces provided their quota. Labor disputes tended to increase costs, and "Pittsburg base prices" cannot be trifled with. The New Glasgow and Sydney export business cannot be dissociated from competitive factors. No doubt needed economies will be effected when the units constituting the Empire Steel Corporation are correlated, but its coal has not relieved the strain upon the popular purse, at least to an appreciable extent.

The Nickel-Copper Position.

Suggestion is made that copper production be fostered by a bounty or a royalty of some sort. An export duty has been suggested, similar to what is the vogue with the Portuguese, Mexican, or Latin-American countries. Perhaps the arrangement whereby the buyer pays the Quebec Government's exaction upon asbestos producers may be urged. Here a difficulty arises, for Quebec is the chief source of supply of asbestos, whereas copper markets hardly would be amenable to any arrangement of the sort. Outside of the Granby, Howe Sound, Weedon and nickel-copper Companies, Trail is the only important contributor of the red metal. Granby has got along without flotation methods of recovering a greater portion of the copper content of its ores. Two of the nickel companies are making copper. Otherwise, without flotation few if any of our sulphide mines would be in operation, unless their ores are of a grade high enough to defray transportation and smelting charges in addition to abnormal mining costs.

Imports of copper and its products in the six months to October, were valued at $5,406,015, as compared with $3,386,733 in the corresponding period of 1919. Blister and refined-copper production is increasing and Canada should not find it necessary to go far afield for copper products. In 1917 Canada reported 109,227,332 lbs. of copper; in 1918, 118,769,332 lbs., and in 1919, 81,500,000 lbs. This is all-sufficient for domestic consumption, if refined and manufactured. Not unexpectedly, there has been a slump in the copper metal market.

Canada is equipped for larger outputting, but Granby was shut down part of the time, Trail has lacked copper ores, Howe Sound operations were curtailed, and the nickel-copper companies cannot force metals for which there is a minimum demand. Combined with liquidating markets has been the insufficiency of labor and freight cars for over-the-border service. If nickel was moving in greater volume, Canadian copper would be more in evidence, consequently discussion of a royalty on refined-copper exported might not be well-received by consumers. On the other hand, General Manager Warren of the Consolidated Mining and Smelting Company, proposes that the 1½ cents a-pound duty on copper ingots be extended to include copper wire rods, which are now admitted free, if drawn into wire in Canadian plants.

Mr. Warren is in a position to state the needs of his corporation. He comprehends the limitations of the home market. Protection for finished products is what he craves, as may been seen from his remarking:

"While the war duty of 7 1-2 per cent. was on the company began to build a wire rod mill so that it might supply the 12,000 tons of copper rods consumed by the five Canadian wire concerns in making telegraph wires, transmission wires, cables, etc. In addition to the wire rod consumption the normal Canadian consumption was only 6,000 tons in the form of ingots. The ingot demand could be filled with the company's copper refinery established during the war at the request of the British Government, with a capacity of 20 tons daily. To supply the Canadian consumer at a reasonable price it was necessary to increase the capacity of the copper plant 60 or 70 tons a day. That could be done only by building a rod mill so that the increased copper output could be made into wire rods, enabling the company to fill the whole domestic demand. This also necessitated arrangements being made to secure a supply of copper ore or concentrates sufficient to supply the enlarged plant. Contracts had been entered into with the Canada Copper Corporation under which a $2,000,000 railway branch line had been built from Princeton to the large copper deposit it controlled nearby. The power line of the subsidiary company, The West Kootenay Power & Light Company, Ltd., had been extended 100 miles from Greenwood to the mines at a cost of $1,250,000, and extensions had been made to the smelter costing $750,000, including $250,000 on the wire rod mill.

Mr. Warren's exposition of the copper situation within his jurisdiction, explains why the Trail plant has to have more copper ores, a measure of Government assistance, and support in domestic markets. They had to offer a premium of one-half cent a pound on the New York price of the metal to induce the Canada Copper Company to construct a railway in order to ship their ores to Trail. In other words the Canada Copper Company insisted upon a bonus before it would enter upon a capital expenditure not justified otherwise. The readiness of the Consolidated Company to pay more than the New York price per pound, bespeaks more than Mr. Warren in all modesty could impart to the Tariff Commission, when it is borne in mind that there was "no market for copper in the West," on either side of the border, and in shipping East, the Consolidated and Anaconda Companies have to compete with copper produced closer to the big market, or copper which can be transported by water. Toronto, Hamilton and Montreal, as Mr. Warren has explained, are the Canadian markets for cop-

per, and freights from New York to these Canadian markets are lower than they are from Anaconda and Trail. From New York, the rate is, or was, 47½ cents a cwt. to Toronto, and 46 cents to Montreal, as against the new rate of 95½ cents a cwt. from Trail to Toronto, and $1.10 to Montreal. Besides, the cost of converting copper into rods is two cents a pound, double what it was in the pre-war period. Moreover, only fifteen per cent. of the Trail copper ores treated came from the company's own properties.

The duty sought by the Consolidated Company is designed to offset the difference in freight, the half-cent extra per pound paid to the Canada Copper Company, and leave a slight margin for protection. Such a duty would obviate royalties, or export duties, and if the plan carried out by which the Canada Copper Company got more than the market price for its copper, was extended, perhaps a greater supply of custom-ores would be forth coming in due time. No doubt, also, the Consolidated will find more ore in its own areas. At any rate, the Canadian copper industry is seeking support.

In this respect it differs from the nickel industry, which is full-grown and husky, requiring only more business and less taxation. The International Nickel Company has a refinery at Port Colborne that is modern in every respect. An investment of close to $6,000,000 upon that plant does not betray any timidity about the future of the nickel industry. Moreover, the new storage-dam on the Spanish River is one of the largest of its kind. It cost $3,000,000, or more. So that corporation — now watchfully waiting — is in an unprecedented state of preparedness, and will be all the stronger when the mill at which Monel Metal will be rolled, is completed. Supplementing these expenditures, are those of the British-American Nickel Company, amounting to a further $14,000,000, or $15,000,000, as near as can be calculated by an on-looker. Then there are the Mond plants, primed for larger contributions of their special products. Unlike copper, Canada has a practical monopoly of nickel, and it is an everlasting credit mark to which it is entitled, that the nickel industry did not profiteer throughout the War.

With the lower prices for copper prevailing in the current year and operating costs remaining at or near to the peak, the output cannot be increased. Few companies can produce copper at 14-15 cents. Were it not for the adoption of flotation at Trail, and other improvements at those metllurgical works, together with what came from the nickel-copper Mines, the red metal would cut a sorrier figure in our score sheet. Given a chance in a better copper market, fortunately the overhanging supplies are liquidated. Granby and Howe Sound will resume their place in the output. The success of flotation at Trail and the Britannia Mine of the Howe Sound Company has established standards of excellence in recoveries of metallic contents which no longer leave Canada apologetic. Metallurgical works are enabled to get more of what they are entitled to from the sulphides. Without flotation the tale might not be worth the telling of it.

Zinc and Lead Prospects.

A vote of confidence in the zinc and lead properties of the Dominion would not be amiss, followed, as it might be, by the maintenance of a protective policy that will not suggest reprisals. Imports of zinc and lead and their products in the first half of the official year, are given as $1,741,515. That is nearly half as much as the total value of the zinc produced in 1919 in British Columbia. It is a third as much as the grand total of the zinc and lead produced in British Columbia in 1919. Considering that British Columbia is the chief source of those metals, Mr. Warren was upon firm ground when he urged the continuance of the duty on lead, the imposition of a limited embargo upon imports of zinc, other than from Great Britain and the States, and a duty of two cents a pound on zinc; for there have been importations upon an extensive scale of those metals and their products, and they are far from inspiring in their influence upon domestic producers, or upon those who are planning to produce in Gaspé. To have Spanish and German lead dumped here and given the "British preference" hardly is consoling, however, brotherly the affection is for the Homeland.

The Consolidated Mining & Smelting Company finally having evolved a practical and economical process whereby the complex ores of British Columbia can be treated, Mr. Warren takes the position that "as "a large part of the world consumption of zinc is in "the form of sheets, the company proposed to put in a "zinc rolling-mill, and felt they should have a bounty "on foreign business in order that it should supply "the British market. Until foreign exchange rights "itself, further protection also is needed. Five hun-"dred tons of German zinc was offered in Eastern "Canada in September." Besides lead, copper and zinc, the Consolidated Company is producing refined gold and silver, bluestone, fluorspar, and both sulphuric and hydro-fluoric acids. Manifestly the Consolidated management has rendered notable service and is more ambitious now the problems contained in complex ores have been solved. Trail expenditures and the magnitude of the Sullivan Mine, taken in connection with the necessity for stimulating British Columbia mineral industries, are matters of national importance. Competition with Germany, Spain, Mexico, Belgium, Australia and India—and with American producers who are prominent in metal markets—is accentuated by increased freights; so Mr. Warren has argued for a duty of $1.50 a ton on lead, the same as the United States duty. Nor did he mince matters when he spoke of the "British Preference". The Canadian consumption of zinc is about 10,000 tons annually, whereas the Consolidated Company's capacity is 25,000 tons, superior in quality. The company's daily lead capacity is about 100 tons, about what Canada normally requires. There is now a specific duty on pig-lead of a cent a pound. Mr. Warren insists "there is no sense in the British Preference. They produce only 7,000 tons of lead in England a year; yet they send large quantities of German and Spanish lead to Canada under the preference of three-quarters of a cent a pound duty." Furthermore, it was contended by Mr. Warren that a "real difficulty in meeting this competition is that just now the English pound sterling is worth about $3.90 in Canadian funds and the German mark had depreciated to a still greater extent." So "the exchange situation negatives the protection on a wide variety of Canadian products besides lead."

Quebec Asbestos—Gaspé Zinc-Lead.

Minister Lemieux having joined the late Premier, Sir Lomer Gouin, in favoring protection for Quebec mineral industries, which topped the score in 1919 with a production of $20,813,670, it is to be expected that more official solicitude will be displayed. Quebec asbestos retains pre-eminence. The asbestos industry is exceptionally prosperous, though short-handed.

Equally unique, though awaiting transportation facilities, which are being provided by private enterprise, are the Gaspé zinc-lead fields, located about fifty miles from Cascapédia. While it is premature to present the Federal Zinc and Lead Mines of the Gaspé Peninsula as rivalling the New Jersey zinc property, or the Sullivan Mine, the extent of the occurrence and purity of the metals assure to Canada a supply that can compete with other producing areas. Apart from asbestos, it is becoming clearer that Quebec has something akin to the Joplin country — a commercial mining section certain to become an industrial factor — with or without protection, however scant has been official appreciation of it.

Unmindful of what happened in Missouri, where Joplin ores enriched those who foresaw their worth, the Canadian view has been that these Gaspé zinc-lead ores are irretrievably handicapped by the long haul from the mines to rail. Montreal owners, though unsupported, were undeterred, however, and there is every reason to believe Gaspé is going to market zinc and lead at a profit, unless the flood-gates of competition are opened. A noted international authority identified with one of the greatest zinc corporations advised his principals that the thickness of the formation is, perhaps, 5,000 feet, and that "'the zinc occurs as a practically pure blende, clear-yellow in color, even more pure than the Arkansas blende. There is almost no iron as pyrite to be seen * * * It seems to me that the way is open to a big development scheme. * * * It looks like a real mining country to me, in which there may be found deposits of copper, chrome, iron, etc., as well as zinc and lead."

Yet Canada has jogged along with the Galetta Mine, in Ontario, what came from Port Neuf, and what the Consolidated Mining & Smelting Company, found precarious. Even with its present transportation difficulty, the Gaspé properties of the Federal company, owing to the exceptionally clean character of the ores, will largely supplement the Canadian output. It has involved the expenditure of a substantial sum, no doubt, to prosecute the work of exploration and development; yet the results already indicate that Gaspé has something near enough to the coast and to a railway to obtain recognition. What is going on was foreshadowed by the noted international authority already quoted., when he stated to his principals that these controlling the Federal were locating additional blocks of ground. "Block B", he wrote, "is the only one on which the timber is cleared off. This was done for fire protection to the camp and for building and mining purposes. There are fifteen vein-outcrops showing on this hill. On only one vein has work been done. * * * Roughly calculating, they can be allowed a block 2,000 by 200 by 10 feet, or 2,000,000 cubic feet, or 200,000 tons from the present workings on this one vein to a depth of 200 feet. * * * I might describe this as, in its infancy, one of the possible great zinc-lead mines of the world. It embraces a district. It is the district that is more important than the ground already opened up."

Singularly enough, let it be reaffirmed, Canada has been skeptical about this Gaspé country. Upon the one-body described, development has continued until its vertical extent makes conservative the estimates of the authority quoted. But why labor the point? Professor Mailhiot, of the Polytechnic School, in behalf of the Quebec Government, reported among many other things, as follows :

"As the deposits are fillings of great fractures of the earth's crust, it would seem that they must go down to the base of the slaty sedimentary rocks. At the slight depth reached some veins show an increase in the volume of ore, while its character remains the same. There are outcroppings of ore distant from each other between which are differences of level of several hundred feet, and it is almost certain that the highest deposits go down in depth at least to the level of the lowest ones. Some veins (that was in 1917) have been followed for distances of 3,000 feet, and it is probable that they extend still further under the cover of superficial deposits."

The international authority heretofore quoted went further than Mr. Mailhiot, and advised his principals: "Exceptionally pure concentrates of lead and zinc can be made easily. The milling of this ore would be simple. Resulting products from these ores would be of good grade."

Flattering as this testimony undoubtedly is, considering it was given to the responsible chiefs of a prosperous competitor, the average of about 8 per cent zinc and 3 per cent lead, without dwelling upon the traces of silver or the gold content, makes of these Quebec fields more than has been realized by the Government of Quebec or the industrial leaders of the country at large. Trail facilities and the accumulating features of Gaspé obviate the necessity of Canada buying abroad what it already possesses in superabundance. Obviously the last word has not been said upon this Gaspé subject. The simplicity of the ores and ascertained contents furnish conclusive reasons why domestic zinc and lead should have a reputation commending them to international buyers. For the time being a lead smelter on the spot will reduce the outgo of money for continental leads passed on by British distributors under the "preference."

PROTECTION OF MINING INVESTORS IN BRITISH COLUMBIA.

The protection of the guileless public against the designing salesman of worthless mining stock is the subject of a recent pronouncement by the British Columbia Minister of Mines. He says: "The Minister of Mines has been given wide powers (under the Mineral Survey and Development Act), as any statement in regard to any company made by him is absolutely privileged. This is a policy intended primarily, and in fact solely, for the protection of the investing public. The Resident Mining Engineers, being in the field and in close touch with actual mining operations and development, are in a position to know whether statements made by stock mining companies for the inducement of the sale of shares are accurate, or if they do not, can readily confirm such statement. British Columbia in the past has been afflicted with too many flotations designed to 'mine the public.' The Department of Mines is determined that the issuance of worthless mining stock shall cease. Hence the legislation by which the government mining engineers are charged with the responsibility of assisting the Minister in seeing that the statements made by mining companies in prospectus or any documents issued for stock selling purposes, are strictly in accordance with the facts. In the course of the last few years there has been occasion more than once to apply the terms of the Act with results of value to the public and the same policy will be continued it being the intention that all money invested in mining shall be spent in legitimate mining development.

Recent Geological Reports on Gold and Silver Areas in Northern Ontario

Ontario Department of Mines.

Part III of the 29th Annual Report of the Ontario Department of Mines recently issued contains reports on five gold and silver districts in Northern Ontario made by officers of the Provincial Department of Mines.

Ben Nevis Gold Area.—Cyril W. Knight.

Mr. Knight's examination of the Ben Nevis area occupied less than two months' time between the Summer and early Autumn of 1919, and consequenty, it is noted, the geology has not been worked out in any great detail, and the map is to be considered as a reconnaissance one. The area is a part of that great belt of Keewatin rocks which stretches across northeastern Ontario, and as it is underlain by dark-coloured lavas which are intruded by a few masses of syenite and felspar-porphry, "it is a prospective field in which gold-bearing quartz veins of economic value may be found." Part of the area, which embraces 300 square miles, is not geologically mapped, and is practically unprospected. With the exception of work done by the Nipissing Company in the southeast corner of Katrine township there has been little activity in the district. The following interesting surmise is made by Mr. Knight:

"While in all probability the locality is one in which prospectors would preferably search for gold, still it may be pointed out that there is an intrusion of serpentine at the west side of Tannahill township. A somewhat similar intrusion elsewhere in Ontario, at the Alexo Mine, has associated with it an economic deposit of nickel and copper ore; while chrome iron-ore, platinum and microscopic diamonds have also been found associated with similar rocks in Reaume township, although not in paying quantities.

The topography of the district is interestingly described, by one who, following the commendable tradition of the Canadian geologist, both sees and records the natural beauties that are seen by the officers of the Surveys, often for the first time by white men. Witness the following description of a part of Katrine Township "From the highest peak on these mountains, which have been named the Workman mountains, a remarkable view of the surrounding country to the north, west and south may be obtained, particularly on a bright clear day. The landscape looks like a vast plain, in which hills a hundred feet high scarcely make themselves discernible. Far off to the northward, a distance of twenty miles, the outlines of the stately Ghost mountains along the north boundary of Harker township may be readily seen, coloured a soft hazy blue, and wonderfully silhouetted against the sky."

The map which accompanies the Report is on a scale of one mile to the inch, and includes Elliot, Tannahill, Dokis, Clifford, Ben Nevis, Pontiac, Arnold, Katrine and Ossian Townships, the townships of Elliott and Dokis being unmapped.

West Shiningtree Gold Area.—Percy E. Hopkins.

Mr. Hopkins report covers an examination made during four weeks in September 1919, and is accompanied by a geological map on a scale of one half mile to the inch, covering Churchill, Macmurchy, Asquith and Fawcett townships.

Mr. Hopkins summarises the economic possibilities of the area as follows.

"Since the first discovery of gold in 1911, when the railway was sixty miles distant, numerous other finds have been made in parts of four townships. The railway now passes within twenty miles of West Shiningtree lake, and is connected by a wagon road with most of the properties. Frieghting in summer is still quite expensive. Not only the poor transportation facilities, but also conditions during the war period, have retarded mining development; hence very little underground exploration has been done."

"Gold occurs in numerous deposits, some of which are quite large, but in many of them the precious metal is not concentrated sufficiently to pay for working, while in others it is irregularly distributed. A few small pockets of high grade ore have been found on half a dozen properties, but this does not necessarily signify that these will make mines, since the other portions of the veins may contain little or no gold. According to the manager's reports on the Herrick, ore shoots of considerable size are indicated by surface sampling, by sinking and sampling a 50-foot shaft, and by diamond drilling. The Ribble vein, which outcrops on the Wasapika, has also been exposed on the Miller-Adair claim, and is traceable for about one-quarter of a mile on the Foisey, being in all over a mile long and of a satisfactory width. The manager, Geo. R. Rogers, reports that the outcrop of this vein on the Wasapika shows 800 feet of $9.00 ore across four feet, while in addition a cross-cut on the 100-foot level showed 23 feet of schist and quartz, assaying $7.20 in gold per ton. One-half mile south of the Wasapika, on the Miller-Adair, there are also indications of ore in the Ribble vein on the surface; and further south still, on the Foisey, the vein is large, and carries visible gold. Shoots of ore may occur in various places along the Ribble vein, but it will not necessarily all be ore."

"A few properties in the area have promise, but they are still in the prospect stage. Whether they will become mines or not will only be determined by further developing the veins underground and sampling the same."

"It may be said that during the geological examination of a deposit such as one of iron or copper, it is often possible to form some idea regarding its value; but in the case of gold deposits it is usually more difficult to do so, systematic sampling being required. It is not the practice of the Bureau of Mines to undertake systematic sampling of gold or other deposits, this being naturally the function of the technical or professional men employed by the property owners."

"No gold has yet been produced apart from what may have come from a few high-grade samples, some of which might be called bullion. The encouraging results obtained on a few properties will probably lead to mining being conducted on a larger scale. There seems no reason why the veins which have a satisfactory length and width should not extend to considerable depth. One would also expect to find the values underground much the same as they are within a foot or two of the surface, since any oxidized or weathered surface zone has doubtless been removed by glaciation. All the rock formations are worthy of prospecting except the granite and diabase. Gold may even be found in the granite, although this rock has not yet, generally speaking, proved very favourable for gold in northern Ontario. The intersection of veins with Iron formation or pyrite formations should be a favourable place to look for enrichment. The Iron formation or pyrite formations do not usually form gold ore bodies themselves, unless cut by numerous secondary quartz veins.

Detailed description of the various mining properties is given in the Report.

Matachewan Gold Area.—A. G. Burrows.

The general geology of this district having been previously reported upon* this report deals chiefly

*The Matachewan Gold Area. A. G. Burrows. Ont. Bur. Min. Vol. XXVII, 1918.

Geology of Matachewan District. H. C. Cooke. Memoir 115, Geol. Sur. Can., 1919.

with the mining properties in the area, which include the Davidson claims, and the Otisse (now the Matachewan Gold Mines) claims, and the Nelson claims in Baden township. The mineralogy of the Otisse ore is discussed at length, and the presence of scheelite is noted.

Barite in Yarrow Township.

The presence of barite has been located near the north boundary of Yarrow township, on the west side of Mistinigon Lake. A selected sample of barite contained 98.25 per cent barium sulphate, while a channel sample taken by M. B. R. Gordon, contained 81.24 per cent. A sample of fine-grained barite taken by M. Burrows carried 94 per cent barium sulphate. As far as can be ascertained the deposit appeared to be free from sulphide minerals. "From the amount of work done, it is apparent that there is a large tonnage of high-grade barite.

Another large deposit of barite, known as the Biederman, in Cairo township, was described in the 1918 Mines Report.

Argonaut Gold Mine.—C. W. Knight

At the request of the management of the Argonaut gold mine, Mr. Knight spent ten days in 1919 in examining and making a detailed map of the property. The map in question is bound in with the Report, and is on a scale of 400 ft. to the inch.

Mr. Knight does not express any opinion on the economic possibilities of the property, but mentions that the felspar-porphry is said by Burrows and Hopkins to be similar to that at Kirkland lake.

The 15-stamp mill on the property was remodelled during 1919 by Mr. John E. Hardman, of Montreal, and is now used for testing purposes only. The intention is to construct a 300-ton mill. The following description of the milling operations is furnished to Mr. Knight by Mr. Hardman:

The mill was remodelled solely to act as a test mill, so that data might be obtainable for the construction of a large mill that would successfully extract the largest possible percentage of the total values contained in the ores. The present mill was not intended to produce bullion commercially and permanently.

The mill contains 15 stamps of the ordinary pattern, each weighing 1,250 pounds; these drop 100 times per minute and discharge through "Tyler" wire screens having an aperture of about .55 mm.

The batteries have an inside "V" plate, an outside splash plate 8 inch wide, a "quadrant" plate with a radius of 9 inches and the usual 8 feet of table plate. The mercury traps are of the usual Homestake type and all the table tails run through a 4-ft. clean-up pan before passing to the concentrating tables.

It is not probable that the new mill will use stamps to comminute the ore, as it has been proved that this can be done more cheaply by other machines that are not so expensive to erect or build.

The main items that are desired from the test mill are: (a) the average value in free gold that is amenable to amalgamation; (b) the percentage of metallic sulphides in the ore and the gold values therein contained; (c) the gold values in the non-metallic tails. The necessity for (b) arises from the fact that the Argonaut sulphides are cupriferous, carrying from 3 to 12 per cent. of metallic copper, and putting their treatment quite outside the usual cyanide methods. A process is now being devised that promises to recover both copper and gold values at a favourable cost so that both metals will help the profits.

The results that have so far been obtained from working some 2,000 tons have been very satisfactory; the average amalgamation recovery being 68 per cent. of total assay value, and the values in the concentrates averaging but 17 to 18 per cent. of total gold values. The 15 per cent. in the final tails yields its gold to a dilute cyanide solution.

Argonaut Gold, Limited, will not decide on either the process or the equipment of the new mill until a sufficient number of tests have been made on the red porphyry ore that underlies the Keewatin basalts. A cross-cut, No. 203, is now driving to cut this porphyry ore, but is not expected to reach it before midsummer; it is possible that a different mineralization may demand additional niceties or equipment in the mill.

Gowganda Silver Area.—A. G. Burrows.

This is a report on a two weeks examination of recent developments in Gowganda, particularly in the vicinity of Miller Lake. Since the discovery of silver in the vicinity of Miller Lake in 1908 there has been produced 5,430,152 ozs. of silver to the end of 1919, most of it from the Miller Lake O'Brien Mine. With the exception of an ore-shoot in conglomerate in the Millerett Mine, which produced about 500,000 ozs. of silver, all the ore has come from the diabase sill.

A series of ideal sections through Miller Lake are given together with a sketch map showing the relation of the diabase sill to the older rocks. Mr. G. M. Colvorcoresses is quoted from the "Canadian Mining Journal" of April 15th, 1912, as pointing out that the westerly side of the diabase sill exposed to the west of Miller Lake is the footwall. Mr. Colvorcoresses, who was at one time manager of the Millerett Mine, stated:

"The Huronian rocks underlying the particular sill on which "the O'Brien and Millerett are located are very clearly "exposed less than a mile west of these properties, and pros- "pecting there has so far had no good results. It would seem, "nevertheless, that the claims thus located would merit par- "ticularly thorough development if Professor Miller's theory "as deduced at Cobalt is in any measure applicable to the "Gowganda district. Professor Miller states that at Cobalt 85 to 90 per cent. of the production has come from the veins "found in the foot wall of the diabese sill; and it is strange "that up to the present time absolutely nothing has been "found in the foot walls of the several diabase intrusions which "carry silver in the Gowganda district."

Mr. Burrows emphasises the fact that silver production in the Gowganda district has so far been from veins in the diabase, whereas at Cobalt it has come from below the diabase. "No silver ore has yet been produced, as at Cobalt, from the formations that were once below the diabase sill and are now exposed by erosion. Under favorable conditions one would expect that silver ore would occur in some parts of this area, where the footwall is exposed in proximity to the diabase."

This series of Reports is annotated with references, and indexed and shows signs of very careful editing and proof-reading, as is usual with publications of the Ontario Bureau of Mines.

It is announced that the Haileybury Frontier Mine, about fifteen miles south of Cobalt in South Lorraine, has been sold by Joseph Newburger of Memphis, Tenn. the owner, to New York interests represented by H. F. Strong, under a leasing option to purchase at a price said to be $135,000. It is understood that operations under the new ownership will commence immediately.

Certain shareholders of Wasapika Gold Mines, Limited, have applied for an injunction restraining the company from issuing stock to the Wasapika Consolidated Mines, Limited in the manner as set out in their circular of November 1st. It will be recalled that the exchange proposed was on a basis of three shares of the new stock for one share of the old and that on November 11th the opportunity for shareholders to avail themselves of this offer would lapse it being intimated that after the date mentioned, the original certificates would have no value. The injunction proceedings were called at Osgoode Hall this week when George R. Rogers, the president, was unprepared to proceed with the argument and an adjournment was granted.

Northern Ontario Letter

THE SILVER MINES

The Cobalt Area.

By eliminating all non-essential work it is believed the power situation at the mines of Cobalt will not become any more unsatisfactory than as at present. It has been found that the consumption of energy may be conserved very considerably by dispensing with certain branches of work. The curtailment of operations in connection with the re-treatment of tailings by oil flotation will be one of the big factors toward relieving the situation. This policy is usually followed out during winter months even under normal conditions. Another factor is that after the close of navigation on the Montreal River, the power company will be permitted to draw more heavily upon the reserve supply of water, and it is felt this will carry work through until the spring freshets set in. In the meantime, should soft weather still set in before real winter commences, the entire situation would become quickly adjusted.

For the month of October, according to the managers' regular monthly report, to the president and directors, the Nipissing mine produced $184,578, and shipped bullion and residue from Nipissing and customs ore of an estimated net value of $316,475. The report states that owing to "power interruptions", the amount of development work done during the period was considerably below normal. The report states that no new veins were discovered during the month, but that developments on old ones were generally satisfactory. The output for the month shows a decline from $225,100 during the preceding period. This decline was partly due to the decrease in the price of silver, the October estimate being based upon silver at 82 cents an ounce as compared with 91 cents during September.

An average of close to thirty tons of ore are being shipped from the Peterson Lake mine, to be treated in the mill of the Dominion Reduction Company. In addition to this, underground work is proceeding as rapidly as the power supply will permit. The management is optimistic over the outlook and confident of a comprehensive scheme of development work resulting in success. The area still undeveloped is quite extensive.

The Crown Reserve Mining Company is stated to have secured an option on the old Farah property, more recently known as the Nipissing Extension. The Crown Reserve is also continuing its deep drilling scheme in which it is planned to explore the formation to a depth of about 2,000 feet. The drill is already down between 700 and 800 feet, working on an incline from the 500-ft level. The crosscut is also proceeding on its way toward the zone in which it is hoped to open up the continuation of the three high-grade veins opened up not long ago on the Kerr Lake, at a point within ninety feet of the Crown Reserve boundary, and running directly toward the Crown Reserve.

Operations have been temporarily suspended on the Beaver Consolidated. The reason for this is that the supply of power has been adequate only to operate at reduced capacity and in addition to this a break occurred in the crushing equipment which has also interfered with milling. These causes provide the reason for deciding to remain closed until repairs can be completed and pending the return to a more satisfactory power supply.

The Elk Lake Field.

Announcement is made that the National Mining Corporation has taken an interest in the White Reserve mine, in the Maple Mountain section of the Elk Lake district. This important corporation has its head office in London England, and was incorporated less than two years ago, having a paid up capital of £2,500,000 for investment in connection with mining within the British Empire. Mr. J. B. Tyrrell, Toronto, is the company's consulting engineer for Canada. The plans of the company are to conduct a diamond-drilling campaign on the White Reserve, where silver showings are highly encouraging.

During the last 25 days of October, the Chambers-Ferland extended a cross-cut 140 feet from the 385-ft level of a shaft on the Right of Way Mine. This drive will ultimately be about 500 feet in length and will connect up with the main workings of the Chambers-Ferland. It is passing through highly promising prospective territory.

Silver mine operators are inclined to the belief that the January silver market will be marked by a substantial increase in price. This belief is based on the fact that Far Eastern demand usually attains its high point about that season. As an instance of such an influence was the sensational rise in January 1920, when the price of silver rose to the record price of $1.37 an ounce.

New interest centers around the Mining Corporation, due to this important silver producer being interested in the exploration of the Flin-Flon mine in Northern Manitoba. Added interest attaches to the new venture owing to a statement issued by Charles F. Ayer, New York, in which it is pointed out the option holds good until March, and that up to the present time, the results have been quite as favorable as expected.

Mr. Ayer points out two questions which will have vital bearing on the final decision. First is as to whether the good results continue underground, and second is the question of a change in the Dominion mining law in which it is provided that refining must be done in Canada and that the Dominion Government has the option of imposing whatever royalty it desires.

The operators of the Flin-Flon recognize that they are confronted with a big problem in getting the enterprise under way. Enormous expenditure will be incurred. For that reason they believe the enterprise should be exempted from the royalty clause for a period of from 15 to 20 years and that after such time a definite maximum be decided upon so as to estimate its bearing on the economic operation of the property. In mining circles the request appears to be entirely reasonable. As regards release from the provision that refining must be done in Canada, it is felt that this might also be done for a limited period at least, say 10 years. This would enable the operators to proceed quickly with production and be able to realize income pending the determination of the extent of the deposit and the size of the refinery required on or near the mine itself.

Request Is Reasonable.

In view of the great importance of the Flin-Flon enterprise to the economic development of that part of Northern Manitoba, mining men express the opinion that nothing should be permitted to impede progress, and the Canadian Government should be willing to make the temporary concessions requested, knowing that in the end the country will be in a position to

benefit in a maximum degree from the success met with in the meantime.

In regard to development work to date on the Flin-Flon, Mr. Ayer has this to say:—"We can say that the results obtained from development to date are fully up to our expectation. This fact, and the statement of our engineers that the diamond-drilling, on which the original ore-estimate was made, has been very carefully done, lead us to the belief that the grade and tonnage of ore on the property will be as high as anticipated."

Ore British Shipments.

During the week ended November 12th, four Cobalt companies shipped an aggregate of five cars containing approximately 382,011 pounds of ore. The Coniagas was the heaviest shipper with two cars.

Following is a summary :—

Shipper	Cars	Pds.
Coniagas	2	168,977
McKinley-Darragh	1	85,696
Nipissing	1	67,338
Beaver	5	60,000
Total	5	382,011

During the corresponding period, the Nipissing mine was the only bullion shipper, sending out one of the largest individual consignments in recent months, made up of 183 bars and containing 250,065.68 fine ounces.

THE GOLD MINES.

The Porcupine Area.

At the beginning of this week, the mines of the Porcupine district took adequate steps to meet the power situation, and the plan adopted conveys re-assurance of steady operation. It has been arranged to reduce the power consumption about twenty-five per cent., and thus establish a rate which may be maintained throughout the winter. To offset this reduction, the leading mines are ordering a large amount of coal and will employ their auxiliary plants. As in the case of the Hollinger Consolidated, the company is stated to have arranged to order some 8,000 tons of coal and to have a part of it delivered by special train. In this way it is hoped to maintain operations at the present rate. The Dome and the McIntyre are also making arrangements to use all the auxiliary power possible.

These arrangements are calculated to assure steady operation throughout the winter, pending the freshets in the spring. At the same time, the peculiar nature of the present Autumn is not without promise of still bringing rain, in which case with the auxiliary power being provided, the mines would be enabled to speed up work to full capacity, and attain records in excess of anything so far in their history. The ore in sight, together with the milling equipment ready to operate, and the steady influx of men go to make up the reasons why a sufficient power supply would lead to great expansion in operations throughout this field.

Cross-cut work at a depth of 250 feet on the Porcupine-Keora has advanced about 200 feet, and with a little less than 180 feet remaining between the present face and the point where it is expected to encounter the first of two veins indicated by former diamond drilling. Circular information from the company brokers is optimistic, it being shown that the diamond-drill core indicated two wide veins in which gold values were high. Until such time as the veins are reached, however, it will be impossible to estimate the accuracy of the information so far available. The property is equipped with a small steam-driven mining plant.

The labor problem at the Dome Mines has been solved to a large extent by the arrival of 109 Cornish miners, imported direct from the Old Country. These men arrived a few days ago and are already at work. They will work out a four months' contract at the Dome, and with the Canadian labor supply having undergone a favorable change, the question of procuring adequate working forces is lessened very considerably.

A report on the strength of which the deal in England for the sale of the Davidson Consolidated is being negotiated has just come to hand. It was prepared by R. C. Fielding, A.R.S.M. and is couched in most optimistic terms. It is addressed to the General Mines Investment (1920) Ltd., of London. Mr. Fielding estimates "probable ore" at 350,000 tons, with $11 per ton in extractable gold content. He estimates costs at $4 a ton, and thus indicates a profit of $2,450,000.

The Kirkland Lake Area.

In common with Cobalt, from which district the Kirkland Lake field receives its electric power, the shortage of energy is felt more or less seriously. Arrangments have been made to reduce the current about 25 per cent. until the water in the Montreal River rises. With the close of navigation it will be permissible for the power company to draw more heavily upon the reserve supply, and even though no more rain falls it will be possible to continue operations as now arranged for. Should a thaw set in, normal rate may then be resumed.

A statement issued to the shareholders of the Kirkland Lake Gold Mining Company, under date of 9th November, states that the No. 2 shaft has been deepened from 700 ft. to 900 ft., at which depth a cross-cut encountered the ore zone 35 ft. wide.

"Drifting on this ore zone", states the Report, "we " encountered assay values in sulphides from $18 to " $42, and recently, in drifting on the foot-wall side, " we encountered free gold and tellurides, special " assays of which give values of $34.70 and $122.75, " and channel assays across the face of the drift— " five feet—average $52.10." The presence of the ore-body at the 900 ft. level is believed to establish a proven body of ore of 700 ft. in depth. The mill is treating 110 tons of ore daily, but has a capacity of 150 tons daily. It is decided to deepen the main working shaft to 900 ft. from its present depth of 520 ft. Operations have been restricted by labor shortage, and also by shortage of hydraulic power caused by dry weather.

As a result of the completion of a large program of surface exploration on the property of the King-Kirkland Gold Mines, in the eastern part of the Kirkland Lake district, careful assays taken show comparatively high values, and the company is now in a position to select the most suitable at which to commence underground operations.

On December 3rd the Bourke's Gold Mines will be sold in Haileybury at public action, subject to a reserve bid.. The property is situated at Bourke's Siding, some twelve miles north-west from Kirkland Lake. It is equipped with a small steam-driven mining plant and has generally been regarded as a promising mining prospect. Development work has been carried to a depth of 200 feet and one or two short ore-shoots opened up. The grade of the ore is quite high, although the deposit is narrow. In an endeavor to induce the stockholders to protect their interests, the Company

issued an appeal some months ago asking each shareholder to pay a certain amount per share to cover the debts owing, at the same time guaranteeing not to get into debt again. In view of the present announcement by the Sheriff of the district of Temiskaming it is believed the appeal did not meet with the desired response.

An injunction has been secured by minority interests in the Orr Gold Mines restraining Hamilton B. Wills of Toronto, as well as the majority interests in the Orr from transferring some 800,000 treasury shares of that company. The trial of the case will come up in due course. It has to do with an apparent endeavor of the Wills' interests to recoup expenditure incurred previously through the Kirkland-Prophyry Company which for a time held an option on the Orr and which subsequently went into voluntary liquidation.

An injunction has also been granted in connection with plans of the Wasapika Gold Mines of West Shining Tree to liquidate and exchange its shares for stock in the Wasapika Consolidated. The point objected to was the setting of a certain date, November 12th, as the final date on which recorded owners of shares would receive credit and specifying the intention of the Wasapika Consolidated to issue its shares to those holders of Wasapika who appear on record. It is said that large blocks of this stock is held by individuals who have never placed themselves on record.

British Columbia Letter

Stewart, B.C.

George Clothier, Government Mining Engineer, has returned after making a final tour of the Salmon River Section, Portland Canal, Mining Division. He expresses satisfaction with the progress made this season in the prospecting of this mineral zone, and in the development, both of new claims and other mining properties. He now is engaged in the preparation of his Annual Report.

The first winter's shipment of ore from the Premier Mine, Salmon Arm, took place a few weeks ago. Last winter's shipments totalled approximately 1,500 tons, and this year it is expected to double the output.

Gratifying reports are received regarding the development of the Silver Tip Group of mineral claims. It is said that thirty-seven open-cuts were made on the veins during the summer, and three tunnels driven an aggregate of sixty-eight feet. As a result important ore showings have been developed. The values include lead, zinc, and iron sulphides, carrying native ruby and brittle silver. The silver values in places are very high.

W. A. Meloche ,managing engineer of the Algunican Development Co., states that ore will be shipped this winter from the Spider Mine, Salmon River, and that if the development planned shows up an ore tonnage equal to three times what is in sight, a mill will be working on the property by next July. With further reference to his Company's operations in the Portland Canal District, Mr. Meloche says:—

"We will carry on development at the Spider all winter and hope to make a mine there. Operation of the George copper group, Bear River, will be undertaken next year but to what extent will depend upon results.

"While we have obtained some satisfactory results here we have also obtained some unsatisfactory ones. But this is true of any camp. On the whole I am very satisfied with what has been done.

"I want to commend the Department of Mines and Department of Lands, and Hon. Mr. Sloan and Hon. Mr. Pattullo, for the way they went ahead and what they accomplished in this district with small appropriations. It was difficult work under difficult conditions. The transportation facilities provided put a country in a position to develop more than anything else.

"I am genuinely sorry to leave Stewart for I have received every courtesy and co-operation from the people."

The headquarters of the Algunican Development Co., have been transferred from Brussels, Belgium, to San Francisco, Cal.

Anyox, B.C.

That the Hidden Creek Mine of the Granby Consolidated Mining & Smelting Co., has 11,000,000 tons of ore designated as No. 1, and containing 2.4 per cent copper, and 14,000,000 tons designated as number two ore containing about 1.25 per cent copper, is the effect of a report recently published. Smelting is said to be limited mainly to the No. 1 ore, but the No. 2 will become available after concentration.

Prince Rupert, B.C.

H. A. Guess, President of the American Smelting & Refining Co., and now head of the Premier Gold Mining Co., arrived from New York recently to visit the latter property. He was accompanied on his trip north, by H. MacDonald, mine foreman.

Nelson, B.C.

The Ottawa Mine, Springer Creek, is rapidly being put in shape for active operation and shipment of ore. The machinery for the tube mill is on the ground, and the cable for the tram is at the upper terminal, which has been finished. The latter will be about 2,000 in length. L. H. Biggar, the mine manager, is gratified by the progress made and is looking forward to the Ottawa becoming a regular producer in the near future.

Trail, B.C.

Ore receipts at the Trail Smelter of the Consolidated Mining & Smelting Co., for the week ending Oct. 21st., totalled 9,239 tons, bringing a total for the year up to that date to 284,497 tons.

Merritt, B.C.

A large clay deposit located near Merritt, has received special attention from Officials of the Department of Mines, Ottawa. It appears that it is a high class bentonite, and as far as known the only such body in Canada. There are deposits in the State of Wyoming occurring in connection with coal deposits similar to those of the Nicola Valley, B.C.

A sample of the clay has been taken to Ottawa for analysis, and the owners of the property are hopeful that the outcome will be the establishment of an important industry.

Vancouver, B.C.

At a recent meeting of the Mining Committee of the Vancouver Board of Trade there was some discussion with reference to the falling off in British Columbia of the production of gold, the upshot of which is the unanimous endorsation of the following resolution which explains itself.

"Whereas the maintenance of the gold production is essential to the financial stability of the Dominion;

"Whereas this bureau therefore views with alarm the falling off in the national gold reserve at Ottawa and in the gold production of the Dominion;

"Whereas the latter condition is due to the abnormal cost of production under existing conditions;

"Whereas these conditions are intensified by the incidence of taxation;

"Therefore, the Vancouver Board of Trade urges on the Dominion and Provincial governments the necessity of action to encourage the gold production to the utmost, and offers the following suggestions:

(a) Removal of all taxation of gold mines and a customs duties on machinery and supplies not produced here and imported for use in the industry, until such time as cost conditions return to normal:

(b) Return to Canada of all gold produced from exported ore, the purchase thereof by the mint at Ottawa and the Dominion assay office at Vancouver. For all gold sold by these institutions for industrial purposes the selling price shall be such as shall cover the normal cost of production, such surplus revenue to be distributed among the gold mining companies in proportion to production."

In the hearing of the trial of Grant vs. Alexander estate, in which the plaintiff seeks to establish his right to a share in the Alexander Mine Property, Atlin District, some rather startling evidence has been submitted. A New York handwriting expert has declared that Captain James Alexander's signature to the declaration of trust, giving W. Pollard Grant a one-fifth interest in the property, is a carefully made tracing of the Captain's signature. It was positively stated that the signature on the trust agreements was copied from that on a check which had also been put in evidence.

Something has been learned of the terms of the settlement of the recent trouble in the eastern British Columbia coal fields and the mining centres of the Province of British Columbia.

It is understood that the day wage men have received an additional $1.15 per ton which is along the lines of their demand. This no doubt will mean an increase in the price of coal in these fields. In fact information has come from authoritative quarters to the effect that both bituminous and lignite coal will advance 60c a ton at the Collieries affected.

Under amendments to the Coal Mines Regulation Act passed in 1919, the Minister of Mines of British Columbia is authorized to arrange for the appointment of a Minimum Wage Board. The powers given this Board include the definition of coal mining districts, within which it may carry on investigations as to the wage scale paid to coal miners.

It also may carry inquiry to the point of ascertaining, by means of evidence taken openly, general working and living conditions among the miners. Although this provision was made by the Legislature of 1919 it did not become operative until July of this year. Since then the Minister of Mines has been engaged in the work of organizing the Board. The Coal Mine Operators of the Province have selected George Wilkinson, Supt. of the Pacific Coast Coal Mines, Ltd., as their representative, and the coal miners now are busy choosing, by means of the ballot, their representative. It is understood that the Minister looks forward to having the Board well launched and able to commence its activities in the course of a few weeks.

The shortage of fuel oil is causing some concern to western transportation officials. The Canadian Pacific Railway is reported to be seriously considering reverting to coal for its locomotives. The Union Oil Company has a contract to supply the C. P. R. with oil until the end of the year, and is of the opinion that it can still continue to keep the Company after that. In view of the uncertainty, however, the C. P. R. men are making such arrangements that in the event of a definite shortage of fuel-oil they will be able to carry on without inconvenience. The Pacific Great Eastern has four locomotives that can be readily converted to coal burners. In the meantime this Company is fortunate in having secured a large reserve of fuel oil.

THE NOVA SCOTIA COLLIERIES.

After protracted conference between representatives of the Nova Scotia District of the U. M. W., representatives from international headquarters, officers of the Department of Labor, and officials of the Dominion Coal Company, Nova Scotia Steel & Coal Co., and the Acadia Coal Co., a basis of agreement was reached which the miners' representatives have laid before the men for ratification, or otherwise, accompanied by strongly worded advice to accept.

The text of the proposed agreement is as follows:

After canvassing the situation from every angle, recognizing the importance of industrial peace in the coal fields at this time and with a full knowledge of both sides that the agreement of January 1920 was still in effect, it was deemed expedient in the interests of peace and harmony that something should be done to improve the existing labor situation. The representatives of the Dominion Coal Company, Ltd., Nova Scotia Steel and Coal Company, Ltd., each submitted the following, as its final offer:

Tonnage rates to be increased 10 cents per ton over present schedules. All datal hands to be advanced 55 cents per day above present schedule rates.

All local contract rates to be advanced 12½ per cent. over those in existence at the present time.

This agreement when approved by the members of District No. 26, United Mine Workers of America to become effective from the first of November, 1920, to November 30th, 1921, both sides to agree to meet at Halifax, twenty days before the expiration of this agreement for the purpose of arranging a new understanding.

The following provisions were also agreed to by the representatives of the companies and the men for inclusion in the new agreement which is to supercede the existing agreements, namely:

Management of Mines.

The right to hire and discharge the management of the mine and the direction of the working forces are vested exclusively in the company, and the United Mine Workers of America shall not abridge this right. However, the Company agrees not to discharge employees or refuse work to applicants on account of, or because, of their affiliation with the United Mine Workers of America. Employees shall perform such work as the management may direct.

Hours of Work.

Hours of labor to be in accordance with the provisions of the agreement of February 21st, 1919, in this respect as follows:

The collieries will commence to hoist coal at 7 a.m., at which time all the men must be in the mine.

The days work will cease at 3 o'clock when all arrangements will be available for conveying the men to the surface.

The surface men around the bankhead and screens associat- with the handling of coal are to be on duty between the hours of 7 a.m. and 3 p.m. and for a short time after, if necessary for the purpose of attending to such duties as will facilitate their own work, such time not to exceed a half hour.

The standard of other surface labor around the collieries to be from 7 a.m. to 4 p.m. with half an hour for dinner.

There continuous attendance is required the shifts will be eight hours instead of twelve both surface and underground.

No Stoppage of Work.

No stoppage of work shall take place owing to any dispute arising at any mine under the jurisdiction of District No. 26, except for refusal of employers to pay wages on the regular pay day without satisfactory explanation, or danger to life or limb.

It is distinctly understood that no other grievance shall be considered where men suspend work to enforce adjustment and employees striking in violation of contract shall not be sustained in such cause.

The international organization and District No. 26 officials guarantee the fulfillment of this agreement and pledge co-operation and support in every legitimate way to maintain and encourage increased output.

Duties and Limitations of Mine Committee.

The duties of the mine committee shall be confined to the adjustment of disputes between the mine officials and any of the members of the United Mine Workers of America working in and around the mines arising out of this agreement or any local agreement made in connection therewith where the mine officials and said miner or mine laborer have failed to agree. Thereafter, the matter in dispute shall be referred to the district executive of the U. M. W. of America and the district superintendent of the company and the higher officials.

In the event of their failure to settle the matter it shall be referred to arbitration and the majority decision shall be final and binding upon all concerned.

If within ten days the representatives of the operators and miners fail to agree upon an arbitration when the selection of an arbitrator shall be made by the prime minister of Nova Scotia who shall make such selection on within ten days and such selection shall be final, miners to continue to work from the inception until the final adjustment.

Funerals.

It is recommended that the operators and miners executive draft a suitable rule to govern the operation of the mines in the event of fatal accidents and funerals.

Housing.

Housing and rental are not part of this contract. However, we recognize the necessity of improving the housing conditions in the mining centres but would respectfully refer the subject back to the management and those who may be affected and recommend that in looking toward betterments in improved housing conditions that where substantial improvements and extensive repairs are requested by the occupants and the same are made that such rental charges covering such substantial improvements and extensive repairs be mutually agreed to between the officials of the company and the parties affected.

Price of Miners Coal.

It is recognized that the price charged miners for house coal has not been in keeping with the cost of production and it is felt that in future the price to the miner for his own use must be considerably advanced and for this reason the price where it is less fixed at $2.25 per ton at the mine or coal yards.

Where it is necessary to transport the coal from the mining centres over a railway in order to make delivery, the cost of said transportation shall be added to the above price.

Comparison between the terms of this agreement, and the working conditions demanded before the Royal Commission, can be made by reference to the "Journal" of 30th July, page 621.

In commending this agreement to the acceptance of the workmen, the President and Secretary of the Nova Scotia District, after detailing the declining trend of business, the difficulties under which the U. M. W. is laboring in the United States, and the reduction in coal selling prices at United States mines, state that the miners in Nova Scotia have the choice of two courses, namely:

"(1) A strike under the adverse circumstances outlined, which would in our opinion jeopardize the life of our organization, and all the gains made during recent years, or

"(2) Accept as a settlement the proposed contract, which we have been, with the assistance of the international union, able to negotiate, after conferences held both in Montreal and Indianapolis, and thus preserve all we have gained."

The terms of settlement have been under discussion by the Wage Scale Committee of the District, and the question of acceptance or rejection is to be decided at a conference of delegates from the locals to be held on the 16th November.

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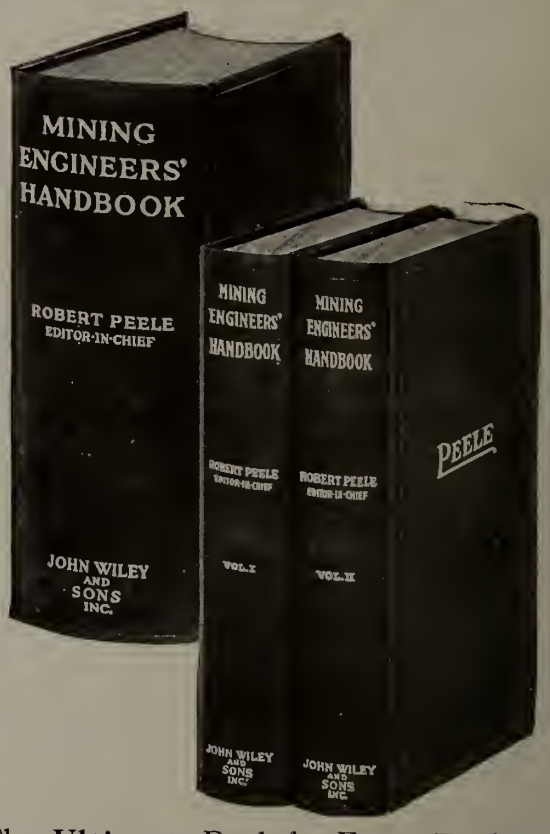

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PHYSICAL CONDITION OF THE HOLLINGER CONSOLIDATED GOLD MINES.

By J. A. McRAE.

Now that the general economic conditions are improving, and steadily moving toward at least a gradual solution of part of the problems which have made gold mining difficult in recent years, the time seems opportune to review the status of the Hollinger Consolidated Gold Mines in its physical aspects.

The Hollinger has produced a little over $37,000,000 to date. In doing this, not far under 4,000,000 of ore has been treated.

As against these figures, the ore reserve as of the beginning of this year amounted to 4,388,940 tons containing $39,894,770.

These total figures show that the amount taken out and that placed in sight aggregate at least 8,250,000 tons containing a total of something like $77,000,000.

Such figures in themselves are exceedingly impressive, but are made doubly so when the general physical condition of the mine in all its aspects are taken into consideration. For instance, these figures deal only with a total of 38 veins which have been developed underground, and only contain estimates of ore to a depth of just 100 feet on 39 other known veins which have been opened up to a limited extent at surface. In reality, the big achievements on the Hollinger are the result of work on approximately one-half of its known veins.

The importance of the 39 veins awaiting development is apparent from the fact that they are officially declared to range in width from 4 ft. to 25 ft., and the average gold content is estimated at $9.88 to the ton. One of these veins is over 11 ft. wide and carrying average gold values of $23.50 to the ton. Another is 16½ ft. wide and carries an average of $20.30 to the ton. As a matter of fact, the average value in these 39 undeveloped veins as shown at $9.88 to the ton is actually higher than that found in the 38 veins being developed which average $9.09 to the ton.

It would perhaps not be in keeping with sound business for the Hollinger officials themselves, to indulge in advance expectations, but to the general observer who endeavors to analyse the physical status of the mine, it is permissible to deal with these enormous potentialities. One half of the known veins having proved to continue rich to great depth, it would be unreasonable to suppose the remaining half do not do likewise.

Another factor having an important bearing on the future outlook is the development at depth on the McIntyre-Porcupine mine, which lies right beside the Hollinger, and in which gold values have been found to increase as greater depth is attained. Indeed on the McIntyre at a point below the 1,000-ft. level, what is believed to be the continuation of vein No. 4 on the Hollinger, has been encountered and contains high-grade ore over great width. This vein where it occurs on the Hollinger was estimated at the beginning of this year to have $5,786,590 in ore reserves, above the 800-ft. level. Below this point very little work has so far been undertaken, but from the results on the adjoining McIntyre, the prospects below the 800-ft. level on the Hollinger warrant optimism.

Of the total estimate of 4,388,940 tons on the Hollinger, containing $39,894,770 in ore reserves, the entire amount (with the exception of 306,920 tons containing $2,433,480) lies above the 800-ft. level. These facts show that the $77,000,000 so far mined or placed in sight is contained in only one-half of the known veins, and these developed to no great extent below a depth of 800 feet.

Geological conditions, as found by diamond-drill tests, are said to undergo no change as so far tested to a depth of over 2,000 feet. Actual developments on the McIntyre-Porcupine show high-grade values over extensive areas at a depth of around 1,600 feet. Therefore, as a consequence of all this, it seems certain the Hollinger Consolidated is only in its early stages of development.

Adverse economic conditions have retarded progress on the Hollinger. Since the completion of its mill, adequate to treat from 3,000 to 3,500 tons of ore daily, at no time has it been possible to procure a full supply of workmen. Nevertheless, development work has been maintained, ore reserves have not been depleted and the conditions of the mine is such as will make it possible to take full advantage of favorable conditions whenever they materialize.

A Recent View of the Hollinger Mine.

This period seems to now be in sight. Warnings in certain of the leading cities for men to seek employment elsewhere, and the expression of fear over the possibilities of a "bread-line" in such centres, indicate a more plentiful supply of workers for the gold mines, and resulting increase in production.

The recent achievements on the Hollinger are the result of working at not much more than half capacity. Results of capacity operating should be most satisfactory.

NEW MAP OF THE FLIN FLON LAKE MINING DISTRICT.

We have received from the Surveyor General of the Topographical Surveys Branch at Ottawa copy of a new map of the Flin Flon Lake Mining District — which lies partly in Manitoba and partly in Saskatchewan. The map shows all the surveys of this district, and is issued to meet a general public demand. It is sold by the Department at a nominal price of five cents per copy. Scale is one mile to one inch.

PLAN INSTRUCTION CLASSES FOR ONTARIO PROSPECTORS.

Ontario Department of Mines Takes steps to Aid Prospecting.

What is regarded in Northern Ontario as a commendable scheme to establish "Prospectors' Classes" at stragetic points in the North, is announced by Thos. W. Gibson, Ontario Deputy Minister of Mines.

It is planned to commence these classes as soon as possible after the New Year, Dr. W. L. Goodwin of Queens University being in charge. In view of mining Schools being already established at Haileybury and Sudbury, it is believed these two points will offer ideal conditions under which to commence such Prospectors' Classes.

The Mining Recorders, Secretaries of the High School Boards and Instructors in the Mining Schools mentioned, are being advised in connection with the scheme, also the Prospectors' Association and Miners' Unions of the various mining camps throughout the Province.

The statement announces that the Minister of Mines, Hon. H. Mills, is desirous of carrying on instruction classes for prospectors at the various mining centres where sufficient interest is shown to justify the undertaking. It is the intention to place at each of these centres an instructor competent to give an outline course in geology, particular reference being given to the principal rock formations with which economic minerals are associated. A collection of minerals will be used for illustration purposes, and an opportunity afforded for all who take the course to familiarize themselves with these specimens and their mode of occurrence.

Evening classes cannot be started advantageously until March, in order that mineral-spotting may proceed in daylight. Day classes are preferable if it is possible to arrange for same. The course will be of two weeks' duration, or longer if conditions warrant. In centres where High Schools or Collegiate Institutes are located and laboratories are available, blow-piping instructions will be included. A minimum attendance of ten persons will be necessary in order to justify the holding of a class.

The foregoing briefly outlines the official information coming from the Deputy Minister of Mines, and mining men recognize in the plan a movement calculated to greatly benefit prospectors in the mining areas. The addition of even a little technical knowledge to the information gathered by practical experience is expected to be very beneficial. Not only this, but men desirous of engaging for the first time in prospecting may in this way educate themselves in respect to the rock formations most favorable for the occurrence of economic deposits.

Apropos the course of lectures to be given by government mining engineers of British Columbia this winter under the auspices of the Department of Mines it is announced that the subjects to be dealt with include Chemistry, Mineralogy, Lithology and Geology. Elementary discussion of these subjects, for the special benefit of prospectors and those wishing to become prospectors, will be followed by a lecture on the general process of the formation of the earth; another on igneous rocks and their origin, and a third on ore deposits.

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ONTARIO MINING TAX ACT.

Decision of the Mining Commissioner "in re" Appeal of Canadian Copper Company Against Assessment and Tax Levied Under the Act.

The Canadian Copper Company, a subsidiary of the International Nickel Company, appealed against the assessment of profits and the amount of taxes levied by the Mine Assessor for the year 1918 and subsequent periods.

The Tax Act was amended in 1917 in regard to the method to be used in arriving at the taxable profits of nickel and nickel-copper mines, and it was the contention of the Canadian Copper Company that not only were certain specified mining costs to be deducted, but that a further allowance should be made "of the actual cost of marketing the metal, or other product, and of each process by which the metal or other product is refined and treated." It was further contended that the taxes assessed in the United States, where the product of the appellant is refined, forms part of the marketing costs and is properly deductible from profits for purposes of tax assessment in Ontario.

The Mining Commissioner, Mr. T. E. Godson, K.C., finds against the appellants, expressing in his judgment the opinion that the Tax Act specifically details all the allowable deductions, and that the deduction of United States taxation is neither allowed nor contemplated by the Act.

Mr. Godson states "The sole issue before me is can a profit tax levied by the Government of the United States against the appellant Company, or the International Nickel Company, be considered 'a cost of marketing the metal'."

"It will be observed the words used are 'actual cost', not 'expenses', 'payments' or 'allowances'. The words 'actual cost', are used, however, in the statutory deduction clauses such as actual cost of transportation, working expenses, cost of supplying power and light, hiring horses, the actual cost of explosives, insurance upon the mining plant and work done on the mine. In each case it is the cost of the particular work done, the specific article purchased, cost of proper insurance, or as the case may be, as in clauses A to J contained. There is no room for speculation as to what shall be allowed as a statutory deduction as they are definitely and specifically named in clauses A to J and sub-section 3 of Section 5 further ties the hands of the Mine Assessor by stating. 'No other expenses, payments, allowances or deductions shall be deducted and made' except as provided in the case of nickel mines by the provision of clause 3 a. From the above I gather the import of the words 'actual cost of marketing'. The language of the sub-section must be taken to mean exactly what the words imply in the light of the intent running through the clauses of the Act under consideration and that is the actual cost have been provided for and allowed; even a profit tax has been provided for by clause 'J' but it is only deductible when taken by the Parliaments of Great Britain and Ireland or the Dominion of Canada.

"While clauses B and C of sub-section 3 (a) are separate and distinct in their several methods of arriving at the profit tax they are properly read together as part of a definite scheme of fixing the basis of the tax with reference to nickel mines and so read elucidate the meaning and construction of the words 'cost of marketing'."

"I find no insuperable difficulty in determining the meaning of the words at issue because all allowable deductions have been provided for by the Act up to the stage where the metal is ready for sale. The assessor is only concerned with the cost of marketing. He has allowed statutory deductions with reference to mining, roasting, smelting, converting and refining. Clause 'J' negatives the right of allowance of a tax levied within the United States. It breaks new ground when allowing the deduction of a tax payable on profits taken by the Parliaments of Great Britain and Ireland or the Dominion of Canada. 'J' and S.S. 3 (D) seem therefore to refute and work against the argument of the appellant company.

"In my opinion the tax is not a cost of marketing any more than it could be said to be a cost of each process by which the metal is refined.

"I can vision a foreign state taking all the profits and there would be if the tax as contended for is deductible no provision under the Act as now framed to preserve to the Province a share of the profits. Such a contingency is however provided for in S. S. 3 (D) in the case of the imposition of a War Tax in Great Britain and Ireland by fixing a minimum tax of not less than 3 p.c. This sub-section again exphasises when and where a tax imposed outside this Province may be allowed as a deduction.

"In Mr. Osler's very thorough and earnest argument he referred to the fact that if this tax was not deducted as 'a cost of marketing' it would not be a tax upon the profits but upon the gross receipts of the Company.

"The answer to this contention is found I think in clause (C) of S. S. 3 A 'and the balance' after making the said deductions and allowances, shall be deemed and taken to the annual profits of the mine.' Whatever the tax is in effect it is deemed to be a profit."

"This appears to be a case that might properly be taken to the Minister under Section 22 of the Mining Tax Act. It in part says 'where owing to special circumstances it is deemed inequitable to demand payment of the whole amount imposed under this Act the Minister may compromise the matter by the acceptance of such amount as he may deem proper'. The tax levied by the United States undoubtedly absorbed a part of the profits of the Company but whether it is inequitable to disallow it as a deduction is a matter now for the Minister."

Following the dismissal of its appeal, the International Nickel Company has paid to the Province of Ontario the sum of $504,000, being taxes due in 1920 and arrears for the years 1918 and 1919, amounting to over $300,000.

BOOK REVIEW.

MINE BOOKKEEPING. A comprehensive system of records and accounts for mining operations of moderate dimensions. Robert McGarraugh. Cloth boards. 9 by 6 ins.; 118 pp., with index. McGraw Hill Co., New York.

This work is evidently compiled by one who has a good grasp of both operating and accounting details in metal-mining enterprises, and it is designed to cover the bookkeeping of mining operations of modest size. The writer agrees with Gillette and other competent writers on unit costs that "the segregation and distribution of cost data is essentially an engineering undertaking," and states that mine costs, if left entirely to clerks, will develop into a cut and-dried thing of no value. That the writer has been behind the scenes is evident when he pleads for a simple set of accounts, with accurate classifications, which he states "is of incomparably greater value for the analysis of costs than an elaborate subdivision, the details of which have been largely approximated or guessed at." The importance of daily records are insisted on, monthly statements being properly classed as "past history." In many cases they are worse than that.

Correct opinions are expressed regarding amortization, depreciation and the distinction between capital and operating expenses. There are rules applying to these things, although mine executives and presidents delight to make hash of them.

We note that the scheme of classification of operating expenses is based on operations, such as "tramming," "timbering" and "breaking ground," to which we take exception, believing that a simpler and more effective classification is into classes of labor,

as "trammers," 'timbermen," etc., but this is an expression of personal preference, and is not accepted practice.

The book may be taken as a correctly written manual of mine accounting for mines of moderate size, and it is fully illustrated by specimen forms which can be adapted to suit the varying necessities of differently conditioned operations.

F. W. G.

USEFUL MINERALS AND RARE ORES. Practical Instructions in the Search for and Determination of the Useful Minerals, including the Rare Ores. Alexander McLeod. Second Edition. John Wiley & Sons, New York, 6½ by 4 ins., limp leatherette backs. 254 pages with Index.

This little book, first compiled in 1913 and re-issued in 1917, is from the pen of a Cape Breton prospector with much practical experience in the field. The book is intended to be a field guide to persons without extensive technical knowledge, although it is not an elementary treatise except in the simplicity of the wording and the tests for minerals that are recommended. It is the aim of the book, states the author, "to furnish severely simple, but fully dependable, means by which anyone can determine the useful minerals." Himself a practical prospector, the author has written an understandable volume that contains much meat and little non-essential trimmings, and the simple tests suggested should be of such value to the prospector "remote from more refined methods in the fastness of the everlasting hills." The author states that he has drawn freely from acknowledged authorities in compiling his volume, but this fact in no wise detracts from its usefulness, which lies in lucidity of wording and arrangement, and in its application to the requirements of the average prospector. The book would form a handy textbook for prospectors' classes such as are being held under the auspices of the provincial departments of mines in several provinces.

METAL QUOTATIONS.

Fair prices for Ingot Metals in Montreal Nov. 17th, 1920. (In less than carload lots).

	Cents per lb.
Copper, electro	19¼
Copper casting	19
Tin	46½
Lead	8
Zinc	8¾
Aluminum	34
Antimony	8

COAL PRICES.

St. John, N.B.—The Dominion Coal Company on November 10th advanced its price here for bituminous coal from $12.25 to $13.25 per ton delivered. Anthracite sells at $20.50 delivered.

Fredericton, N.B.—Anthracite is quoted at $20.00 per ton delivered. Recent prices for anthracite have ruled as high as $25.00 per ton.

Toronto, Nov. 16.—Navigation has practically closed down and so far there has been no apparent change in the situation, with receipts very meagre and business correspondingly dull. The price of hard coal remains unchanged. Bituminous mine run is quoted at from $10.00 to $11.00 with bituminous slack slightly easier. Smokeless is still selling at from $10.50 to $11.50. Bituminous lump coal is scarce. Hard coal is quoted at from $8 to $16.00 at the mines.

TORONTO MINING STOCKS

Following are the average quotations for active gold, silver and oil stocks, on the Standard Mining Exchange, for week ending 13th November, 1920:

	High	Low	Last
SILVER			
Bailey	4½	4	4½
Beaver Consolidated	39	34¾	34¾
Chambers-Ferland	5½	4½	5½
Coniagas	2.25	2.20	2.20
Crown Reserve	22	20	20
Gifford	1¼	1¼	1¼
Hargraves	1⅞	1⅞	1⅞
McKin.-Dar.-Savage	48	46	48
Mining Corp. of Can.	1.68	1.65	1.65
Nipissing	9.75	9.75	9.75
Ophir	1⅞	1⅞	1⅞
Peterson Lake	11½	11½	11½
Temiskaming	30½	30	30
Trethewey	26¾	24¾	24¾
GOLD			
Atlas	10	10	10
Davidson Gold Mines	50	45	45
Dome Extension	45½	46	46
Dome Lake	4	3	3
Dome Mines	14.00	13.25	13.25
Gold Reef	3½	3⅛	3½
Hollinger Cons.	5.60	5.50	5.51
Hunton Kirkl'd G.M.	10	10	10
Keora	16	15	16
Kirkland Lake	44	43	43
Lake Shore M. Ltd.	1.08	1.04	1.04
McIntyre	1.94	1.91	1.91
Moneta	9	8¾	8¾
Newray Mines, Ltd.	5	5	5
Porcupine Crown	22½	22	22
Porcupine V.N.T.	23¼	22¼	22¼
Preston East Dome	2½	2½	2½
Schumacher	19¾	19¾	19¾
Teck-Hughes	7	6½	6½
Thompson Krist	6¾	6	6
West Dome	5⅞	5¼	5¼
West Tree Mines Ltd.	5	5	5
Wasapika Gold Mine Ltd.	10½	9	10
OILS			
Vacuum G.	27	25½	26

BRITISH APPLICATION OF ASBESTOS.—USES IN INDUSTRY AND WAR.

(Communicated by Turner Bros. Asbestos Co., Rochdale, England).

Beyond the fact that the word Asbestos suggests something of a fireproof nature, the general conception of this marvellous production of inorganic nature is of a very hazy character. As a matter of fact, it is extremely doubtful whether even the user of Asbestos, in one or other of its multidunous forms of manufacture, has any idea of the extent to which the industry has grown.

To enumerate only the "Group" headings, into the composition of which Asbestos enters, results in a formidable list, including fibre, yarn, cloth, webbing, listing, tubing, braiding, sheeting, jointing, compressed Asbestos fibre rings and joints, millboard, paper, tubes, packings of all kinds for high pressure, superheat, for medium and low steam pressures, for hydraulic and feed pumps, for ammonia and acid pumps, packings with and without rubber, some metallic and some non-metallic. In fact, the variety appears to be

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almost endless. Then, it is used in the manufacture of such goods as catalyser nets for oleum, gloves, suits, leggings, aprons, iron-holders, rings for arc lamps, lamp shades, Asbestos-faced beltings and other articles of a special character, mainly of interest to scientists, the laboratory, etc.

In the second category, under the heading of "Pipe and Boiler Insulation," appear sectional blocks, locomotive lagging, sectional pipe coverings, bulkhead linings, Asbestos mattresses for locomotives and marine boilers, etc., Asbestos fibre rope, Asbestos composition, flange and valve covers, etc.

Under the third heading is found an infinite variety of goods made of Asbestos-cement, including building materials such as sheets, slates, tiles, partitions, shutters, doors, etc. These materials are rapidly gaining favour as proof of their weather-resisting properties become more apparent to the building industry generally. Asbestos-cement materials are suitable alike for factory, hospital, barracks, villa, garage, or cottage construction. The architect, moreover, has at his disposal a large variety of tiles, also ridging, etc. of a more or less decorative character.

The part played by Asbestos in the great war was an amazing one. As Asbestos shields on warships, mattresses made of Asbestos saved many lives from the dangers of flying fragments from the guns of small craft, including submarines firing under the cover of smoke clouds and fog. All exposed positions, whether around the guns, the bulwarks, gangways, or other parts of a warship, which have to be continually traversed by the men during action, are well protected by Asbestos mattress shields.

In the stokehold of the battle-ships also Asbestos is found in the shape of jointing rings or gaskets, insignificant rings the use of which can only be appreciated by those who have a more or less intimate knowledge of the working of the engine rooms and stokeholds. Upon the accuracy of these jointing rings depends the high degree of efficiency in steaming. Thousands of these little rings are used in the boiler equipment of a single battle-ship. Any leakage from tubes due to defective rings means enormously increased work, to the point of exhaustion, on the part of the stokers, and what is of still more serious consequence, decreases the speed of the battle-ship. Until these rings were discovered, the naval water-tube boiler never attained its 100 per cent. efficiency, which is now established as the rule.

In the form of packing, Asbestos is comparatively well known. It prevents the escape of the driving force, whether as steam or any other pressure, from stuffing boxes, piston rods, and valve spindles, etc., while allowing easy movement without undue friction. The properties which make Asbestos so valuable in this case are that, whilst it is flexible and of a fibrous nature, it is indestructible by heat conditions. Its coefficient of friction is low, consequently a minimum amount of wear and loss of power takes place. As packing, Asbestos has been used more extensively than in any other way up to the present time.

Asbestos in the form of compressed Asbestos fibre jointing is also used on the principal joints of the auxiliary propelling turbines and plant, and the hydraulic machinery which operates the huge guns; also in regard to the torpedo tubes, and all deck gear, its importance may be realized when it is stated that upon its reliability depends the immediate operation of all the machinery for a sea battle.

In the form of fibre and fibre rope, commonly called Asbestos fibre-filled rope, it is used for covering pipes in battle-ships, the object being to maintain the steaming efficiency of the plant by the prevention of condensation and the dissipation of heat, and also to reduce the consumption of coal.

Asbestos, combined with cement in conjunction with Asbestos corrugated paper, is used for bulkhead linings, *i.e.*, the inside partitions, gangways, cabins, etc., are covered with this material for its insulating properties, with a view to maintaining an even temperature under varying conditions, and also for the prevention and spread of fire. This material is largely replacing wood for the purposes named in all modern battle-ships.

In the form of a metallic cloth, Asbestos was used to make gun "grips" to protect soldiers' hands from the heat of the rifle barrels. Many hundreds of thousands of such "grips" were provided for service during the Great War.

At home also Asbestos in the form of woven nets is used in the manufacture of chemicals for high explosives, the nets being put through a special chemical process necessary for the production of oleum, or fuming sulphuric acid.

For some years prior to August, 1914, the quantity of Asbestos products of British manufacture sold in the home markets was much in excess of the total imports from all other sources, and afterwards the imports formed a very small proportion of this country's requirements. At the same time, British manufacturers were exporting very considerable quantities to the Colonies and foreign countries, including those highly protected, in open competition with the products of Germany and Austria.

There are only a very few bona-fide British manufacturers of Asbestos goods. It is quite a mistake, however, to assume that British firms—though few—have been either insignificant or backward from the scientific standpoint. In the latter connection, particularly, credit is due to one of the pioneer British concerns, in that tests of the goods manufactured by the firm have proved British products to be of superior value to those of German manufacture for many years past.

Following these tests, and before the war, *i.e.*, in 1910, the British Admiralty made their own tests of British products, and approved them for use throughout the Navy in preference to those of foreign manufacture, the use of the latter being then discontinued.

B. C. MINERAL EXHIBIT FOR OVERSEAS.

It has been decided to assemble a representative exhibit of the minerals of British Columbia for display in England and on the Continent. This exhibition now is being prepared. It will be the best that ever has been got together for the purpose of illustrating the mineral resources of the Province. A considerable part of it already is in shape for shipping and the whole exhibit, it is hoped, will go forward very shortly. International Exhibitions of importance are being held in England and different centres on the Continent and it is considered imperative that there should be a representative display of the mineral resources of British Columbia available for use on such occasions.

EDITORIAL

THE OCCURRENCE OF GOLD IN THE RAND BANKET.

A paper by Mr. H. Pirow, Government Research Scholar, South Africa, dealing with the "Distribution of Pebbles in the Rand Banket and other Features of the Rock" is referred to in a recent issue to hand of the "South African Mining and Engineering Journal" which contains interesting speculations on the origin of the Rand Banket, particularly with regard to the distribution of pebbles in the banket, the presence or absence of which, Mr. Pirow concludes, has hitherto been erroneously used as a basis of correlation. Mr. Pirow's observations, which were conducted at the instance of the Research Grant Board, and by the assistance of a scholarship awarded for the purpose, are stated to strengthen the arguments for a placer origin of the gold in the banket. The main points brought out are "the fairly wide-spread occurrence of gold values in the banded pyritic quartzites, which may be regarded as originally layers of auriferous black sands, and the distribution of pebbles corresponding to that found under deltaic conditions". The evidence against the infiltration theory is that the pavability of the reefs is by no means dependant on the presence of a specific kind of footwall, and that the gold in the banket is not normally associated with any particular mineral or igneous intrusions.

THE NEED FOR CO-ORDINATION OF GEOLOGICAL DATA.

The remarks, above referred to, of the "S. A. Mining and Engineering Journal" regarding the occurrence of gold in the Rand Banket, are of interest because of the very different conditions of origin usually ascribed to Canadian gold occurrences, but the general remarks which our contemporary takes occasion to pass on the study of geology on the Rand are quite pertinent to Canadian conditions, and conditions elsewhere.

"There are two facts that strike the student of geology," writes the "S. A. Journal", "the first being the amount of fresh information continually available in the ever-growing area under exploitation in the mines, and the second the urgent need of gathering and co-ordinating data often noted by mine officials, but as frequently lost to geologists owing to the lack of a definite system of compiling geological records. It appears anomalous that mining officials should be forced to have recourse to the journals of scientific societies for geological information concerning the very properties on which they are employed."

Fortunately, in Canada, the institution of a central bureau for the gathering of geological statistics, which is suggested for the Rand, is not necessary, as there already exist in the Canadian Geological Survey and the provincial departments of mines—notably in Ontario and British Columbia—a repository for geological data which is being daily added to by a wholehearted co-operation between these institutions and mining engineers and prospectors.

Nevertheless, there is quite a lot of information that is lost, particularly in those provinces that have not as yet any separate department of mines. In Alberta, Saskatchewan and Manitoba, many deep wells and other excavations revealing the nature of the strata have gone unrecorded, and an interesting note made at the Winnipeg Meeting of the C. I. M. & M. was that steps were being taken to record the sinking log of all government wells. This does not, of course, cover privately-sunk wells, and some steps seem desirable to secure records of this not-less important information.

Probably the most-neglected province in Canada in regard to mining and geology is New Brunswick, and, so far as we are aware, apart from the records of the Geological Survey, no provincial officer is charged with the preservation of the records of the quite numerous borings that have been put down in this province. Singularly enough, some of the earliest names on the geological roster of Canada are associated with New Brunswick, but, apart from the persistent endeavors of a handful of local men who believe in the mineral possibilities of the province, it has been passed over. To some extent, this is the

fault of the people of New Brunswick, who like the people of Newfoundland, have not yet seen the advisability of entrusting the oversight of their mineral resources to scientists.

It may be safely stated—without exaggeration—that there is no province of Canada (except Prince Edward Island) that can profitably dispense with a competent department of mines.

There is no more hopeful aspect to the mineral industry in the western provinces than the fairly general delegation of the oversight of mineral resources to men of scientific attainments.

The agricultural frontiers of Canada are now well within sight. The day of the pioneers of settlement and transportation is coming to a close. What is now needed in Canada is the scientific pioneer. Many of our mineral deposits must await for their development not alone the axe of the explorer and the advance of the railhead of communication, but the development of processes, the linking up of ascertained geological facts, and a general enlargement of the staffs of the technical departments of the federal and provincial governments.

There is not yet available, for example, a really worth-while text book on Canadian Geology. The nearest approach to such work is the admirable sketch of the Geology and Economic Minerals of Canada, by Young and Brock, published in 1909, but that is over a decade ago, and, as the authors explained, that work was but a sketch, and was published when, in Dr. Brock's words, "the mining industries of Canada may be said to have only just begun."

PRESIDENT WILSON.

Mr. T. A. Rickard, in "Mining & Scientific Press," writes in a recent issue regarding the Chief Executive of the United States, in words that have a proper ring of sincerity and sympathy.

"With most of his policies we were never in sympathy," writes Mr. Rickard, "for his irresolution before we went to war we had a feeling of resentment; we did not respond to his idealism and we did not admire his obtinacy, but he has played a great part in human affairs, and he has devoted himself with intense sincerity to the service of his country, therefore at this moment he seems a nobler figure to us than any of his detractors..... He sacrificed his health and his political career for the sake of the idea that was nearest to his heart. Today he is broken, humiliated, all his hopes shattered, all his policies frustrated, all his dreams ridiculed. We salute him with the deepest respect and the profoundest regret."

A finely conceived and courageous statement, which we believe the writer will read with increasing satisfaction as the passage of Time places Mr. Wilson in his proper elevation as a great man, who played a great and decisive part in a battle of giants that closed an era of history. We are too near the event to assess President Wilson's place in human affairs, but it is within the bounds of possibility that like Lincoln, his memory may survive the ephemeral spleen of a passing moment and become enthroned in the Pantheon of his country. Two years after the Armistice, the news of which sent a world crazy with ebullient joy, it is remembered by some, and apparently forgotten by others, that it was on Mr. Wilson's fourteen points that Germany capitulated. Great as was the military power of the United States, enormous as is her wealth and educated population, history will state, we venture to assert, that President Wilson's personality, projected into European affairs through his category of the "fourteen points" did more to cause Germany and her allies to "crack up" behind the lines than did the pressure of the armed forces of the United States.

It is also within the bounds of possibility that in the years to come the "fourteen points" will overshadow the Constitution of the United States, which is the more probable, as they were founded upon that Constitution, being its modern exemplification; and were animated by the same spirit that urged those who wrote the Constitution and put their lives in jeopardy to defend it.

With no less respect do we salute President Wilson.

THE FIREBOSS.

A paper read before the Rocky Mountain Coal Mining Institute by Mr. D. Harrington, of the U. S. Bureau of Mines, on "Duties, Trials and Difficulties of the Coal-Mine Fireboss" touches a sore point in coal-mine organization. Mr. Harrington notes that the "fireboss," (which is the rather inelegant designation of the mine examiner) is a man of whom much is expected and to whom little is given. He is expected to cover much territory, in inadequate time, so that "he must travel at a rapid rate, or even run." Careful examination is in many cases quite impossible within the specified time and examination area. On his conscientious discharge of his duties depend the safety of many men, and yet the fireboss is given little executive authority, and much manual and unskilled labor is required of him that could better be delegated to an ordinary laborer. As to the wages paid the fireboss, Mr. Harrington makes a statement that is precisely correct, namely:

"In many coal mines the fireboss is paid by the day, like an ordinary mine laborer, or he receives a stipulated monthly salary, but deductions are made for days of absence from duty. This practically puts him on a basis of daily pay. Yet the fireboss receives in many mines a remuneration below that given common labor, and certainly far below that received by contract miners. Also, whenever the general wage scale is increased, only too frequently the fireboss, in common with other so-called salaried men, continues on the former schedule, although this may be even at that time, low compared with that which other workers receive."

Under these conditions it is not surprising that it has been found difficult to get good men to accept the onerous and ill-requited duty of the fireboss, who, as Mr. Harrington writes, has "practically no other authority than recommendatory, with practical exclusion from actual operations, generally with inadequate pay, abnormal working hours, and heavy responsibility as to both lives and property."

The tendency has been to fill the position of mine examiner with men who are debarred from other work in the mine by disinclination or inability, though the work of the mine examiner calls for physical and mental strength, and executive initiative in full measure. In addition, the fireboss should be technically trained in all matters connected with mine gases, dust dangers, electrical dangers, blasting and ventilation. That this is far from being the case is notorious.

In Canada, it is pleasing to note that provincial mining laws in a number of instances have recognised the anomalous position of the mine examiner, and one large coal company has taken steps to raise the status of the mine examiner to that of a really responsible official, and has also undertaken to make the remuneration such as will attract good men.

The position of fireboss should be considered to be a rung in the ladder of promotion to that of mine manager, as the duties not only require men fitted by mentality and training to fill official positions, but, when conscientiously carried out with understanding and a commensurate sense of responsibility, they develop such a type of man.

In ten out of sixteen colliery disasters investigated by Mr. Harrington, he lays the blame on faulty inspection by the fireboss, and expresses the opinion that the chief fault in coal mine inspection lies in the inadequate status given to this pseudo official in the organization of the mine.

The fireboss has too frequently been regarded as an official when responsibility for disaster was to be assessed, and as a day-laborer, unsupported by his fellows, when wages and hours were being decided.

The indeterminate status of the fireboss, and his unattractive wages, are very largely to be blamed for the paucity of aspirants to official positions at coal mines, and taken all in all the treatment accorded to the fireboss has been shortsighted, and provocative of much discontent and much inefficiency in production.

MINES ACT ADMINISTRATION IN ONTARIO.

There appears to be some danger, judging from a communication appearing in this issue from Mr. J. A. McRae, of Cobalt, that the mining men of Northern Ontario and the Minister of Mines may drift into a position of mutual misunderstanding, if not antagonism.

The opinion is fairly widespread among technically trained mining men that no one is so properly qualified to administer a mines department as one of themselves. Nevertheless, the obvious wisdom of giving the oversight of technical matters to a person who knows something about them is a counsel of perfection to which democratic governments have not as yet attained, and until mining men undertake the distasteful, but necessary, part of citizenship that includes political office, this elementary notion will never gain general acceptance.

The Minister of Mines of Ontario informed the fraternity, in meeting assembled at Toronto last March, that at one time he had swung a pick underground, which makes him an initiate of the honorable craft for which this journal aspires to speak. With such antecedents, it strikes us that Mr. Mills would welcome any reputable medium through which he could avail himself of the advice of the men actually engaged in the mining industry, previously to taking action under the powers of his office. The suggestion of periodical conferences made by our correspondent would seem to afford such a medium, and is in line with a request preferred by the mining men and prospectors of British Columbia to the Minister of Mines in that province, and with accepted practice in the province of Nova Scotia.

The action taken to collect a provincial tax of an amount that is trivial in comparison with the interests imperilled to collect it, was decidedly ill-advised, and not at all in accordance with the usual procedure for the collection of tax debts in municipal practice, where the procedure has been most completely worked out. Nothing alarms investors so much, or deters capital from venturing investments, as insecurity of title to real estate, upon which all stock issues are floated. So far as we are able to judge, the real criticism to which the Mines Department may be subjected in connection with this incident is not so much upon the action taken, but in regard to the failure to make certain that all interested persons were duly advised of the impending action and of their danger from default of payment. The throwing open of lapsed claims to immediate re-staking, without giving the defaulting lessee prior opportunity to re-enter upon payment of the sum owed, seems also to have been a harsh measure, and one that in no way enures to the advantage of the Province.

We believe that Mr. Mills is genuinely desirous to administer the Mines Act for the benefit of all concerned, and in strict compliance with its provisions, of which the Minister is the servant and not the creator; but he will lose a rapidly passing opportunity if he fails to fortify himself with a consideration of the studied opinions that such bodies as the Canadian Institute of Mining and Metallurgy and the Ontario Mining Association are prepared to give, upon request.

Correspondence

Department of Geology
Toronto University.

Norite Occurrences.

To the Editor of the Canadian Mining Journal,
Sir,

A new occurrence of nickel with norite is reported from Manitoba ,and, appropriately, at about the same time, Vogt's "Die Sulphid-Silikat-Schmeltzlosungen" arrives from Norway. Vogt's report covers very elaborately the question of the origin of the nickel ores of Norway, always associated with norite or closely related rocks, and as he convincingly proves, always of magmatic origin. He describes and figures patches of pyrrhotite completely enclosed in fresh norite where even the susceptible mineral hypersthene is unchanged, and shows how important pyrrhotite-norite is in proving the magmatic theory of the formation of nickel deposits. This is a point which the one or two remaining opponents of magmatic segregation always pass over, since these widely scattered portions of ore in fresh norite are entirely unaccounted for by any theory of replacement. In the Sudbury region probably more than half of the ore is thus enclosed in pyrrhotite-norite.

Vogt shows also that the marginal ore deposits, he uses the Canadian term, have separated from the cooling and solidifying norite because the sulphides remained liquid at a lower temperature than the silicates of the rock. They were forced into all the fissures of the underlying rocks and often formed breccias of these rocks exactly as they have been shown to do at Sudbury. The copper ores, with the lowest temperature of fusion, are found chiefly at the lower and outer margin or in veinlets in the country rock, so that offset deposits are richer in copper than marginal ones. He shows also that the dimensions of the ore deposits are roughly proportional to the size of the norite masses with which they are connected, which accords with the magmatic theory and not with the replacement theory.

He shows, further, that the proportions of iron, nickel and copper in all the ores, whether from Norway or Canada, are much the same, which could hardly be the case if each deposit was formed for itself by solution replacement.

Perhaps the most interesting part of this report, and of a later one, published a year after, is the experimental examination of the relations of basic slags to molten sulphides of various metals, in which dozens of experiments reach results very similar to the actual field relations found in nickel ore deposits associated with norite or less often with peridotite. The solubility of sulphides in silicate magmas is thus studied on a small scale.

Professor Vogt attacks the subject of the magmatic segregation of sulphide ores from a new point of view and completely cuts the ground from under any theory of their formation by solution and replacement.

Canadians interested in the genesis of nickel ore deposits should acquaint themselves with this masterly study of a formerly much disputed type of ore deposits.

A. P. Coleman.

PERSONAL

Mr. E. V. Neelands, of Toronto, has returned from Venezuela.

OBITUARY.

James Percy Macnaughten, General Sales Agent of the Dominion Iron & Steel Company, died at his residence, after a long illness, on the 21st November.

Mr. Macnaughten was a resident of Sydney during the earlier stages of the Dominion Steel Company's activity, but in recent years has had his office at the headquarters of the Company in Montreal, and resided in the City. He was born and educated in Ottawa, and was 53 years old at the time of his death.

Those who knew Mr. Macnaughten personally are best able to appreciate his loss to his family, the steel industry in Canada, and to the Company with which he has been associated virtually since its first products were placed on the market. He was a man who did not seek publicity, but whose integrity, and loyalty could always be reckoned upon, as could also his assistance to a friend in need. His early death, following that of Mr. Francis H. Whitton of the Steel Company of Canada, measurably thins the ranks of the steel men of the Dominion, and is a distinct loss to that industry, but a much greater loss to his immediate business associates in Montreal, in Sydney and elsewhere.

CLOSE OF THE BROKEN HILL STRIKE.

The Broken Hill strike was declared off on November 10th after having lasted eighteen months and cost twelve million pounds in loss of wages and profits. The terms on which the strike ended were arrived at under a judicial commission appointed by the Premier of Australia and the Government of New South Wales. Under the award wages are based on a minimum of 15s. Od. per day, hours to be 44 per week both above and below ground, with the provision that until a technical commission has reported on occupational diseases in the mines, and given a list of incapacitated men, the hours of labor underground are to be five shifts of seven hours each.

The companies in the Broken Hill District had no alternative but to fight the demands of the workmen, as these would have absorbed the whole of the profits of the industry.

With reference to the prospects of an iron and steel industry being established in British Columbia it is stated that the activity of the government in the obtaining of accurate information of the iron ore resources of the Province is to be continued. It long has been known that an important deposit of hematite ore exists on Sand Creek in the Fort Steele Mining Division and A. G. Langley, government mining engineer, recently inspected the property. His report is favorable, showing that there is a considerable body of massive red hematite which assays in places 57.4 metallic iron. He recommends that there should be further development and the Provincial Government, it is understood, will initiate diamond drilling and other work to the end that the deposit may be opened up and some information obtained as to the tonnage. Another property to which attention is to be given is the Zymoetz (Copper) River limonite deposits. These are situated in the Skeena River section of northern British Columbia and there is no doubt, from reports of J. D. Mackenzie, Canadian Geological Survey, and Wm. M. Brewer, Provincial Government, that these are of importance.

A Norite of the Sudbury Type in Manitoba. A Reconnaissance. (1)

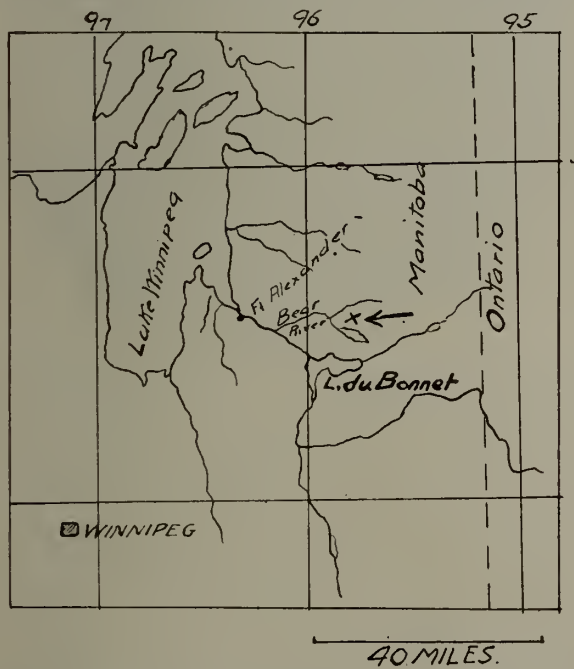
By R. J. COLONY, Ph.D. (2)

[Reprinted by Permission from the November Bulletin of the Canadian Institute of Mining and Metallurgy.]

Eighteen miles north, or slightly northeast of Lac du Bonnet, and about 35 miles east of Fort Alexander on the Winnipeg river, occurs a body of mineralized norite strikingly similar to the Sudbury norite of Ontario in origin and character. This mass of igneous rock is situated in the area bordered on the south by the Maskwa (Bear) river, and on the north by Cat creek, a tributary to the Maskwa river. It is roughly oval in shape at the surface, and occupies an area of 16 or 20 square miles. The shape of the mass, its textural, structural and compositional characters, and its relation to the associated rocks suggest an intrusive of roughly stock-like form and habit.

Physiographic and Structural Features.—Low, narrow, strongly glaciated and roughly parallel ridges with a general northeast-southwest trend, having a minimum width of from 150 to 250 feet, and a maximum width of from 500 to 1,000 feet, and ranging in length along the strike from a few hundred feet to two miles or more are characteristic of the region.

The ridges, varying in height from 20 to 100 feet are separated by, and surrounded with, spruce swamp and muskeg, so that while having the same general direction, they stand as islands in the surrounding lower



Approximate Position of Mineralised Norite Body herein described

ground. The ridges are undoubtedly connected, however, and provided the area was stripped of all cover, it would present an undulating, fluted aspect of interrupted ridges and low, flat valleys, striking northeast-southwest. The ridges within the norite area are in part norite and in part greenstone; many of them are composed of both norite and greenstone, the contact between the two being in some cases obviously igneous, tight and sinuous in the extreme, the greenstone in such cases exhibiting strong injection and "soaking" phenomena.

In other places both norite and greenstone are so strongly sheared as to suggest fault-contact rather than igneous; not infrequently sheer, vertical scarps, strongly suggestive of fault origin and running approximately in the direction of strike, cause the ridges to rise abruptly in cliff-like form from the muskeg. That more or less faulting has occurred is certain, and the writer judges that the faults are either strike-faults, or else they cut across the general trend of the ridges at very low angles.

A crush-zone of considerable length striking with the ridges may be traced from some distance northeast of the Anaconda claim (in the western end of the area) to as far as the Rio Tinto, and possibly beyond. On the Anaconda claim the crush-zone is about 150 feet wide, and on the Terra, on an 'island' in the muskeg, it is about 250 feet wide.

The extreme traceable length is nearly two miles, so that this sheared area undoubtedly represents a fault of some magnitude. On the northwest side of this crush-zone one encounters only norite; the elevations are here at their maximum, 100 feet or more in places, and the ridges are wide and long. On the southeast side of the crush-zone lies the norite-greenstone complex, in successive low, interrupted ridges separated by areas of spruce swamp and muskeg. Certain of the ridges in this part terminate in a manner suggestive of more or less lateral displacement by possible cross-faulting in an oblique direction, but this is not so absolute in indication as the more plainly evident crush-zones of the strike-faults.

The repeated alternation of norite and greenstone in approximately parallel ridges with alternating igneous and sheared contact between the two formations, and the occurrence of a wide crush-zone in the western part of the area with an abrupt change in structural habit and absence of greenstone, strongly suggest a step-faulted region, although the faults may not necessarily be of very great throw.

An effort has been made to represent this structure by a hypothetical section across the strike. The profile is not drawn to scale nor are the faults exactly shown. The section merely illustrates the structural conditions suggested by the habit of the norite-greenstone complex.

The Formations Involved.—So far as the writer's own explorations went, the norite body is completely surrounded with granite. While fairly certain of the delimitation of the area on the northwestern, northern and northeastern sides, he is not certain of the exact conditions of the southern boundary. Granite was encountered, however, on the Kelly claim, which lies in the extreme southeastern part, and the writer judges that it is safe to conclude that the entire mass of norite is surrounded by granite, mixed possibly with greenstone, into which the norite was intruded. (3) The only formations to be considered then, are (a)

(1) Submitted for presentation at the Western Annual Meeting, Winnipeg, October, 1920.

(2) Instructor in Geology, Columbia University, New York, N. Y.

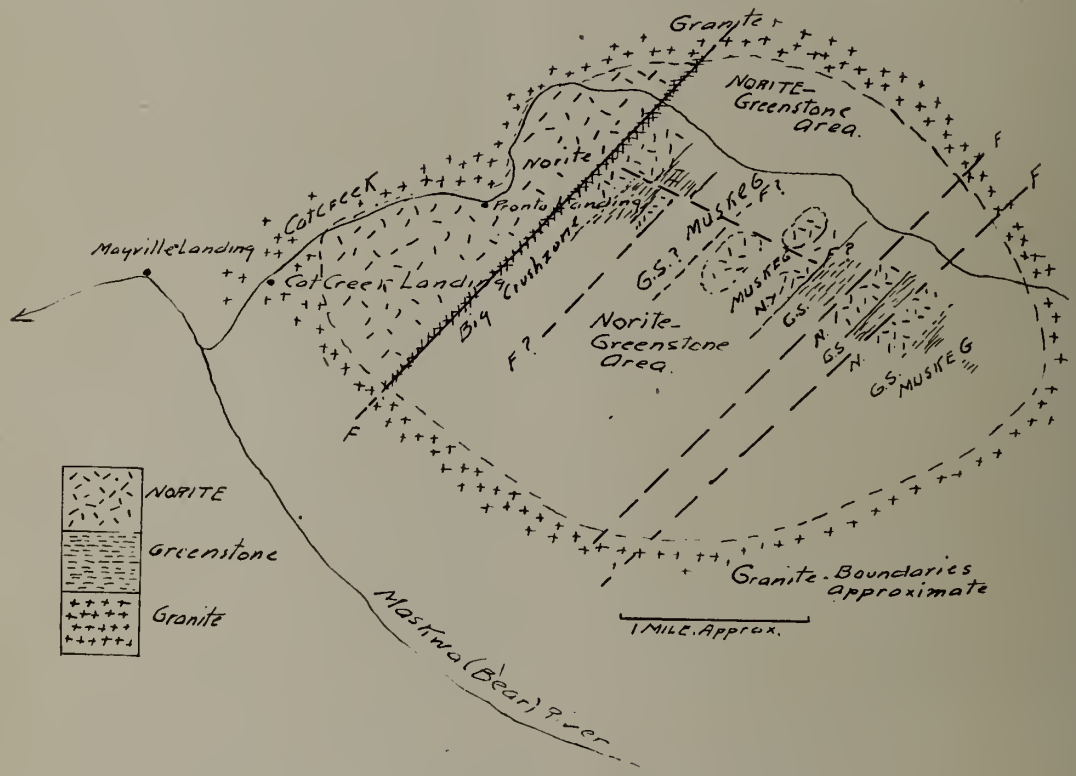
the granite, (b) the greenstone, and (c) the norite and its various facies.

The granite has been tentatively called Laurentian (4) in part, and in part "post-Lower-Huronian". Additional and careful work will be necessary before the age of this granite can be definitely established. It differs from the granite one encounters along the Winnipeg and Maskwa rivers in the absence of included blocks of old gneisses and schists of presumably Grenville or Keewatin age, so characteristic of the granite *en route* to the norite area. Moreover, these xenoliths, representing stoped blocks of Grenville or Keewatin gneiss, had a complicated structural and dynamic history before they were intruded by the granitic magma in which they are now included.

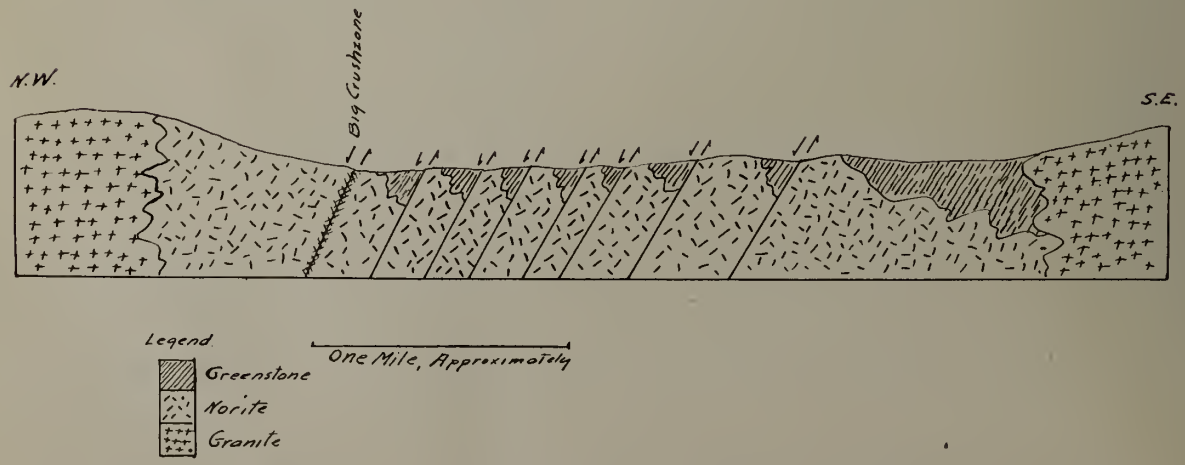
They were *lit-par-lit* or injection gneisses; they do not in the least resemble the greenstones of the norite area in history, composition, structure or mode of occurrence. Yet these greenstones have likewise been

(3) The areal geology of the norite body and its exact extent have been worked out by Mr. W. S. McCann, and his assistants, of the Geological Survey of Canada. Mr. McCann camped on the Hititrite claim, near the writer's camp, and the writer had the pleasure of his company in the field. Mr. McCann's report will doubtless appear in the near future as a bulletin of the Department of Mines.

(4) Moore, Elwood S., Region East of the South End of Lake Winnipeg, Geological Survey of Canada, Summary Report, 1913. Sessional Paper 26, pp. 262-270.



Structural Features and Boundaries of Norite Area



Maskwa River norite. Hypothetical section across strike of ridges, showing structure suggested by the habit of the norite-greenstone complex.

called Keewatin; (5) it is because of the pronounced structural, dynamic, compositional and injection differences between the numerous included blocks in the granite, and the greenstone, that the writer has difficulty in correlation. Whatever the age of the granite, however, in the vicinity of norite, it is intrusive into the greenstone, but is intruded by the norite; and the granite, norite and greenstone are all cut by numerous pegmatitic dykes, more especially at, and near, the norite-granite contacts. It is judged that these pegmatite veins and dykes are related to the norite and represent extreme end-phase consolidation products of it. The granite, as represented by that phase of it which occurs on the Kelly claim, is moderately fine textured, pinkish-gray, and is composed largely of feldspar and quartz with a minor amount of biotite in very small flakes. The feldspar is dominantly potassic, with some admixture of the soda molecule and but very slightly sericitized.

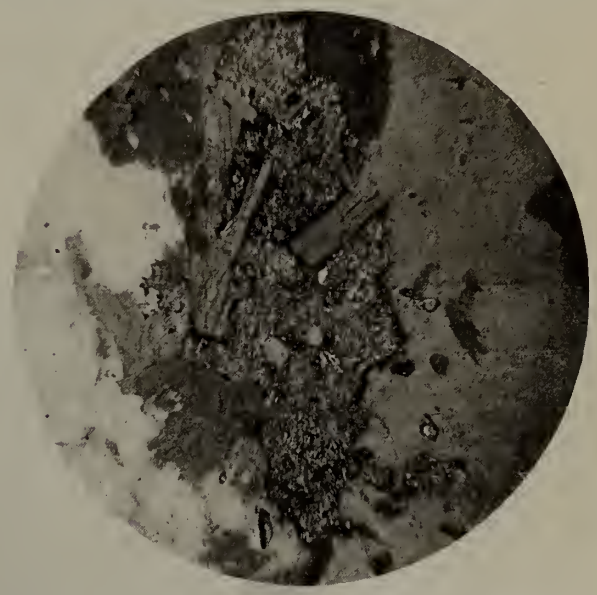
The most striking feature shown microscopically is the marked inequi-granular aspect of the rock, which carries numerous hyp-idiomorphic microcline crystals

Photomicrograph of Maskwa River norite. Light polarized, nicols crossed, magnification 35 diameters. Showing microfaulted plagioclase and granulation effects.

with crenulated margins, ranging from one-half to one centimeter in size and surrounded with much smaller grains, which give the rock a pseudo-porphyritic texture. There is also, in numerous other grains a strong tendency toward micrographic intergrowths on a very minute scale. The dominance of feldspar and quartz, the extremely variable textural habit and the tendency toward micrographic structures are characteristic of marginal phases of granitic intrusives, such as this rock is judged to be.

The greenstone is also more or less variable in texture, composition and structure, ranging from massive, fine to granular, dense dark-green rocks, to strongly sheared and schistose amphibolitic types. In some places the rock has been much shattered, especially along the sheared norite contact; in such cases healing has been effected largely with quartz, which occasionally forms veins of some size and not infrequently shows mineralization to a small degree, chiefly pyrite and chalcopyrite. Curiously enough, while the trend or strike of the ridges is northeast-southwest, the schistosity developed in places in the greenstone (not along the norite contact) strikes in a variable way from almost directly east-west to West 8° North, thus making evident a secondary or cross structure, in the direction of which lies the foliation in the

Photomicrograph of quartz-norite, taken in combined reflected and transmitted light, magnification 35 diameters. The green amphibole is strongly poikilitic, acting as host for numerous quartz grains. The metallics (magnetite, pyrrhotite and chalcopyrite) are replacing the amphibole and penetrating cracks.



Photomicrograph of norite taken in combined transmitted and reflected light, magnification 35 diameters. A stringer of pyrrhotite replaced in part by chalcopyrite (lighter). The sulphides themselves are cutting and replacing the feldspar (light gray) and are encroaching upon and replacing the green amphibole (dark gray).

greenstone and occasional small shear zones as well. In places near the igneous contact the greenstone is thoroughly impregnated with noritic matter; one of the most remarkable manifestations of this phenomenon may be seen on the Vidi claim, where crystals of labradorite, five to ten centimeters in size and resembling huge phenocrysts, are scattered through

(6) Roberts, Hugh M., and Longyear, Robert Davis. type are in general assigned to the Keewatin, and Moore follows the usual custom of placing the greenstones (basic metamorphosed igneous types) of the Rice Lake series in that division.
1918, pp. 27-67.

an otherwise fine textured, dense greenstone. Injection and impregnation are so pronounced in this vicinity that the large bunches of plagioclase are clearly due to those processes. In such places, also, the greenstone is slightly mineralized.

The norite is of simple composition, but varies both in texture and mineral make-up to some degree because of differentiation. In general it is composed almost wholly of basic feldspar ranging from andesine to labradorite, and carries as the only ferro-magnesian component a green amphibole, or actinolite, derived by uralitization from a former magnesian pyroxene, probably hypersthene. One of the most striking features of the rock is the manner in which the uralitized pyroxene encroaches upon, cuts through, and penetrates the feldspar (which is otherwise perfectly fresh and unaltered) in every conceivable direction; it is clearly a product of the action of magmatic and-phase-consolidation matters upon an original containing both magnesia and iron, i.e., hypersthene.

The feldspars have not been affected in any other way; they are hyp-idiomorphic, with crenulated margins, showing granulation along the borders in some cases, with wedge-twinning, bent grains and microfaulting.

The ore minerals are magnetite, ilmenite, pyrrhotite and chalcopyrite, all closely associated and intergrown. So far as a time relation can be made out they are all of late magmatic stage, essentially almost contemporaneous, but overlapping, so that the earliest are magnetite and ilmenite, the next pyrrhotite and the latest chalcopyrite, with replacing effects on one another in the order named.

They occur in blebs, in irregular patches, stringers and veinlets, lying in, surrounding, cutting and replacing the silicate minerals of the rock, and penetrating cleavages; their mode of occurrence and the manner in which they are associated with the silicate minerals clearly indicate that these ore minerals were formed later than, but immediately following the magmatic alteration of the original pyroxene to uralite, thus placing them very definitely in a late magmatic stage.

The 'ore', therefore, is merely a mineralized phase of the norite itself. The ore minerals of economic value are chalcopyrite and nickeliferous pyrrhotite, distributed, with a little magnetite, ilmenite and pyrite both in disseminated grains throughout the norite, and more especially, segregated along the igneous contact between the greenstone and the norite, where mineralized zones occur up to 150 feet in width (at the surface).

Various assays have been made of samples taken from different localities, and the maxima and minima are here given. The maxima and minima of a large number of assays of Sudbury material (6) are also given for the purpose of comparison.

	Copper %		nickel %		Platinum metals oz. per ton	
	Max.	Min.	Max.	Min.	Max.	Min.
Maskwa River norite . .	3.60	0.68	1.68	0.29	0.03	0.01
Sudbury norite	1.79	0.61	2.97	1.14	0.02	0.03

Marked differentiation is exhibited within the limits of the norite area so that one finds typical coarse-textured norite, finer-textured and less basic phase, quartz-norite somewhat similar to the norite (micro-pegmatitic) of Sudbury, coarse anorthosite, extremely coarse norite-anorthosite pegmatite in which the large bunches of plagioclase separated by much smaller quantities of dark interstitial ferromagnesians, have weathered chalky-white on exposed surfaces, making an extremely striking rock. Very acid, fine-textured facies, doleritic norite, veins and stringers of magnetite as well as a body of magnetite of considerable size that lies in the muskeg on the northeast corner of the Copper Contact claim, and pegmatite and quartz dykes and veins judged to represent the extreme end-phase of consolidation. There are also later basic dykes, from an inch to eighteen inches in width, cutting the norite in many places, and frequently offset by small faults.

The ore minerals are essentially magmatic in origin, but the writer does not conceive them to be the product of simple magmatic segregation ; nor have they originated through the action of hydro-thermal process operating subsequent to the consolidation of the rock.

They have been produced by the concentration of materials through the action of selective freezing, and belong to a very late magmatic stage during which the ore minerals, acid 'juices' and mineralizers were concentrated so as to become a very mobile, pervasive solution of essentially aqueo-igneous character, capable of penetrating and replacing to a marked degree. The very extreme end-phase-manifestation of this, the writer takes to be the quartz veins and stringers which, in addition to quartz, carry carbonate and epidote, and sometimes pyrite and chalcopyrite.

The writer has called this norite the *Maskwa River Norite*; judging by (a) its character and origin, (b) its extent, (c) its striking similarity to the Sudbury norite, (d) the occurrence of mineralized zones and the assay returns on these, it seems reasonable to state that this body of igneous rock and its 'ore' compare very favourably with, and is strikingly similar to, the occurrence at Sudbury.

Trench across norite 'orebody' on the 'Hititrite' claim. The 'orebody' is here a mineralized zone 150 feet wide, along the norite-greenstone contact. Muskeg in the background.

(6) Roberts, Hugh M., and Longyear, Robert Davis. "Genesis of the Sudbury Nickel-Copper Ores as Indicated by Recent Explorations." Trans. A.I.M.E. LIX.

The Administration of the Ontario Mining Law

Minister of Mines Should Consult Representatives of Industry Before Taking Legislative Action.

J. A. McRAE, Cobalt.

What is interpreted in the district of Temiskaming, inclusive of the silver and gold mining areas of such fields as Cobalt, Porcupine, Kirkland Lake, Gowganda, etc., as being a chaotic state of affairs, exists in the administration of the Mining Laws of Ontario, at least to the extent which it is taken out of the hands of the Mining Recorders and the Mining Commissioner.

New legislation and the injudicious application of former laws has caused a feeling to grow which threatens to discourage prospectors and capital alike from entering this field. By reason of a few alterations to the Act, and the application of powers of confiscations which were probably never intended to be enforced, the present administration has brought down criticism of the Mines Act of Ontario which formerly held a place with the most satisfactory mining law in existence in any province or state.

Cooperation between business men all over Canada and the United States who have made it their business to assist prospectors with grub-stakes has been eliminated to a large extent by a regulation which prohibits a prospector from staking more than three mining claims or more than nine altogether for himself and on behalf of others. It had formerly been the intention of the past Government to encourage as much staking as must be done in order to hold the claims. Consequently, the more work, the greater chances for developing paying mineral deposits. The new regulation, of course, may be evaded by simply hiring someone to buy a Miners' License and have them do the required staking. The difference is that the prospector is thus obliged to turn employer and is penalized to that extent. The measure seems calculated to cause inconvenience and friction rather than cause any benefit.

Further new legislation renders it necessary for a prospector to first ask for permission to use timber before erecting a cabin or using any such timber for mining purposes. Not only this, but whereas the old law permitted a claim holder to remove pulpwood if he so desired, the new regulation prohibits this. As a consequence, the bushfires which seem bound to occur in areas where extensive prospecting work is being carried on, and where ground must be cleared for building and mining, seems destined to destroy much of the timber which otherwise might be turned into revenue for the claimholder and to the benefit of the country in general. Much of the incentive to protect such timber may be lost where the claimholder has no claim to it.

Confiscation of Claims.

Perhaps the most unfortunate occurrence of all has been the confiscation Order-in-Council of October 13th, by reason of which serious loss has been incurred by conscientious claimholders. Finding a provision in the Mining Tax Act, being Chapter 26, R.S.O., 1914, that conferred such power on the Ontario Government, the Minister of Mines passed an Order-in-Council declaring all patented mining claims forfeited to the Crown on which a certain provincial tax of some 5 cents an acre or $2 per claim per year had not been paid. The Order further provided that these claims should be open for re-staking on and after noon of October 28th. Many property holders declare they knew nothing about such a tax and received no notice. However, the Order went into effect on the 13th. As a consequence of this, many titles to freehold land have been revoked. Even the Teck-Hughes Mine with a plant valued at perhaps $200,000 and with several hundred thousands of dollars in ore blocked out and producing at the rate of about $1,000 every twenty-four hours was among the properties listed for forfeiture. It was only thirty minutes before the hour set on October 28th, that the Government was induced to withhold the property from staking. Nevertheless, forfeiture had occurred on the 13th, and the Teck-Hughes is now technically Crown Land. This, of course, is now being rectified and in due time no doubt the title will be re-established in the name of the Teck-Hughes Mining Company. The Little Pet mine, near the Dome Mines in Porcupine was forfeited and did not even get a release. It was forfeited for a matter of a few dollars, yet is equipped with a small milling plant of its own. Various other instances of this nature may be cited.

Contrary to British Law.

The question now being raised in all seriousness is that having to do with the application of a confiscation law. The point is raised as to whether such is really permissible under British law. The matter of enforcing collection of taxes finds general support all over the North, but carrying this to a point of confiscation with no avenue left by which title may be redeemed is thought to be stretching authority beyond the point intended by the framers of such a law. The procedure in regard to real estate on which taxes are owing, is to list such property subject to sale as against the levies due. The sale of such property is carried out subject to the former holder redeeming title if within thirteen months he pays the taxes due plus the expense caused by his neglect. Such procedure is regarded as being reasonably fair to all concerned.

Prospectors Discouraged.

So different is this attitude from that of former Governments, that mining men of Northern Ontario are scarcely able to believe their senses. The effect upon outside investors and capitalists will damage Ontario in their eyes. These interests who spend many thousand of dollars yearly in helping develop the mineral resources of this country and who had formerly held the laws of the province in very high regard, now find deeds which they carry have been revoked,—due to the non-payment of a certain provincial tax which they declare they knew nothing about and amounting to only $2 per claim each year. Not a few prospectors have openly declared they are through with mining in this country so long as such state of affairs is permitted to exist. These men are numbered among those who are not given to complaining habitually.

Pioneer Suffers.

An instance of the manner in which pioneers have been penalized may be cited in the case of E. J. Morrison, of Haileybury. Mr. Morrison is a citizen of

moderate means, having a small dairy business in the town of Haileybury. Some years ago, he lent his support to the general activity in the Kirkland Lake district, acquired a mining claim on which he performed the necessary assessment work at a cost of some $1,200 from money saved from his little business. Mr. Morrison knew nothing about the Provincial tax of $2 a year on the claim and as a consequence the Government confiscated his ground. No offer of relief has been made.

The situation as it exists was not altogether unforeseen at the time of the ascendency to power of the present administration. Indeed such fears were openly expressed prior to the selection of a cabinet by Premier Drury. This journal appealed at that time for mining representation, but the appeal fell upon deaf ears.

Hon. Mr. Mills, who was appointed as Minister of Mines, was formerly a locomotive engineer. There has been no effort at any time to discredit his ability in connection with matters about which he possesses knowledge. At the same time, on no occasion does it appear to have been possible to point to any reasonable hope of the judicious administration of the mining laws of the Province by one not familiar with the industry

Hoped in Vain.

It is true that for a time critics grew silent, on the strength of the hope that not being familiar with the mining industry, the new administration would at least avoid meddling with the Mining Act. This hope has long since become dissipated and mining interests are now standing in fear with the question on their lips: "What Next?"

Finally, this danger appears to lie ahead. It is feared the new administration is contemplating a further so-called revision of the Mining Act. To the extent of the changes contemplated, ego may in a large degree constitute the answer. The spectacle of an amateur, already accused of creating chaos in Ontario's mining laws is causing some uneasiness, and the Minister would seem to be well-advised to go slowly. It may be expected that mining men and prospectors will submit an appeal to the Premier to discuss this matter seriously with his lieutenant.

Meanwhile, capital, much needed foreign capital, is hesitant, and in the meantime prospectors profess to be discouraged.

Possible Remedies.

In conclusion, there are two suggestions that might be made with the view of preventing further chaos. First, is this:—It would be a wise procedure for the Ontario Department of Mines to hold periodical conferences of its staff of Mining Recorders from the various mining divisions, and with these gentlemen, together with the Mining Commissioner, hold a joint conference and obtain expressions of opinion and general discussion before enacting legislation calculated to alter the existing laws. The second suggestion is this:—To establish a Mining Court, giving the Mining Commissioner powers equal to a County Court Judge, armed with the authority to deal in a similar manner with patented mining lands as is now vested in that official when dealing with unpatented lands. The verdict rendered in all such cases would be the result of deliberations between men fully acquainted with the mining industry and the meaning of the Mines Act. It would stabilize administration, remove the worry and responsibility from the political representative at the head of the Department, and would shield prospectors and mining men from such mistakes as have recently been committed.

TORONTO MINING STOCK QUOTATIONS.

Following are the average quotations for active gold, silver and oil stocks, on the Standard Mining Exchange, for week ending 20th November, 1920.

Silver.			
Adanac Silver Mines, Ltd	2	1¾	1⅞
Bailey	4½	4	4
Beaver Consolidated	34½	31½	32
Chambers-Ferland	6	5½	5½
Cobalt Provincial	40	35	35
Coniagas	2.35	2.35	2.35
Crown Reserve	20	19	19
Hargraves	1¾	1¾	1¾
La Rose	28½	26	27
McKin.-Dar.-Savage	48	47½	48
Mining Corp. of Can.	1.65	1.60	1.64
Nipissing	9.75	9.50	9.60
Ophir	1¾	1¾	1¾
Peterson Lake	11½	10¾	10½
Silver Leaf	1	1	1
Temiskaming	29½	25¼	26
Trethewey	25¼	21½	23¼
Gold.			
Apex	1½	1½	1½
Atlas	12¾	12½	12½
Dome Cons. Mines	13.45	13.00	13.00
Dome Extension	48	45	48
Dome Lake	3½	3	3⅛
Gold Reef	3	2.7	2⅞
Hollinger Cons.	5.60	5.44	5.60
Hunton Kirl'd G.M.	10	9	9
Keora	16½	14½	15¼
Kirkland Lake	40	39	40
Lake Shore M. Ltd	1.03	1.00	1.02
McIntyre	1.92	1.88	1.92
Moneta	8	8	8
Porcupine Crown	21	20	21
Porcupine Imperial	⅜	⅜	⅜
Porcupine V.N.T.	21	20¼	20¼
Preston East Dome	2½	2½	2½
Schumacher	19	18	18½
Teck-Hughes	6¼	6	6
Thompson Krist	6½	6	6½
West Dome	5½	5	5½
West Tree Mines Ltd	5	4.7	4.7
Oils.			
Rockwood Oil, Gas	2¾	2½	2⅜
Vacuum G.	25	24	24½

METAL QUOTATIONS.

Fair prices for Ingot Metals in Montreal Nov. 24th, 1920. (In less than carload lots).

	Cents per lb.
Copper, electro	19
Copper casting	18½
Tin	45
Lead	7¾
Zinc	8½
Aluminum	34
Antimony	8

Northern Ontario Letter

THE SILVER MINES.

The Cobalt Field.

At the time of writing, shortage of electric power continues to constitute the chief problem of the mines in the Cobalt district. Like in the majority of such instances, however, the situation is exaggerated, and pessimistic views gain ground rapidly.

Last week's reference to this, was made clear when it was stated that by eliminating all non-essential work, it is believed the power situation will not become any more satisfactory than as at present.

It is now announced the Mining Corporation of Canada, the largest individual power consumer in the Cobalt district, has been able to reduce its power consumption to the extent of 700 h.p. without interfering with the usual operation of the mine. This has been made possible by reason of summer operations having resulted in storing up a large surplus of tailings, which makes it possible to close down sand-pumping operations for the winter. This company could go still further, if necessary, and close the old Buffalo mill for the winter and thus further reduce its power consumption. Not only this, but by utilizing its auxiliary steam-driven equipment, the mine itself could be operated without hydro-electric energy. This would leave it necessary only to draw sufficient electricity to operate the mill. Such steps, of course, may not be necessary, but are mentioned in order to show the lengths to which the company could go and still continue production. This summary should discount pessimism.

A moderate amount of rain is officially reported by the Meteorological station at Haileybury, during the third week of November. This rain has fallen on top of several inches of snow, and has created a condition which would quickly alter the power situation should a reasonable amount of additional rain fall.

A discovery of importance has been made at the 385-ft. level of the Chambers-Ferland mine. Special arrangements had been made to drive a long cross-cut through that part of the property lying between the Nipissing and the LaRose. A lease was secured to carry this work on through a shaft on the Right of Way mine, the object being to carry the cross-cut some 500 feet so as to connect up with the main workings on the Chambers-Ferland. This work had progressed not more than 150 feet when ore was encountered. A feature of the find is that at the present point of operation the cross-cut is traversing a layer of slate formation. Good milling values have been found over a width of 22 feet. The average over 4½ feet is 28½ ounces to the ton, while the lowest over the entire 22 feet is five ounces per ton. It is now planned to sink a winze to the underlying conglomerate formation which is estimated to lie not more than ten feet below the cross-cut. It is believed a high-grade vein occurs in the conglomerate, the values encountered in the slate indicating this.

Reports were in circulation early in the past week to the effect that the Temiskaming mine was curtailing operations. Inquiry revealed the fact that only a few carpenters had been laid off and that the Temiskaming is operating both mine and mill as usual. Mr. Gordon Dickson, manager of the Blue Diamond Coal property in Alberta, paid an official visit during the past few days to the Temiskaming mine.

A small force of men are at work on the O'Donald property, in Lorrain, formerly known as the Lang-Caswell. What appear to be the more important veins are being examined, and a pump was shipped this week for the purpose of de-watering part of the underground workings. This is one of the properties which became forfeited by reason of the application of the Order-in-Council of Oct. 13th, which declared all patented mining claims forfeited to the Crown, on which certain provincial taxes of some $2 per claim had not been paid. The property was re-staked by J. C. O'Donald, of Haileybury.

It is now intimated unofficially that the Department of Mines is contemplating action to re-establish title to properties forfeited under the recent Order, at least in such cases where a hardship appears to have been imposed.

The Elk Lake District.

The work of erecting camp buildings for the accommodation of additional men is proceeding on the property of the Cane Silver Mine. Returns have not yet been received from the shipment of high-grade ore recently made, but it is understood the ore contained an average of at least 500 ounces to the ton. It has not yet been determined to what extent operations will be carried on this winter, and the question of installing a small mining plant has not yet been definitely decided upon.

The Regent Silver Mines is continuing operations, and has made preparations to carry on work throughout the winter. It is planned to make a shipment of ore some time early in the new year.

Additional machinery is being taken into the property of the Gold Nugget Products Company, situated in the southern part of the township of Henwood on the Elk Lake branch of the T. & N. O. Ry. The property was first opened up some two or three years ago by Mr. Stone, of Toronto, and was subsequently purchased by A. R. C. Smith and his associates. Among the products from the property is a good-grade pumice stone. It is also reported a granite outcrop on the property has been found to be of commercial value, the grade being such as is required in the manufacture of tombstones, etc. The representative of the "Journal" has not yet had an opportunity to investigate the accuracy of the report, which comes unofficially. The company's address is Kenabeek, Ont.

Financial arrangements are under way with a view toward opening the Paragon-Hitcheock property. Former work met with encouraging results, and encouraged the control to make another effort to develop the property.

In a general way, the lower quotations for silver have not had much adverse effect on the activity in the silver-mining areas. The fact is kept in mind that before the war and for some time after its commencement, the operators considered themselves fortunate when receiving around 60 cents an ounce. They are pointing to the fact that the price now is averaging around 80 cents an ounce, with the cost of supplies used in connection with mining gradually declining.

Ore Bullion Shipments.

During the week ended Nov. 19th, only two Cobalt companies shipped ore, the following being a summary:—

Shipper	Cars	Pds.
Dominion Reduction	1	83,000
O'Brien	1	64,890
Totals	2	147,890

During the corresponding period the Mining Corporation sent out a large shipment of bullion, made up of 97 bars containing 100,201 fine ounces.

THE GOLD MINES.

The Porcupine Field.

The gold mines of the Porcupine district are rushing operations to the fullest possible capacity permissible with the available supply of hydro-electric power. Not only this, but all the auxiliary equipment available is being employed so as to take advantage of the improvement in the supply of labor.

An instance of the determination of the companies to enlarge the scope of operations may be found at the Dome Mines, where a large number of miners have been engaged to work with hand-steel. Not content with operating to the full limit of the power supply, the company has decided to speed up work beyond this point, and has placed not far under a hundred miners underground with hand-steel.

A serious break has occurred in the big underground crusher at the Dome, and temporary shift has to be made to make up the deficiency. It is understood some little time is expected to elapse before the new part may be secured, and the question of installing two small crushers as a temporary measure is being considered. In the meantime, an endeavor is being made to break the ore as fine as possible by overcharges when blasting.

On Dec. 1st., the Hollinger Consolidated will disburse a dividend of 1 p.c., amounting to $246,000. This is the 8th dividend to be paid so far during the current year and is expected to be followed by another on Dec. 28th, making a total of 9 p.c. or $2,214,000 for the calendar year.

Total dividends from the silver and gold mines in the district of Temiskaming, made up of mines at Cobalt, Porcupine and Kirland Lake, will amount to well over $7,000,000 for 1920. This approximates the average paid yearly for the past fifteen years and is pointed to as a highly favorable achievement in view of labor shortage and power shortage caused by low water. The 1920 achievement exceeds by over $600,000 the record made in 1919. This increase was due to the Dome having resumed dividend disbursements at the interim rate of 2 p.c. at intervals of about three months, as well as the Hollinger having paid 8 p.c. and 1 p.c. more expected as compared with 7 p.c. last year. Such an increase having taken place at the gold mines during a period when economic conditions were generally unfavorable is pointed to as an indication of further increases during the coming year.

Work on the Porcupine Crown and the Thompson-Krist mines, now operated by the Northcrown Company, is proceeding at a rate somewhat below normal. The mill is permitted to operate only intermittently, owing to the shortage of electric power. As regards the intimation made some months ago in the "Journal" relative to a capital increase being under coonsideration, nothing has recently been heard. It is believed, however, such a measure may be adopted just as soon as the opportune time appears to have arrived. With the present power shortage, the time is not regarded as being opportune, but with the arrival of Spring, everything should be working in favor of gold mining.

The Kirkland Lake Area.

Mill construction at the Wright-Hargreaves mine is now in its final stages, and the machinery will soon be ready to turn over. Chemical supplies have been placed on order and with an improvement in the hydro-electric supply the company should join the producers early in the New Year.

The case involving the re-staking of the Teck-Hughes property was heard last week in Haileybury, the stakers claiming $20,000. The defense put up was based on the fact that a special Order-in-Council passed in Toronto just before the hour of forfeiture precluded any right of any prospector to restake the property. The case was heard before Mining Commissioner T. E. Godson, K.C., the decision being reserved.

Shaft sinking on the Lake Shore mine is now well below the 500-ft. level. A station will be cut at a depth of 600 ft., and the shaft will then be continued to a depth of 800 feet. The scheme of development will be to open up two operating levels, one at the 600 and one at the 800-ft. level. This is expected to add greatly to the volume of known ore and may reasonably lead to a decision to increase milling facilities.

Shiningtree Area.

The court has dismissed the injunction in the Wasapika dispute which was referred to in last week's "Journal," and dissolution of the Wasapika Gold Mines, Ltd., will now proceed in accordance with the Ontario Company's Act. This company is being absorbed by the Wasapika Consolidated.

Boston Field Creek.

Development work on the Miller Independence Mine, at Boston Creek, has been quietly but steadily progressing during the past few months, the pace of operation being considerably greater than at any previous time in the history of the enterprise.

Chief attention is being devoted to the systematic exploration of the 500-ft. level where work is in progress at three points, and where a plan of diamond drilling is being formulated. This program is to first thoroughly explore in a lateral direction all of the formations in several areas not yet penetrated by cross-cuts, and then to test their value at depth possibly down to about one thousand feet.

In the main north cross-cut at the 500-ft. level, a vein was encountered at a point 250 feet from the main shaft. Subsequent development has shown this to have characteristics very similar to those of the hanging-wall vein in the faulted zone at the second level in the "D" or telluride shaft. This vein is being followed, the present face of the drift being at a point almost directly beneath where the "D" shaft was started. It is intended to continue its exploration and development right to the northern boundary. Should this vein prove by further development, as seems probable, to be identical with the hanging-wall vein at the upper level, indications would seem to point to a combined straightening-up and fault-displacement of all the formation for about 300 feet northward below the plane of movement. In continuing the drift on the hanging-wall vein, to the boundary, not only is the rock formation being proved by actual examination but facilities are also being created simultaneously for subsequent exploration of the telluride and all other veins scattered throughout the property, by means of diamond drills.

The Miller Independence, in common with the mines of Cobalt and Kirkland Lake, draws its electric power fom power plants on the Montreal River. Last summer, however, as a precautionary measure against possible contingencies, two of the old steam-boilers in use prior to the installation of the hydro-electric system, were thoroughly overhauled, re-tubed and put into efficient repair. The company also engaged woodcutters during the past few months, and as a consequence is in a position to utilize this auxiliary plant and upon the hydro-electric power supply.

British Columbia Letter

Prince Rupert, B.C.

On his return from the Premier Mine, Salmon River District, Portland Canal, Mr. H. A. Guess, vice-president of the American Smelting & Refining Co., is quoted as saying that the development of the Premier mining property has disclosed actual ore, and the possibility of a greater tonnage than has yet been proved, that comes up to the most optimistic expectations. He referred to the plans being made to ship over the snow during the winter and stated that the muddy condition of the road during the Summer made the transport of ore to the Coast during that period impracticable. Two caterpillar tractors and sleds are the transportation facilities provided for use as soon as the trail hardens. The water power plant at the Premier will be in operation in less than a month, permitting the utilization of larger compressors and more rapid progress in the development and exploratory work now underway. The Cyanide Mill will be complete and in operation early next year.

Trail, B.C.

Ore receipts at the Trail Smelter of the Consolidated Mining & Smelting Co. for the last ten days of the month of October, totalled 12,125 tons of ore and concentrates.

Hedley, B.C.

Official announcement has been made of the closing down of the Nickel Plate Mine of the Hedley Gold Mining Company. Most of the employees have been discharged, only enough being retained to put the plant in such a shape that it will be ready for the resumption of operations when the time comes. The circumstances leading to this action are reviewed by the management in a statement given publicity in British Columbia. It is explained that during the war the mine was continued on a producing basis because it was felt that the gold was needed and after the Armistice it was thought that economic conditions would so improve that it would be possible to pay dividends on the capital invested. This anticipation has not been realized, as the management puts it: "We have been disappointed in this conclusion and find that we cannot earn reasonable dividends under existing conditions and maintain our reserves of ore." It is added that the shut-down is but temporary, that it will last probably for one year, and that the mine and plant will be in good condition to resume work when times improve. It is felt that under pre-war conditions or even 20 per cent thereof, "we can earn good dividends." That it had been hoped that the Government would do something to encourage the production of gold and that the Company has been disappointed in this, too, also is set out.

G. P. James, General Superintendent of the Company, does not speak as optimistically as the statement reads. He asserts that it is absolutely out of the question for the plant to be worked at a fair profit until prices of supplies, etc., come down to within 20 per cent of pre-war conditions. It was not expected that wages would drop to that extent and personally he did not think that material would decline sufficiently within a year to permit the re-opening of the Mine and the Mill. It might be two years or more before this happened: in fact the shut-down was for an indefinite period.

That the closing of the Nickel Plate is to be regretted by reason of the effect on the mining industry of the Province as a whole, cannot be gainsaid. One of the reliable producers over a long period of years, a mine the output of which in gold amounted to approximately 35,000 ozs. in 1917 and 1918 and little less in 1919, it has contributed substantially to the annual production of British Columbia. Not only is this true but there is the purely local aspect. The prosperous little town of Hedley has received a blow that it is hard to see how it can sustain and survive. The miners are leaving their families there while they go out and look for work to tide over the winter, but that they will move away as the breadwinners adjust themselves to the changed conditions is a foregone conclusion.

Vancouver, B.C.

Fifty gold bars, valued at over $500,000, have been shipped from the Dominion Assay Office of this City to Ottawa, the Canadian Capital. This represents the takings of the year up to the present date. The 1920 season is produced by officials to have been unsatisfactory in point of the gold production of British Columbia and the Yukon. Dredging operations have been interfered with by water shortage and both lode and placer mining has been affected by high costs. The closing of the Nickel Plate Mines is the culminating incident of a period which appears to have been marked by a constant decline. The resumption of shipments on the part of the Rossland Mines of the Consolidated Mining & Smelting Co., however, furnishes the silver, or should golden be used in this instance, lining to the cloud. Bullion is beginning to reach the Vancouver Office from Trail as a result.

Victoria, B.C.

Dr. J. E. Dutcher, who has just returned from Cape Prince of Wales, where he has been with the Lost River Tin Mining Company in the capacity of medical attendant, reports that work is being undertaken on rather a large scale on this property. While it has been under development for some seventeen years only recently have considerable operations been initiated for the opening of the deposits. The shaft now is down 300 feet. In sinking it was necessary first to penetrate the tundra and afterwards the glacial ice, which is some feet thick. Incidentally Dr. Dutcher furnishes a side light on life in the far north when he says that supplies brought to the mine last October are still in use and that the eggs lately have been taking on rather too high a flavour. Eskimo labour, he states, is unsatisfactory. Those employed in the mine work spasmodically and lately have been becoming more than ever independent because of the high prices to be obtained for the skins of fur-bearing animals. As a fox skin brings the Eskimos from $35 to $40 and as some of them trap as many as from 75 to 80 in a season it is not hard to understand their disinclination to the work of the miner.

Referring to placer mining in Alaska, Milton B. Roper, of Nome, states that the production has fallen off chiefly owing to the high cost of transportation. Freight is $19 a ton, lighterage $13 a ton, and wharfage $1.50 a ton. Coal in the yard is $46 a ton, which makes gold mining practically prohibitive. Mr. Roper, who is interested in dredging, says that operations of this character are going ahead on a large scale where conditions are suitable. Among the miners and prospectors of the north, interest is being manifested in the possibilities of placer mining on the Siberian Coast.

There is a well established idea that there are possibilities on the land across the Behring Sea and Mr. Roper believes that, if restrictions now preventing the export of gold from Siberia except in small quantities, are removed there will be a considerable exodus of miners to that country. Mr. Roper's business in British Columbia is to inspect certain placer grounds situated in the vicinity of Kamloops and elsewhere along the Fraser River and its northeastern tributaries with the object of instituting dredging operations. He expresses the opinion that there are good openings in this country and that, if good ground is found, it will be more satisfactory than Alaskan work because there will be practically an all-year working season.

While the copper market remains in the doldrums the Consolidated Mining and Smelting Co. proceeds with the development of its Vancouver Island properties. On the Sunloch Group, Jordon River, there is diamond drilling in progress at present. At Quatsino Sound considerable exploratory and development work still is underway. It is the opinion of those in touch with the work that both these properties will become large producers and that it is likely they will be put on a shipping basis as soon as more stable conditions prevail in respect of the world's copper requirements. It may be said, incidentally in this connection, that the Company is experiencing no difficulty at present in finding the labour needed for the work in hand. This changed condition is common to the mining camps of the entire Province.

Prince George, B.C.

The Cariboo District of British Columbia looks forward to an early revival of the placer mining industry. Barkerville has gone through a long period of extensive prospecting and hydraulicking by mining operators whose success has varied. Since the discovery on William Creek in the days of the Cariboo Gold excitement large sums of money have been spent in deep diggings between Quesnel and Barkerville by companies attempting to recover the gold from the gravels far below the creeks. The tremendous water pressure and difficulties of transportation have prevented any great success and attention now is being turned to a hunt for the Mother Lode which fed the rich placers of William and other adjacent Creeks. New York interests are said to have been favourably impressed by reports of engineers on the Barkerville field and are expected to commnce dredging operations in that section. The Imperial Group of Claims, Proserpine Mountain, upon which a shaft has been sunk 21 feet, is reported to have shown up a vein carrying values averaging $17 to the ton.

THE COLLIERIES.

The transfer of an area of 3,000 acres of coal bearing land situated in the Cedar District, Vancouver Island, for a figure aggregating a quarter of a million dollars is authentically reported. A number of British Columbia businessmen are the owners and, while the identity of the buyers has not been disclosed it is understood that they are undertaking to commence development with a view to the opening up of the coal seams and the establishment of a colliery without loss of time. The land carries bituminous coal of the same quality as that produced by other Vancouver Island coal mines.

Once more the City of Vancouver has taken umbrage over the cost of coal to the consumer. The Mayor of that City has taken the lead in protesting. Inquiries made by him are said to have led to the establishment of the fact that lignite can be imported to the Pacific Coast from the Province of Alberta and sold cheaper than is the bituminous coal of Vancouver Island and the interior British Columbia coal fields. The investigation now is in progress. The retail dealers have filed a statement of their case. They point first to their investment in Vancouver which runs to about $2,000,000 and dwell on the unfairness of the municipality entering into the business in competition with them. They then show their costs to be $13.41 per ton net, made up as follows: Price at the mines per ton net, $8.93; towing per ton net, 67 cents; unloading scows, 50 cents; wear and tear on sacks, 25 cents per ton net; screening and sacking 50 cents per net ton; wharfage or average rent per ton, 20 cents; overhead, 75 cents per net ton; cartage and packing, $1.50 per net ton. Their selling prices are $15.00 per ton for lump and $14 per ton for nut coal. The quality of the Alberta coal in comparison with that of this Province is attacked and it is asserted that the City would have to figure on selling run-of-the-mine coal at $11.36 at the cheapest while run-of-the-mine coal is sold by them at $11.50, so that there would be a saving of only 14 cents a ton for an inferior quality of fuel.

The production of the Vancouver Island, (B.C.) Collieries for the month of October shows a marked increase. It is apparent that all the Companies are speeding up their output in order to meet the increased domestic and bunker demands. Perhaps the most remarkable advance is in the case of the Cassidy Collieries of the Granby Consolidated Mining & Smelting Co. the production of which has jumped from 16,477 to 21,703 tons.

Following are the figures for the Island Collieries for the past month :

	Tons.
Canadian Western Fuel Co., Nanaimo, B.C.	60,582
Canadian Collieries (D) Ltd., Comox	43,390
Canadian Collieries, South Wellington	9,062
Canadian Collieries, Extension	17,593
Pacific Coast Coal Mines Ltd., S. Wellington	7,610
Nanoose Wellington Collieries, Nanoose Bay	6,460
Granby Consolidated M. & S. Co., Cassidy ..	21,703
Total	166,400

The production of the Crow's Nest Pass Coal Field, B.C. for the month of October was as follows:

	Tons.
Crow's Nest Pass Coal Co., Coal Creek	22,058
Crow's Nest Pass Coal Co., Michel	11,504
Corbin Coal & Coke Co., Corbin	14,678
Total	48,240

VANCOUVER MEETING OF THE CANADIAN INSTITUTE OF M. & M. FEBRUARY 1921.

It has been decided to hold the Annual Meeting of the British Columbia Division of the Canadian Institute of Mining and Metallurgy in Vancouver sometime in February 1921. An organising meeting has already been held, and definite particulars as to date will be shortly announced.

LABOR AND WAGE CONDITIONS AT THE NOVA SCOTIA COLLIERIES.

The terms of agreement proposed by the leading coal companies of Nova Scotia, (see page 955 of last week's issue) were discussed by the Wage Scale Committee of the United Mine Workers in Truro during the week ending the 20th November.

Many of the delegates to the Convention were definitely instructed by their locals to reject the agreement, which to this extent tied the hands of the Committee, and it has been decided to take a referendum vote of the members of the Union.

The President and Secretary of the Union were subjected to much criticism by the delegates, although there was a strong minority that supported their action at the Montreal Conference, and expressed the opinion that the men's representatives at Montreal had made the best bargain possible under the circumstances.

The extreme step of a strike is unlikely to be taken, the possibility of success being remote, higher wages not being a condition in the power of the operators to grant, even if attempted. The ability of the international funds to finance a strike in Nova Scotia has been very plainly stated by the international officers to be doubtful, seeing that in two States in the Union, West Virginia and Alabama, the U. M. W. of A. is engaged in a bitter fight that will test its resources to their utmost extent. In West Virginia, what is described by "Coal Age" as the "most critical situation in the country" now exists as the outcome of the attempt by the U. M. W. to unionize one of the last-remaining open-shop mining districts in the United States. The striking miners are now living in open tents, and the final outcome of the struggle, to again quote "Coal Age" will "depend upon human endurance." In Nova Scotia, the only principle now at stake is a question of wages. The international leaders and the local representatives in Nova Scotia have admitted the non-effect of the recommendations of the Royal Commission, and the continued force and existence of the agreement of January 1920. The conditions of trade, of coal-selling prices and of commodity prices, are admitted to have undergone a complete change since the Royal Commission made its award in the Summer, and, in any case, even under the different conditions of two months ago, it was apparent to those who were in touch with the facts that the recommendations of the Royal Commission contained suggestions that were impossible of fulfullment in practice, no matter what inclination to accept them might exist on either side. The miners definitely and very deliberately refused these recommendations.

Speaking to the delegates at Truro, the President of the Nova Scotia district said that it cost from $4.60 to $5.60 per ton to produce coal in Nova Scotia. In the United States, he stated, the men produce upwards of three tons per day per man employed. An increase of 27 per cent to them adds 40 cents per ton to the cost. In Nova Scotia an increase of 27 per cent would make the cost of coal $1.25 per ton higher. Thirty-five per cent of the miners in the United States are day-paid workers, but in Nova Scotia from 65 to 70 per cent are day-paid hands.

The figures given by this union official are approximately correct, and it may be added that the production per man employed in Nova Scotia does not reach two tons per man per day, consequent upon the disproportionate number of day-paid workers.

The Federal Trade Commission in the United States has recently published the figures of cost and sales realization for 535 identical operators in general competitive regions in the United States, which shows an f.o.b. mine cost of coal of $2.69 in June and $2.72 in May 1920, or a mine cost of from two to three dollars per ton below that of the Nova Scotia collieries. It is interesting to note, also, from the standpoint of earning ability, that these mines worked only 17 days in May and 19 days in June, whereas the collieries in Nova Scotia worked every day, except holidays and Sundays.

The miners in Nova Scotia are naturally chagrined and disappointed, having for some months calculated on receiving a wage increase that was not an economic possibility even at the peak of currency inflation and coal value—as expressed in a fluctuating paper medium—and not having realized that the aspect of business has completely changed, and that with great rapidity. Actually, the miners are doing very well to hold what they have, and it is also very much to be doubted whether the limitation of the Nova Scotia coal markets which will result from the wage increase proffered—under duress—by the operators, and the resulting unemployment, will be found as profitable in gross earnings, as increased individual production at existing rates of wages.

At the time of writing, the action of the miners is overshadowed, and to some extent presumably sought to be forestalled, by a strike of the railwaymen of the Dominion Iron & Steel Company, and impending similar action by the railway employees of the Nova Scotia Steel Company. The railwaymen employed on the steel plants are demanding the application of the McAdoo award to their wages to the same extent that it was applied to the wages of the employees of the Sydney & Louisburg Railway, a railway line operated by the Dominion Coal Company. The railway employees within the steel plants proper have never been regarded as entitled to the status of main-line employees, their work including only shunting and switching operations connected with the internal operation of the plants. The railwaymen gave the Company only seven hours notice of intention to strike, but by the help of officials and volunteers it is hoped to save the blast-furnaces, coke-ovens, and other continuous-process equipment from the disastrous consequence that will follow a cessation of all movement of coal, coke and ore in the plant without opportunity to bank furnaces and arrange for a lay-off.

In view of the serious slackness of orders at the Sydney plant, the closing-down of the Scotia plant, and the likelihood of a curtailment of operations at the Dominion plant through lack of demand for plates, rails and other main products of the plant, the action of the railwaymen seems very ill-advised.

The General Manager of the Sydney Plant, Mr. E. P. Merrill, has issued the following statement, which sufficiently discloses the difficulties under which the Dominion Company is laboring. Under a condition of steel demand, which if not soon bettered, will advise the drastic curtailment of steel-ingot production at the Sydney plant, the policy of the railwaymen seems to have been hastily conceived, and decided upon in ignorance of the Steel Company's position. Mr. Merrill states.

> "The public should know that there is an economic situation controlling the number of hours of work and the wages paid at the steel works at the present

time. The plant was not designed nor is it equipped to operate on the basis of an eight-hour day at cost that permits of reaching markets open to us.

"Our strongest competition is from the United States, where steel companies, prior to the war, accumulated large surpluses not subject to abnormal taxation, and which enabled them to install every known improvement and labor-saving device which made for lower costs and increased output. We have certain natural advantages in our geographical location, but we must have co-operation of employees and stockholders while we are building up our plant and our markets.

"For several months, in a declining market, we have sought business in all parts of the world, even offering rails in exchange for certain grades of ore and finished products to foreign governments on credits. Nothing has been left undone in an effort to keep all departments in operation, for we appreciate the need for employment and we know the value of maintaining our organization intact.

"The sooner the employees of the Dominion Steel and Dominion Coal Companies come to a realization of the honesty of our purpose to establish a permanent all-the-year-around industry in Cape Breton, the sooner will they participate in the benefits.

"It must be evident to the most unthinking that we will never approximate or establish such a condition as long as our men blindly follow advices of outsiders as to how our business shall be managed.

"The McAdoo schedule and the Chicago award may be all right when they can be passed along in increased passenger fares and freight rates, but we are in no such position.

"We looked upon our men as loyal employees and good citizens and it is disappointing to us that by their action they left us without means to protect our property."

The blast furnace of the Nova Scotia Steel & Coal Co. at Sydney Mines, and the open-hearth plant there, have been closed down, and the works at New Glasgow will be operated on cold metal until trade conditions warrant the resumption of steel-ingot production at Sydney Mines. Some 400 men will be displaced.

The production of the Glace Bay collieries of the Dominion Coal Company on the 18th November totalled 13,152 tons, this being the best individual day's output since January 1918.

BASE METALS BEING USED IN EUROPEAN COINAGES.

Samuel Montagu & Company's circular of 4th Nov. states that the mintage of base metal, other than copper or nickel, still prevails in Germany. Up to the end of August Mks. 53,300,000 of aluminium coins had been minted. Other coins minted up to the same date were iron coins, Mks 71,800,000, and zinc Mks. 56,800,000; so that in all about Mks. 181,200,000 of these coins of small denomination have been struck.

The "Times" Paris correspondent stated that the dies and metal for the new tokens, which are to replace the much-soiled 50c., 1 f. and 2 f. notes, are now ready, and the mint is only waiting the authority of the Chamber of Commerce of France, which is responsible for their issue.

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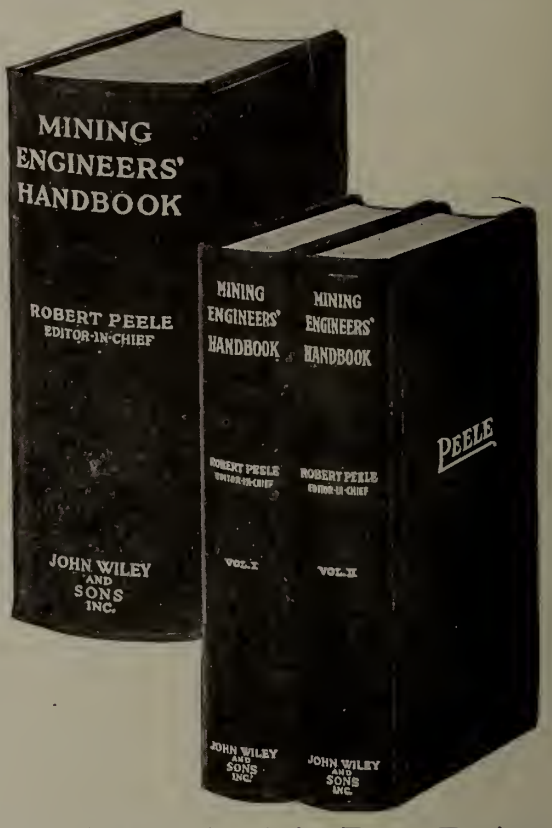

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Asbestos Mining in Australia

By HARTWELL CONDER.

(From Chemical Engineering & Mining Review, Melbourne).

The last five years have seen a development in a branch of mining which bids fair to win a permanent place as an economic producer. Asbestos has been known to exist in Australia since the days of early exploration. The demand, however, until recently, was almost solely for long fibre high-grade material, and nature had so arranged the distribution in Australia that the high-quality fibre—of wonderful length and texture—was located in the remote and sun-scorched vicinities of Marble Bar, in W.A., while the supplies within easy reach comprised fibre good enough in texture and tensile strength, but of average length well below the half-inch limit.

The introduction of asbestos sheeting has changed all that. It was found that by the addition of asbestos fibre to cement a product was obtained with the durability and other advantages of stone or slate, and yet with sufficient elasticity to withstand the ordinary rough usages of daily life. At first the rejected products of the Canadian mills were garnered and sold at low cost for this purpose, but the demand steadily increased, and freights and prices rose, so that it became of special interest to the Australian manufacturers to develop the supplies to be found at home. There is no lack of supplies, but considerable caution is necessary before expenditure is incurred in developing them. There are several forms of so-called asbestos. Mineralogically, true asbestos is a variety of hornblende; the commercial asbestos of Canada and Australia is a different mineral, and is known as chrysotile —almost pure hydrated silicate of magnesia. In composition it is identical with serpentine, with which it is invariably associated. When the vast intrusive masses of granite rocks commenced to cool, the more basic elements segregated along the margin to form distinctive rocks, such as gabbros, dolerites and others, grouped broadly under the name of ultra-basic rocks. Subjected to heat and the action of heated water vapor these rocks became altered—they lost iron and other elements and became hydrated, and serpentine is the name given to the final product. A soft, green, greasy rock, it is as widely distributed as the granites themselves; as a rule it does not carry minerals of economic value; chromite and magnetite accompany it, and in Tasmania it is the mother rock of the very valuable and extremely scarce osmiridium. In addition, it is the source of our supplies of asbestos.

The asbestos occurs in two forms. The first is found in the joints and selvages of the rock where in all probability local faulting has taken place. The fibres are parallel to the place of the faulting, and may be over a foot in length, but they are coarse in texture and lacking in tensile strength. This class of fibre is known as picrolite or slip fibre, and is of little use for sheeting or similar purposes.

In the second form the mineral occurs in narrow veins or seams running through the solid rock, and the fibres are all arranged transversely to the seams. Where exposed to the sunlight even the smallest seam stands out distinct, like a ribbon of silk along the face of the rock. The fibres may be teased apart to a flossy mass, and under the microscope the fine strands that compose this mass are seen to be bundles of finer and finer strands beyond the limits of even microscopic vision. It is this fine subdivision which gives the silky sheen when the light shines upon it, and which allows the better quality material to be spun into yarn and used for cloth.

Some interest has been shown lately in the manner in which this structure arises, and in the Transactions of the American Institute of Mining Engineers, Mr. Taber advances the theory that the fibres grow longitudinally as the crevice they form in opens. This theory does not appeal to the writer. Serpentine invariably shows the clearest signs of intense crushing and contortion. In the asbestos quarries both in Tasmania and in New South Wales local fault planes with slickensides occur at every angle and of every dimension. It is one of the main difficulties of working the ore, since at any point a good patch of ore may be cut off completely by a "head" coming either from the side or from below. With movements such as this taking place, cracks would develop in certain portions of the rock, to be instantly filled by the mobile solutions which were permeating the whole mass. It did not follow that chrysotile then formed from the solutions. In many places the rock is creviced through and through, but the crevices are filled with a green amorphous mineral with no sign of fibrous structure. The quality of the solution, and probably the rate of cooling, were determining factors, and when these were favorable the fibrous structure arose, even as the foliated structure of mica develops in the cooling granite itself.

The first treatment plant in Australia was erected under the writer's supervision near Beaconsfield, Tasmania, for the Durabestos Company, of Sydney. The asbestos occurs there in a serpentine belt lying between pre-silurian slates and Devonian granites. The geology has been described recently in Tasmanian Geological Survey Report No. 8, by A. McI. Reid. The plant was erected with considerable doubts as to the extent of ore available, but supplies were imperative, and this was then the source that offered most promise. There were many outcrops on the property, showing good fibre, but some considerable prospecting work had been done previously, and this work had shown that the ore bodies were of limited extent. It was realised that if the surface shows were attacked one by one and worked out singly, the property would soon be brought to a standstill. Effort was made, therefore, to open out a face where the fibre seemed most plentiful, and to carry this face right into the hillside, in order to expose other ore bodies at depth as the surface shows "petered out." It was hoped, too, that some system might be found to regulate the occurrences. The results were disappointing. No sign of system or method could be traced. The ore occurred in a hopelessly haphazard and erratic fashion. After some months working it became obvious that the hillside could not be taken in a face and that the ore bodies must be followed. This meant that the mine was doomed, and search was commenced for other supplies.

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The most promising and most accessible source proved to be in the New England district of N.S.W., on the western fall of the dividing range. From the granite mountains that form this range with Glen Innes perched high upon it, a stretch of broken, hilly country extends for over 50 miles till it merges into the western plains. The geology of this part of the country was dealt with by Dr. W. N. Benson, and the results of his work are published in the proceedings of the Linnean Society of N.S.W. He has shown that a great fault line extends in a direction about N.W., from a point about 20 miles N. of Tamworth, almost to Warialda, 100 miles away. The line passes about 12 miles east of Manilla and Barraba, and goes right through Bingara. Granite lies some distance away on the eastern side with a complex variety of rocks known as the eastern series stretching from it towards the fault line. Along the major portion of the fault line itself serpentines, gabbros, and other basic rocks are developed on the eastern side, and the serpentine in many places carries chrysotile asbestos.

The locality where the asbestos is most strongly developed is at Woodsreef, about 10 miles east of Barraba, and at that place quarries have been opened up and dressing plants erected by Messrs. Wunderlich and Messrs. James Hardie and Co., of Sydney. Messrs. Wunderlich had been interested in the Durabestos Co., which operated in Tasmania, and finally took over full control of this company. Their operations are briefly described here.

In the main features there is a close resemblance between the occurrence of the ore at Beaconsfield, Tasmania, and Woodsreef, N.S.W. Serpentine does not yield fertile soil, and its outcrop is marked by the stunted gum timber that battles for life upon it. Chromatite and magnetite are associated with it in both localities, some of the chromite patches having proved payable at Woodsreef. At both places the distribution of the fibre veins in the mother rock is most irregular and liable to sudden and total extinction, but the work done at Woodsreef leads to the conclusion that the distribution here is on a larger scale and of greater frequency. Weighed carefully in the light of the experience gathered in Tasmania, the mine here seemed to warrant a larger plant and to promise a good many years of profitable life. It would, however, prove a stumbling block to the engineer who aims at figuring out his ore reserves to the third figure in decimals. So far no practicable method of blocking out asbestos ore has been advanced. Even the diamond drill is useless, since the fibre fluffs up and chokes the bit.

To safeguard the position as far as possible, on Messrs. Wunderlich s property over a dozen quarries have been opened up, and these have been connected by tram with the mill. The mill itself is driven by a powerful Diesel engine, the fuel problem not being a simple one in these distant hills. The milling process is based on the Canadian practice, and depends first on crushing the rock with breaker and rolls to the size of peas. This product is then passed into a disintegrator, which pulverises the brittle rock to sand and beats out the fibre into fluff. From this machine the product is passed over shaking screens, at the lower end of which the mouth of a suction tube is brought down close to the surface. The fluff is caught up by the air current, carried away, and deposited in collecting bins. The process is not quite as simple as it sounds. since it is easy

both to lose fibre and to carry over an excess of useless sand, while the dust problem is always present. Fortunately, the soft serpentine dust appears to be free from the pernicious effects of the angular quartz particles, but care is taken to carry it off with fans, and keep the building as clear as possible. The disintegrating machine also is open to improvement. It is most difficult to devise a machine which will reduce the rock rapidly without damaging the fibre, and without excessive wear and tear. In Canada, where there was an excess of short fibre, the machines employed were most severe on the fibre; the ore was rich and a certain loss was compensated by large capacity and better quality product. With poorer ore in Australia the loss of fibre is a serious matter. A machine built in Sydney is installed in the present plant, and it is hoped it will prove successful.

The plant has been made, as far as possible, self-acting The tram by which the ore is delivered to the bins curves round, so that there is a straight run through as the trucks are emptied. The mill is located so that a good gradient with the load is secured from nearly all the quarries. The tailings are passed out by conveyor, so that as little "shovel work" as possible is entailed.

The enterprise has brought fresh life and activity to a little way back township hidden among the hills which had already in the past had a brief experience of mining vitality from the alluvial gold that was worked there. Gold is still won in the vicinity, and there is talk of real lodes and large plants, but it is the asbestos that offers the immediate revival. How long such revival will last and how great a benefit it will bring to this part of the country must for the present remain unknown. This asbestos industry has, however, come to stay, and it is clear that the demand for the product will increase day by day as its merits become better known to architects and builders. It does not follow that every natural occurrence of asbestos has commercial value, but the stage has been reached when such occurrrences are fully deserving of careful investigation, to decide whether in quantity and quality they may not prove profitable to the investigator, and useful to the men who are turning Australian minerals into Australian goods.

NEW COBALT DEPOSIT.

A Queensland Discovery.

The development of new uses of metallic cobalt in recent years has established a demand for this commodity, which a few years ago was a metal of comparatively small account. In the circumstances it becomes important to put on record any discoveries of new occurrences that give any promise of development to meet the world's requirements, and in this connection a report by the Queensland Government geologist recently received at the Imperial Mineral Resources Bureau concerning a high-grade deposit near Selwyn, in the Cloncurry district of Queensland, is of special interest.

The locality is approximately 19 miles south of Selwyn, the nearest railway station, which is 71 miles from Cloncurry. By track it is about 5 3-4 miles south of Mount Dore (located on Queensland four-mile map sheet 120) and one to two miles west of the Mort River.

The cobalt ore occurs at the contact of diorite (apparently a dyke about five chains wide) and schists, the latter belonging to the Cloncurry series of supposed Silurian age. The schists have a strike of 5 degrees west of north and dip easterly at angles of 74 degrees to 80 degrees. They form noticeable outcrops on the area.

It is estimated that in prospecting the lode between 130 tons and 140 tons of ore have been raised, of which 92 tons represent ore in paddocks; 30 tons of the latter are approximately of 25 per cent. grade and the balance 10 per cent. to 12 per cent. grade. The lode is regular in its trend, following almost a straight line for at least 300 ft. It is very desirable, says the Government geologist, that the whole of the diorite contact should be prospected, particularly the eastern contact, on account of copper carbonates, scheelite and cobalt ores having been already found along it.

VANCOUVER BRANCH, C. I. M. M.

At a recent meeting of the Vancouver Branch of the C. I. M. M., it was decided to hold a luncheon early in November. This luncheon will be the first of a series of luncheons to held during the Winter by this branch. It is proposed to make the meetings interesting, and have them prove a means of getting the members of the Vancouver branch together in a social way.

1921 MINING CONVENTION, PORTLAND, OR.

Reports are coming from Portland, Ore., that the Chambers of Commerce are even now talking of the International Mining Convention which is to be held there during the coming Spring. Plans and ways and means are being discussed, and it proposed to give the visiting delegates an interesting time. Vancouver will soon start some publicity work in connection with the coming convention, and the British Columbia Chamber of Mines proposes to take a most active part.

J. A. RICHARDS,
Acting Chief Inspector of Mines, Alberta.

BOOK REVIEW.

The Efficient Purchase and Utilization of Mine Supplies: Stronck & Billyard. First Edition. John Wiley & Sons, New York. 5 by 7½ inches. Cloth Boards. 97 pp. No index. $1.25.

This little book, written by two mining engineers, deals with two subjects that are not usually conjoined in mine operation, because the office of Purchasing Agent does not, generally, carry with it any supervision over the efficient utilization of the supplies that he purchases in his capacity as agent for his employers. The combination of clerical and purchasing ability with a practical knowledge of the use and upkeep of mine material is not often found, and in choosing a purchasing agent, consideration of the desirability of such dual equipment in the person selected might not be out of place.

The book gives a clear idea of the clerical equipment necessary, and lays properly great stress on the desirability of written requisitions and receipts for all material issued, although it is noted that the competent executive will know where to draw the line between useless red tape and proper system.

The treatment of the question of utilization of mine supplies contains useful hints, particularly with regard to hand-tools, the storage of oils and lubricants, timber preservation, treatment of pipelines, prevention of corrosion in iron and steel, fuel consumption, etc.

A department regarded as necessary by the authors, but only occasionally found at mines, is for testing materials received. In such items as oils and lubricants, wire-ropes, horse-feed, to mention a few typical things, some equipment for testing is necessary to check up the firms supplying material, nor is it necessary to assume that only large concerns can afford such equipment.

Another matter touched upon by the writers is that warehouses should be designed with track connections, handling devices and bin arrangements of substantial and permanent construction, designed to assist the economical storage and subsequent distribution of material.

HANDBOOK OF ORE DRESSING. Equipment and Practice. A. W. Allen, First Edition 1920. 7½ by 5 inches. 242 pages with Index. Limp leatherette backs. McGraw-Hill Co., New York.

This handbook is written by the author of "Mill & Cyanide Handbook", published by C. Griffin & Co., London, and previously reviewed in the "Canadian Mining Journal."

It deals with the various stages in the mechanical handling and preparation of an ore for metallurgical treatment. Amalgamation, concentration, flotation, chemical solution and smelting, are considered as essentially metallurgical processes, and as outside the scope of this treatise.

The introduction (from which we note the author's footnotes, the original presence of which is indicated in the text, have been omitted) discusses interestingly the proper definition of the term "ore-dressing" and its distinction from metallurgical extraction. We recollect that a legal question touching the application of taxation to mines in Northern Ontario turned on this distinction.

The treatise appears to be what its writer sets forth as his aim, namely, "a handy and practical vademecum for millmen and engineers." A bibliography is appended, and illustrations are numerous. Many statistical tables are also included.

MINERALOGY, by E. H. Kraus, Professor of Mineralogy and Crystallography, University of Michigan, and W. F. Hunt, associate Professor of Mineralogy and Petrography, University of Michigan. Published by McGraw-Hill Book Co., New York.

This book is written for the purpose of helping the student to grasp the fundamentals of the science of mineralogy. It is obviously intended to be used as a handbook in a laboratory where specimens of the minerals are available for study and which is equipped with simple apparatus for easily applied tests. It should serve as a useful text-book for elementary classes in mineralogy. It deals specifically with 150 common minerals, but should help to give the student a good groundwork for the study of any other minerals as well as assist him in determining the 150 described in the text.

The authors have advisedly lain stress on the physical properties of minerals. It is by the easily determined physical properties that most minerals are identified. The less easily understood subject of crystallography is however given prominence because of the highly distinctive character of the crystallization of minerals.

As the ordinary student in our colleges knows little about crystallography or the optical properties of crystals, the authors have necessarily presented these subjects at some length. They have endeavored to simplify these matters for the student by using large numbers of illustrations, including numerous excellent photographs of minerals and crystal models. The information given in the text, when used in conjunction with laboratory study of crystals and crystal models should make easy the acquirement of the rudiments of crystallography and its application in the identifying of minerals.

For the determination of minerals simple blow-pipe tests are in many cases used to advantage. The authors of this book have presented an excellent description of blow-pipe methods that require only simple apparatus and a few reagents.

In the descriptions of minerals, the authors have chosen a logical arrangement and grouping that commends itself to the reader and should help the student to keep in his mind. Chief attention has been devoted to characteristics which are useful in identifying minerals, mention is made of the economic uses and value of the various minerals and some of the districts in which ores are mixed are noted.

The ways in which minerals have been formed are dealt with in one chapter. Some description is given also of the common rocks. The student is also given some idea of the methods of utilizing the polarizing microscope for the examination of minerals.

To assist in the determination of the common minerals a very complete set of tables is presented. With these tables the student can utilize readily determinable physical properties in identifying specimens. Just how satisfactory these tables are for the purpose can be determined only by frequent use. Knowing the authors I would expect these tables to be the result of long experience and to have been well tested and found very satisfactory.

The book differs in many respects from the ordinary text-books on mineralogy. It is not a mere descriptive text or a dissertation on the science of mineralogy; but rather a book with a purpose: to give the student a grasp of fundamentals of the subjects and to arouse his interest in minerals and ores and in the industries in which they play a large part.—R. E. H.

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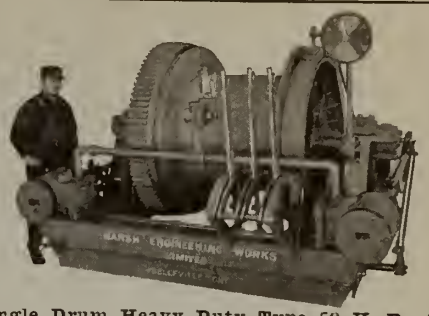

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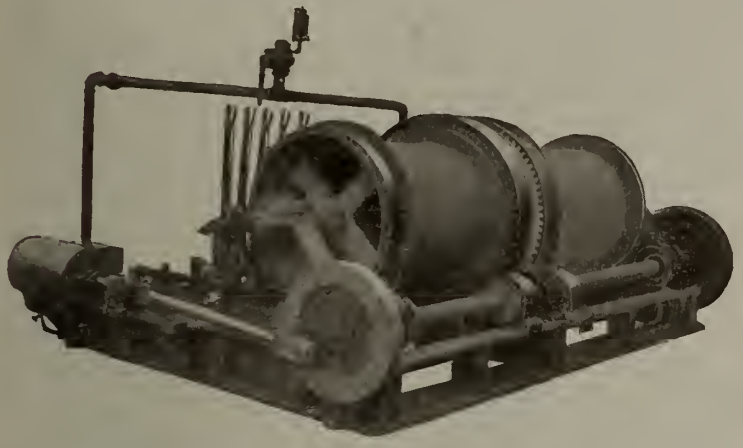

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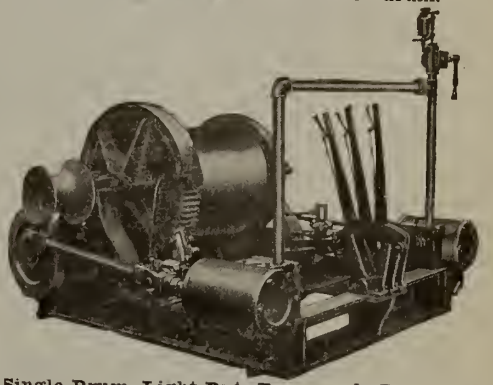

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MINE GASES AND VENTILATION.—Text-book for students of Mining, Mining Engineers and Candidates preparing for Mining Examinations. J. T. Beard, Second Edition. 5½ by 8 inches. Limp leatherette backs. 433 pages with index. McGraw-Hill Co., New York, $4.00.

Mr. Beard's connection with the International Correspondence Schools, and with "Mines and Minerals" is well-known to coal-mining students. As Senior Associate Editor of "Coal Age". Mr. Beard prepared a series of study courses in coal mining, with the intention of their inclusion and later publication as a pocket book. The present volume is issued in request to many applications for immediate publication, and it is, as stated in the preface, a very handy volume for mining students, dealing simply with one of the subjects in a coal-mining course that usually gives most worry to the aspirant to a certificate of competency and official position.

The volume treats on the physical phenomena of atmospheric air, heat, mine gases, mine explosions, mine rescue-work and appliances, the theory and practice of ventilation, mine lamps and lighting, and contains an addenda of useful tables.

The volume is, of course, written from the standpoint of United States practice, which in many respects connected with mine explosives, the use of electricity in mines, mine illumination and the use of explosives, permits practices that are not allowed in Canadian or European collieries.

Mr. Beard's viewpoint, is however, in advance of the practice of his country.

MINERAL RIGHTS OF ESQUIMALT AND NANAIMO RAILWAY BELT, B.C.

For some months negotiations have been in progress between the British Columbia Department of Mines and the representatives of the Esquimalt and Nanaimo Railway. Co. for the settlement of the unsatisfactory condition now prevailing as to the administration of the minerals within what is known as the Railway Belt on Vancouver Island, an area of 3,396.9 square miles. In this section the Company owns the surface and the base metals and the Government the gold and silver and there are the Railway Company's regulations and the Provincial Mineral Act to be complied with before title to the minerals can be obtained or even recorded effectively. The result has been the retarding of mining dvelopment in that region. After extended discussion, and exchange of views, the Government has made a proposition to the Company which may be summarized as follows:

"That, as regards the mineral rights within the E. & N. Railway Belt remaining unalienated, the Government is prepared practically to go into partnership with the Railway Company.

"The district to become fully under the operation of the Mineral Act as far as underground mineral rights are concerned; that such mineral rights be administered by the government; that the cost of such administration be entirely borne by the government and that the gross receipts of all revenue received by the government from and on account of such mineral rights, including taxes, etc., be divided equally between the government and the railway company."

TORONTO NOTES.

Dr. W. L. Goodwin, formerly Dean of the Faculty of Applied Science at Queens University, Kingston, has arrived in Toronto. Dr. Goodwin has been requested to act as principal and has accepted the task in connection with the establishment by the Ontario Department of Mines, of schools of instruction at the various mining centres. It is expected that the schools will be at Belleville, Madoc, Cobalt, Porcupine, Fort William and Sault Ste. Marie.

Oil boring operations will be carried on all winter in Alberta and Saskatchewan by ten rigs of Imperial Oil, Limited, according to an announcement by President A. W. McQueen, who has just returned to Toronto from the West, where he completed arrangements for the continuance of operations. This will embrace all the rigs of the company now operating in the West, with the exception of the two that were in the Fort Norman territory of the far north, where the weather is too severe for winter work. No further announcement has been made as to results in the latter section as work was closed down for the winter some time ago. The continuance of boring in the more southerly regions may bring announcement of success in other places in the course of the winter months. In any case the company's program in the West is being prosecuted with vigor.

Thompson Powder Co., Limited.

The mining industry generally will be interested in learning of the progress that is being made at the plant of the Thompson Powder Company, Limited, manufacturers of high explosives at Deseronto, Ont. A new magazine has been erected which will hold several carloads of the finished product and one of the buildings is in readiness for the reception of over fifty tons of raw material, which will at once be hauled to the power house. Other buildings have been remodelled and site cleaned up. The Hydro line will be strung during November. Motors and other machinery have been ordered and it is expected that before long the plant will be in active operation. The company are the manufacturers of "Thompsonite" an explosive which, it is claimed, throws off no noxious fumes and does not require thawing in the coldest weather. It is claimed, also, that the inventor has perfected a powder which is stronger by at least fifteen per cent than any explosive now in use in Canada. The powder is said not to be affected by water, does not leak or crystallise out and does not contain nitro-glycerine, making it safe to handle and manufacture.

JOPLIN DISTRICT ROCK DRILLING CONTEST.

Down in Baxter Springs, Kansas, in the Joplin District, they have an annual Fall Festival at which the drawing card and most exciting event is a rock drilling prize contest, which, as a true criterion of men and machines, closely approaches the ideal contest. The contest was held this year on October 20th.

Teams are required by the rules of this contest to set up tripods; connect hose to drill; drill hole clear through rock; tear down drill; disconnect hose; loosen bolts; and place hose, steel, drill, and tripod back in position where found.

The rock used last year was a block of Carthage marble five feet square, marked off into twelve square spaces, one space being reserved for each drilling team, while this year a block of concrete, six feet thick and filled with boulders, was used.

Miles and Vickery, who carried off the first prize last year with the Waugh Turbro drill, were just one minute behind Abbott and Mitchell, the team that won the first prize this year. Both teams operated the Waugh Turbro drill, as did also Santon and Cox winners of the third prize in this year's contest.

The drilling time for the first three teams including setting up, tearing down, etc., was as follows: First, 4 minutes 26½ seconds; Second, 4 minutes, 27½ seconds; Third, 5 minutes 4½ seconds. The nearest competitor of the three winning teams, operating another make of drill, completed their hole in 7 minutes 4½ seconds. Last year the winning time in this contest was 5 minutes and 16 seconds.

That the Waugh Turbro drill should have won the first and second prizes in the Baxter Springs contest last year, and first, second and third prizes in this year's contest is considered a remarkable achievement in the Joplin district where the Turbro ever since its introduction has enjoyed great popularity.

COAL PRICES.

Toronto, November 25.—Local dealers report that there are indications of a recession in anthracite prices. Business is exceedingly dull. The storms of the past week resulted in a still greater shortage of cars and there has been a considerable reduction in motive power on the railroads. Bituminous mine run is quoted at from $9.25 to $10.50 with good grade slack at $9.50. Smokeless is quoted at from $10 to $10.75. Bituminous lump continues to be scarce and hard coal is ruling at from $8 to $14.

Montreal.

Boston News Bureau states drop in bituminous prices in United States has been a collapse of the spot market rather than any serious reduction in contract prices. This is what would be expected, as unconscionable increases which took place in United States coal during the Summer were for "spot" coal; the mines, by some process best known to themselves, managing to hold back on contract deliveries and avail themselves of spot coal prices. Prices for good grade bituminous steam are stated to vary from $4.25 to $6.00 per ton, at the pitmouth an average of $5.00 being representative.

Tendency to substitute bituminous for anthracite is noticeable in the New England States, and it is further stated that large demand for anthracite from the Middle West which was simultaneous with high wages there is now failling off, and that bituminous coal is being once more generally used. The status of anthracite as a "luxury" fuel, but not an indispensable one where bituminous coal is available, is becoming established.

Statistics just compiled indicate that the British Columbia Department of Mines, in carrying out the policy enunciated by the Mineral Survey & Development Act of extending assistance in the construction of roads and trails to mining properties favorably reported upon by government engineers, has built and maintained, between the years 1917 and 1920 inclusive, a total of 3,901.95 of such roads and trails in different parts of the Province. These figures are interesting as showing that the mining industry has not been dormant in the Canadian West in recent years and that considerable work has been done towards the opening up of new mineralized areas.

The First Grinding Principle

The ancient Greek and Roman both recognized the primary principle of grinding as crushing a smaller, softer object with a heavier, harder one. These super-men endowed with their marvelous physique, hurled huge boulders against smaller and softer stone. With this slow method, they reduced such minerals as quartz and limestone to powder form.

This first recognized grinding principle, improved and marshalled into commercial force by modern engineering science, is the basis of the Hardinge Conical Mill. When one considers that an 8-ft Hardinge Ball Mill can grind more in a day than a legion of early Greeks and Romans could in a week, the part modern engineering science has played is very impressive.

The Mill contains 3600 steel balls of various sizes which strike the material being ground at an average of 90,000 times a minute exerting a reduction force of approximately 360,000ft. lbs. of energy. Due to the conical shape of the Hardinge Mill, coarse material, on entering immediately gravitates to the point of greatest diameter. There it comes in contact with the largest balls traveling at the highest speed and striking with the greatest impact. As the particles are gradually broken they flow toward the narrower end meeting the smaller and lighter balls. The material undergoing reduction reaches the required degree of fineness and the discharge end simultaneously.

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Port Arthur Notes

By J. J. O'CONNOR.

The recent announcement of Thos. W. Gibson, Deputy Minister of Mines, that Mining Schools for prospectors would be opened at suitable mining centres during the coming Winter, has been received throughout Northern Ontario with general satisfaction, by all classes interested in the development of the immense area of unprospected territory, of which we know so little.

In the light of the mineral development that has taken place in Northern Ontario during the past ten years, there is no more inviting field for the intelligent well informed prospector, than is afforded in the unprospected areas of Northern Ontario. The vast triangular expanse of country, bounded on the south by the settlements of agriculturists, and the cities of Port Arthur and Fort William, on the east by Lake Nepigon, on the north by the Canadian National Railway, thousands of square miles in extent, is practically untrodden and unknown to the prospector. Similar extensive tracts of promising stretches of country lie east of Lake Nepigon, almost wholly unprospected. While north of the Canadian National Railway, (Transcontinental) we know no more of today, than we did in the days of the pioneer fur-traders.

These virgin fields are beckoning the well equipped prospector, offering opportunities of gaining splendid rewards for their time and labour.

The Hon. Mr. Mills, Minister of Mines, is to be highly commended for affording facilities that will be within the reach of all interested, to fully equip themselves at a season when their ordinary field work is restricted. It is to be hoped that many will avail themselves of this splendid opportunity, and that the pack-sack, the pick and the frying-pan, may be familiar sights on the trails and portages of the North, during the coming summer.

It has long been felt that a Mining Commissioner, familiar with, and competent to direct publicity, covering the mineral areas of Northern Ontario, would be of substantial advantage to this section, in making known its possibilities, to the investing public. The advantage the Province of Manitoba has received from the employment of an official of this character, is asknowledged by all mining men, and furnishes a good precedent for Ontario to follow.

The steamer J. Frater Taylor, of the Algoma Central Steamsip Line, cleared for Buffalo, on the 16th instant, with the last cargo of pyrites for the season. This cargo completes a total shipment of slightly over 100,000 tons for the season of 1920, from the Northern Pyrites Mines, at Northpines, Ontario.

SILVER-GALENA MINE—For sale limited number One Dollar shares in Yukon Silver-Lead Mining Company, incorporated under laws Yukon Territory, operating Lookout Mountain Claim in Mayo District of Yukon Territory, Canada, has option on five claims adjoining. Capitalised for $250,000. Bona fide opportunity. Geo. F. Johnson, 817 South El Molino Ave., Pasadena Calif.

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EDITORIAL

Mines Regulation in Canada

In this issue is published a comparison of the statutory mining regulations of the provinces of Canada, copied from the November issue of the "Labor Gazette." The comparison has been carefully made, and should be useful for purposes of reference and annotation, as mining laws are constantly being changed and added to.

The provincial laws as they exist today—and ignoring purely local regulations and the so-called "Special Rules," which are a rather important part of all mines' regulation—are compared with a standard of uniformity and excellence, prepared by a Commission on Uniformity of Labor Laws, appointed as a sequel to the Industrial Conference of September 1919.

Insofar as the Commission has confined its recommendations to statutory regulation of mines, considered from the standpoint of the well-being of the workmen, the standard adopted is not out of line with actual practice and the trend of modern thought, but in some respects the functions of the provincial officers, to whose hands the statutory regulation of mines is entrusted, seem to have been encroached upon.

For example, it is suggested that in case of disagreement following upon the report of a dangerous condition by a mine inspector, the matter may be referred to a board of arbitration consisting of a judge, and representatives of the interested parties.

This, to our mind, reveals a misapprehension of the duties and the status of the government inspectors of mines. These officers of the law are considered in most British courts to represent the directly delegated authority of the statute law, and it is not by courtesy or by custom, but by legal right that these men are designated as "His Majesty's Inspectors of Mines." Loose thinking of this kind recently led to a mine inspector in Nova Scotia being placed on trial for manslaughter, the inference being that he shared the responsibility of the mine officials. To our mind, the inspector of mines cannot delegate his authority, nor allow of its abatement. He has one duty only, and one responsibility only rests upon him, which is to administer the law. The only tribunal of reference he can admit is his superior in office, the Minister of Mines, who represents the court of final appeal.

Another recommendation to which exception is taken is that providing for administration of first-aid and mine-rescue work by the Workmen's Compensation Board of such provinces as have established this authority. If this recommendation were confined to medical aid and the generally recognized scope of first-aid and accident prevention, little exception could be taken to it, but the inclusion of mine-rescue work, (a much misunderstood term) introduces a highly technical branch of the mining engineer's duties that in most well-regulated mine administrations is specifically dealt with by statute. The selection of such appliances as oxygen breathing-apparatus, fire-fighting devices, gas detectors, illuminating devices, signalling apparatus; the direction of rescue work, the supervision of men and materials; the formulation of rules of procedure, the training of men, and many other things that might be mentioned, come within the duties of the mine management and the mines inspectorate, and are certainly foreign to accepted conceptions of the duties of a Workmen's Compensation Board. The concluding paragraph of the Report of the Commission states: "The *administration* of first-aid and mine-rescue work is in no case entirely *within the hands* of the Workmen's Compensation Board."

Unless we entirely misconceive the viewpoint of the provincial departments of mines, and misinterpret both the intent of the workmen's compensation acts and the mines regulation acts of the several provinces, it will never be so.

The uniformity of mines regulation is not undesirable so far as this governs the social status of the mine-workers, but it is neither desirable or possible that uniformity should be attempted—for the mere sake of

uniformity—in technical regulations, as these advance with time and with the progress of technical invention. So far, the most effective spur to changes in the mining regulations of the various provinces of Canada, has been a spirit of emulation, and no literature is so avidly read by mining men as that which compares accident rates arising from mining in the provinces as they appear in the annual reports of the inspectors of mines. Nothing, moreover, is more instantly objected to than any attempt at unfair comparison, or slur upon the good name of any province, in regard to its mining accident rate, which we take to be a first-class indication of a commendable spirit of emulation in the good work of lessening accidents.

There could be little objection to the provision of funds for the purchase of first-aid and mine-rescue appliances; these having hitherto been provided at the expense of the mine owners, and, since the passage of compensation acts, possibly to be regarded as a fair charge against compensation assessments held by the compensation boards. This is the meaning we would give to the Commission's recommendation in Clause 14, but it is inconceivable that the "administration" of first-aid and mine-rescue work should in any case "be entirely in the hands of the Workmen's Compensation Board."

THE PUBLICATION OF TECHNICAL BOOKS.

We are reminded by a well-known New York publishing house, John Wiley & Sons, that the prices of technical books are advancing, and that they will not join the downward movement of general commodities. Since 1914 the costs of manufacturing books has advanced 132 per cent, and is still going up. Printers are now asking for a further forty per cent wage increase. The war caused a slump in the demand for certain classes of technical books, and in some instances necessitated the withholding of publication of books well advanced towards issue. The renewed demand has depleted the stock of books, and a general increase in the price of new issues will be required in technical books, as it has been required in novels and other books.

Of the making of books, the Preacher said, there is no end, and this is an ancient dictum that may be fittingly applied to the technical book of today, often out-of-date in its references before it reaches the public because of the rapid advance of human knowledge and recorded experimentation.

The publication of technical works has always ranked as one of the most honorable of professions, and it is fitting in this connection to note that the firm of Charles Griffin & Co., of London, has issued a centenary volume, with a foreword by Lord Moulton, F.R.S., to mark its completion of one hundred years of service to the technical professions. The list of publications mentioned in this volume, beginning with Rankine's classics in 1858, is actually a catalogue of British engineering and technological progress and the names of those who laid the foundations of progress.

Canada has not yet developed a publishing house that is equipped to produce technical works on a scale to compete with the large firms of London and New York, and it is hardly to be expected that such should be the case, but it is possibly not the happiest of omens that our large publishing houses have so far specialized in volumes of fiction or ephemeral literature. Notable among the few British book-publishing houses that has established a Canadian branch is MacMillan's, but perhaps the day is coming when such firms as Isaac Pitman & Sons, Griffin & Co., or some of the better-known New York houses may see fit to set up shop in Canada, or better still that some of our Canadian houses may develop a substantial technical-book business.

In one particular, that of elementary and high-school books, there is much need for preparation of manuals on distinctively Canadian subjects. For example there is no competent text-book on Canadian industries, on the association of regional geography and geology with industry and population, no understandable manual on Canadian minerals and mining, and no book that attempts to apply to Canadian life the principles—and not the dry-as-dust facts and figures—that animate the geologist, the geographer, the historian, the forester and the scientific agriculturist. Our school literature is largely clipped and borrowed material, and it is distinguished by the minimum of originality and the maximum of compilation.

Really worth-while school text-books of the nature above outlined cannot, of course, be originated by the individual provinces. They will have to be assured of a Dominion-wide circulation, and will probably have to originate outside existing educational authorities.

CANADA AS A PRODUCER OF PETROLEUM.

In the issue of the 19th November, exception was taken in these columns to an opinion of the "Petroleum Times," of London, which stated " it must not be imagined that Canada has the slightest hopes of ever becoming a great oil-producing country." It is pleasing to note that in the latest issue of our informative contemporary which is to hand, there appears a geological sketch-map of Western Canada illustrative of the oil occurrences and prospecting boreholes, and containing a note on the Fort Norman oil strike, and the interesting statement that the new oil-field "is probably of great extent and may be one of the largest in the world."

We congratulate "Petroleum Times on its quick publication of accurate information regarding the successful prospecting of the Imperial Oil Company, based upon Dr. Bosworth's researches, and its evident ap-

preciation of the real importance of the Fort Norman oil-flow, which follows so soon upon a previously expressed adverse opinion. The statement of Mr. Camsell, the Deputy Minister of Mines, that "Canada is a continental area, only partially prospected," is in these days being amply demonstrated.

THE INTEREST OF THE COAL PRODUCER IN COAL DISTRIBUTION.

Our British Columbia correspondent gives some particulars of the cost of marketing domestic coal on the Pacific Coast that are fairly typical of the customs of the coal trade in general.

The price at the mines to dealers is given as $8.93 per net ton, which seems high. The cost of mining coal in Vancouver Island is, however, quite high. Except in some favored localities, the Island coals are characterised by a high percentage of discard in the preparation process at the mines, running in some cases from 25 to 30 percent. The seams are also disturbed by rolls, and the work of development is extremely costly. The difficulties under which mining is carried on in some Vancouver Island districts are indeed such as would dishearten those accustomed to continuous, regular coal seams.

The process of getting the coal to market in Vancouver includes the following operations, towing and unloading scows, screening and sacking, cartage and packing. These total a cost of $4.37, or about half the mine cost of the coal, and they represent largely the cost of inefficient and superfluous handling. Customers demand screened lump coal, and to supply this demand, runmine is screened, leaving a residue of slack of little value. Ordinary runmine should be good enough for most domestic purposes. Sacking is another practice that is only necessary where coal has to be delivered in extremely small quantities. The items of towing, unloading scows, wharf rent and overhead charges, indicate that much could be saved by bringing coal cargoes to Vancouver in larger bulk, and unloading by modern devices.

The suggestion that Alberta coal should be brought to Vancouver and sold by the city in a municipal yard is not one that commends itself to many, but it does indicate that the effect of large areas of coal that can be very cheaply mined is commencing to be felt, and Vancouver people should not overlook the fact that some day their city is likely to be a point of much importance in the export of Alberta coal by water. The obvious remedy for any inefficiency that may exist as a result of competition among Vancouver Island mines in the Vancouver domestic trade, is the consolidation of the sales organizations, a concentration of the freighting, discharging and marketing arrangements; and the absorption of the business of the retailers by the coal companies.

Even on their own showing, the retail dealers in coal in Vancouver take a profit on $1.20 per ton on lump coal. It is safe to say that no coal company in Vancouver Island ever made such a profit over any representative period, after deduction of all legitimate charges. It is also safe to say that a coal company would consider itself justified in spending many thousands of dollars to effect a producing-cost saving of ten cents per ton, and they should not contemplate —without some consideration of its repercussion on their own interests—a charge of $1.50 per ton for "cartage and packing" of domestic coal. He may not deserve it, but the coal producer will always be blamed by the ultimate customer for the high cost of coal, and the necessity for action in self-defence is quite clearly indicated.

LOW FATALITY RATE IN BRITISH COAL MINES.

In pleasing contradistinction to the many difficulties that at this time beset British coal-mining is the fatal accident record, which in 1919, for the first time in its history, showed a ratio of mortality from accidents per thousand persons employed that fell below unity, the figure being 0.94 per 1,000 persons. The number of persons who lost their lives by explosions of fire damp and coal dust, was 27, out of 1,191,313 employed, or 0.03 per thousand, a record that was only bettered in 1917, when only 20 deaths occurred from these causes.

Twelve of the deaths from explosions occurred in Scotland, where the use of naked lights is common. In the English mines, the practice may be said to be virtually extinct.

Another notable fact is that not a single person was killed in Great Britain in 1919 through breakage of ropes and chains in shafts, and only six fatalities are attributed to the use of electrical plant underground.

As compared with our friends in the United States, British mining engineers pay a high price in restrictions on output and in increased cost of production because of the operation of regulations forbidding naked lights, naked power wires, black powder, underground trolley-haulages, and other practices that are permitted in the coal mines of the United States, but while this journal shares in the innate dislike of coal miners to any appearance of congratulation upon freedom from fatalities, it can hardly be doubted that the very favorable record of the British coal-mines is to a large extent due to observance of the Coal Mines Regulation Act.

The owners and managers of British coal mines have been accused of carelessness in regard to the safety of employees, and it has been freely stated that the after-war conditions of the collieries was poor. The accident record does not bear out any such ideas, and altogether the achievement is one that reflects credit on all concerned, and particularly on the mines inspectorate.

The Mayo Silver Area, Yukon Territory

By GEO. F. JOHNSON, Vancouver.

The Mayo area in the Stewart River district of Yukon Territory, Canada, has attracted considerable attention within the last few years and more particularly recently, by reason of the extremely rich and promising lode-deposits of Silver-Galena Ore, which have been located in considerable numbers, extending over an area of fifty miles.

The writer, who has just returned from making a personal inspection of the Mayo District, submits the following brief report, which may be of interest to your readers.

The town of Mayo is situated on the Stewart River, about 180 miles from its mouth. The Stewart River flows into the Yukon and is easily accessible. Navigation opens early in May and usually remains open until middle of October. During the open season the White Pass and Yukon Route run regular passenger steamers there as the needs justify. During winter months, Mayo is served by a regular freight and passenger-stage from Dawson, Yukon Territory.

From Mayo good wagon roads radiate to nearly all of the important operations, which include those on Lookout Mountain, (Spur of Mount Haldane) Silver King. Galena Hill, Rambler Hill. Mount Cameron, Mount Hinton and Keno Hill, which is in the Gustaveson Range.

Previous to 1914 little prospecting for other than gold was done in the ordinary type area, but the opening up of the extremely rich silver deposit of the Silver King mine on Galena Creek, stimulated interest in lode deposits and since then vigorous prospecting has been going on, with the result that several most promising prospects have been discovered and are being developed.

The Silver King mine produced from a "pocket" approximately half a million dollars in Silver, with comparatively little effort or expenditure.

The next prospect to be developed, was that on the Lookout Claim, on Lookout Mountain, at an elevation of 3,500 feet.

This claim, with four adjoining ones, are under option to the Yukon Territory, for the purpose of developing this property.

Development work on the one claim has been going on for two years and results are 1,200 feet of adits and shafts, with a total depth of 450 feet on the original "discovery vein."

The country rock on this claim is gneissoid quartzite and quartz mica-schist. Greyish granite-porphyry and greenstone schists also occur.

The hanging-wall is usually well defined and marked by gouge.

The ore is of a disseminated character, the galena occuring in small streaks and masses. There are several zones in which this occurs, permitting of sorting a shipping grade of ore.

The vein follows a well defined but slightly irregular fracture in a gneissoid quartzite and quartz mica-schist, striking from 120 degrees to 150 degrees magnetic and dipping from 45 to 50 degrees to the north east.

The width of the vein varies from 6 to 33 feet, its length and depth being undetermined. The workings are entirely within the oxidized zone.

Dr. W. E. Cockfield, Dominion Geologist, in his 1918 report says that, in addition to the vein on Lookout claim, two and possibly three other veins as yet undeveloped, occur on the adjoining claim. From the outcroppings they were traced, by means of float, a distance of over 2,000 feet.

The development work on the Lookout claim proves the vein to have streaks of carbonates to 12 inches in width, carrying very high but somewhat erratic values in silver.

A sample shipment of 27 tons of ore sent to the Trail Smelter gave returns of 95.6 oz, silver and 59.4% lead.

A sample of 1800 pounds from discovery tunnel, gave 125 oz. silver and 62% lead.

The efforts of the Yukon Silver-Lead Mining Co, have had entirely the object of proving depth of vein, but since the wonderfully rich surface enrichment recently discovered on Keno Hill, the managment intend seeing if their property is not similarly enriched.

I have purposely given extended data about Lookout caim, for the reason that this was the only property which has been systematically developed and the district generally has been depending somewhat on this property to prove geology, etc.

Rambler Hill, situated about six miles east of Lake McQuestion, has some very promising properties with similar formation to that on Lookout claim.

The workings are at an elevation of about 5,000 feet and are entirely above timber line. The owners of property have outlined considerable work for this winter.

Mount Cameron, which is about 45 miles in a direct line from Mayo, has three claims upon which some development work has been done and it is claimed that in the adit the vein has a banded appearance, with alternating streaks of galena and sphalerite, the galena occuring in streaks from 2 to 6 inches wide. The general geology of the district is similar to that of Keno Hill and Lookout mountain.

The size of the outcroppings and the fact that streaks of pure galena carrying high values in silver occur, indicate that the property may have considerable value, but much development work is necessary to prove this.

Development work on this property has been retarded by reason of the fact it was the most inaccessible, but road conditions are now improved.

Keno Hill is one of the Gustavus Range of mountains lying between the head of Lightning and Christal Creeks, at an elevation of about 6500 feet. It is about 42 miles from Mayo. Discovery and location was made in July 1919. Six of the original claims were taken under option by the Yukon Gold Company (the Guggenheims). There was three main shewings of mineral on one claim and two on the other. Development has opened up nine separate leads on these claims. Values on discovery vein of 150 ounces silver from a series of samples, were obtained by the owners. Grab samples taken from the dump on one of the claims, ran from 100 to 1000 ounces silver.

The veins on some of the claims opened up shew a width of 15 feet of solid galena, the values in silver being phenomenally high.

The results of the development work done by the Yukon Gold Co. up until July proved sufficiently satisfactory for the management to authorize the statement that they will spend half a million dollars on

further development this winter. They have let contracts to haul 3000 tons of ore from mines to Keno Hill to Mayo this winter.

Dr. W. E. Cockfield in his 1919 report on Keno Hill says in part, 'On a number of other claims minerals have been reported, and it seems probable that mineralization has taken place over a wide area. It seems probable that further prospecting will add greatly to the area around Keno Hill where mineral has been discovered. The prospects already discovered all contain a high grade ore, which will stand mining and shipping even under adverse conditions and many of them could be worked by hand methods of mining.''

The writer in July, saw ample proof of the truth of the above prediction, for hundreds of tons of pure silver-galena ore was stacked up in piles awaiting shipment, nearly all of which had been mined without the aid of power, merely by the use of pick and shovel.

Many other properties than those being developed by the Yukon Gold Co. have similar shewings.

Mining engineers and experts who have visited the Mayo District are practically unanimous in their verdict that the present shewing justifies the belief it will develop into a big camp.

The Mayo district is fortunate in having considerable winter and timber available from which power can be developed for operating.

The few properties mentioned above, do not by any means give an idea of the number located which have good shewings, to do so would take too much space. The area is large and intensely mineralised. Its greatest need is intelligent prospecting and development.

The distances by the present wagon roads from Mayo to the best known properties are as folows, Lookout Mountain 29 miles, Silver King 29 miles, Keno Hill 42 miles, Rambler Hill 45 miles, Mount Cameron 65 miles. These roads also serve the other properties which are being developed.

The open season on navigation on the Yukon and Stewart Rivers is of ample length to enable the necessary supplies to be shipped in, and the result of operations to be shipped to the smelters, in Canada or the United States.

Unlike most cold sections where considerable snow is encountered, which closes down operations, these conditions are an advantage here. The cold does not materially affect adit or stoping operations and the small fall of snow is necessary to decrease hauling expenses. Mostly all of the freighting is done during the winter season, with sleighs drawn by teams, over a hard-packed snow trail or road.

It is the intention this winter to put motor-trucks and tractors in competition with horse-drawn vehicles to demonstrate which is the most economical method.

My opinion is that the Mayo area will astonish the mining world by its richness. Have been a resident of Yukon since 1898 and shall be pleased to give information to anyone genuinely interested.

MAYO DISTRICT, YUKON, ANXIOUS TO BE KNOWN.

The preparations of one of the largest mining companies in the Yukon to ship something like three thousand tons of silver bearing ore from the Mayo district this season is attracting the attention of nearly every Yukoner, and inspiring prospectors of the territory to greater activity than they have exerted for years.

Nothing so stimulates the prospector as the opening of a paying property. That the one company now operating on Keno Hill has a paying property in its central group, at least for the present winter and possibly for several years, is admitted. The needful thing now to prove that property permanent is to prove depth.

To obtain depth, much earnest work is required. Diamond drilling and the sinking of shafts will tell the tale. It is understood that this work soon will be done by more than one now interested in the field, and there always is the possibility of others taking similar steps. Not only those directly interested in the mining game, but also those in other pursuits in the territory hope to see the prospecting pushed to a conclusion as rapidly as possible.

The federal government and the local government can do much to assist in encouraging the prospector, and much can be done toward hastening development by getting more genuine hard rock miners into the country. Men who are not miners and who are placing their funds in the Mayo region as grubstakes to assist the prospectors now there deserve every credit, and should share the returns as compensation for taking a portion of the early burden upon their shoulders. However, when it comes to proving the existence of veins and deposits, the trained and experienced miner is invaluable. Now that Yukon has such an attractive field mineralized over a large area, one essential thing is to make known the inducements of the region to men who affect the mining game and are eager for new chances.—''Dawson Weekly News.''

DEATH OF A PIONEER OF NOVA SCOTIA COAL MINING.

With the death of Robert Belloni there passes a pioneer of coal mining in Nova Scotia. Mr. Belloni, who has recently died in New York at an age exceeding ninety years, formed in 1864, with his brothers Charles and Augustus, and his brother-in-law Havermyer, the ''Blockhouse Coal Company'' and opened a mine at Morien, Cape Breton Island, where he built a shipping pier at the pitmouth and loaded coal direct from the pit-tub into the vessel. Passing through many vicissitudes, the original company was reorganized as the Blockhouse Coal & Railway Co., and finally as the Blockhouse Mining Company. Since passing out of the hands of the Belloni family the mine and areas have been successively known as the Gowrie & Blockhouse Coal Co., and the North Atlantic Collieries, and are now owned by the Dominion Coal Company, which, it is understood, proposes re-opening of the property.

Mr. Belloni was a man of broad vision, and his plans forecasted some of the undertakings that have since been carried out by those who followed him. He had a railway route surveyed to Louisburg, and employed two eminent mining engineers, Prof. Lesley and Benjamin Smith Lyman, whose reports were among the first bringing the Nova Scotia fields to the attention of the outside world, and rank prominently in the early bibliography of the Cape Breton coalfields.

In 1864 the production of coal in Nova Scotia was less than 600,000 tons, and it included, moreover, the entire Canadian production. The span of Mr. Belloni's life and his connection with coal mining in Canada has covered the rise of the coal industry in Nova Scotia, and has been long enough to see the beginning of a coal industry in the West that will shortly leave the eastern coalfields far behind.

For the particulars of dates and other information in the foregoing note, the Editor is indebted to Mr. C. M. Odell, of the Dominion Coal Company.

Flotation in the Mill Flow-Sheet

A Few General Remarks on the Milling of Ores That Involves the Use of the Flotation Process.

By P. E. PETERSON (Member).[2]

The sulphide minerals now recovered by the flotation process will practically all pass through a 60-mesh standard Tyler screen. A typical screen-analysis of flotation concentrate shows:

Flotation-Concentrate Screen-Analysis.

Heads—8.31 per cent. Cu.

Mesh.	Total p.c. Weight.	Cumulative p.c. Weight.	Assay p.c.Cu.	Total p.c. Contents.
40	3	3	..	..
60	6	9	6.40	7.0
80	6	15	6.48	4.9
100	3	18	..	..
150	13	31	7.68	17.5
200	19	50	8.52	19.6
200 (minus)	50	100	8.48	51.0

Thus, it is seen that the flotation process is applicable to the recovery of such minerals as are crushed through a minus 80-mesh, and, in general, is adapted only to the treatment of the so-called mill slimes.

In the crushing of ores to the various sizes required for the separation of minerals, there is always a part of the product that must be classed as slimes. For instance, the product from a Blake rock-crusher showed 40 per cent of the material on a 1-inch square opening; and 5 per cent of the total product passed through an 80-mesh screen. In the following cumulative screen-analysis of the ball-mill discharge, it is to be noted that 64.7 per cent is minus 80-mesh.

	Screen-analysis of the ball-mill discharge.
40-mesh	6.8 per cent
80-mesh	35.3 "
100-mesh	46.0 "
200-mesh	62.3 "

On account of the physical properties of the sulphide minerals, they are invariably crushed finer, and to a greater extent, than the usual associated gangue minerals. Thus in many instances, an ore that is ground quite coarse will have over half of its valuable constituents in the fines. In order to illustrate this point the following screen-analysis is given :

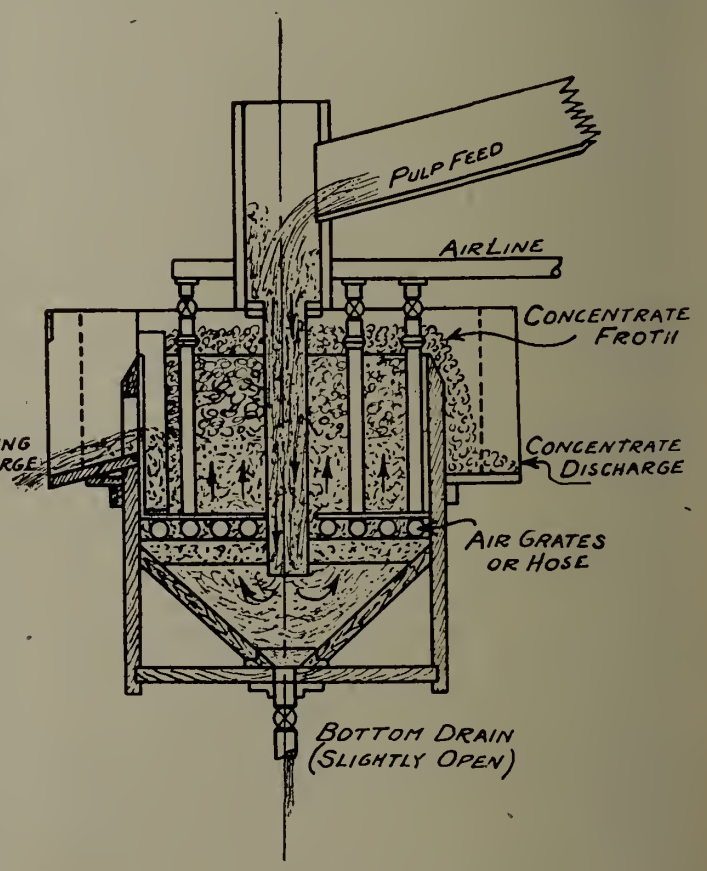
Flotation-heads screen-analysis.

Heads—1.38 per cent Cu.

Mesh.	Total p.c. Weight.	Cumulative p.c. Weight.	Assay p.c.Cu.	Total p.c. Contents.
20	5.9	5.9	1.00	4.2
40	13.0	18.9	1.06	9.8
60	15.5	34.4	1.30	14.4
80	9.6	44.0	1.36	10.5
100	7.0	51.0	1.52	7.5
150	11.0	62.0	1.58	12.4
200	6.2	68.2	1.56	6.9
200 (minus)	31.8	100.0	1.52	34.3

All the sulphide minerals that are minus 80-mesh can be recovered effectively by the flotation process.

In the evolution of the art of ore-dressing (which, one might say, had its origin in the simple separation by hand-picking), treatment of the fines has, up to quite recently, been carried on as an adjunct to the principal operation of coarse concentration by gravity. The introduction of the flotation process has, in many cases, modified the entire plan of operation, wherein coarse concentration was dispensed with entirely and the ores were crushed with a view to producing an all-slime product, suitable for flotation. The treatment of an ore entirely by flotation, involving as it does the all-sliming of the ore, can be done in a mill arranged with a simple flow-sheet. But this simplicity in mill-design is often obtained at the expense of higher crushing costs, and for this reason, gravity concentration is still considered an essential feature to be included in the design of modern mills.



Sectional View of Petersen Flotation Cell in Operation.

In the milling of ores, wherein the valuable constituents are included with the sulphides, and it is desirable to recover all the sulphide minerals, a cust-

[1] Presented at a meeting of the North Coast Branch, C.I.M. & M., Stewart, B.C., Aug. 31, 1920.

[2] Superintendent of Concentration, Granby Consolidated Mining, Smelting and Power Co., Ltd., Anyox, B.C.

omary flow-sheet is one in which the crushing is done in stages, and the minerals separated by means of jigs and tables at the largest permissable sizes necessary for making a clean product, the slimes from each of these operations being separated by means of hydraulic classifiers and thickened in Dorr thickener tanks, to be subsequently treated by flotation. Each ore requires variation in the flow-sheet, but, in general, most ores require crushing through 20-mesh to completely free any appreciable quantity of the sulphide minerals.

Stage-crushing, with its complicated flow-sheet, is of doubtful advantage, unless it is possible to reject a certain proportion of coarse tailing. While it is true that a small saving can be made in the crushing costs by the recovery of a coarse concentrate and in some cases a slightly reduced smelter-treatment charge is obtained, these advantages are more than offset by the complicated mill flow-sheet. From the writer's observations of the size of mineral crystals in various ores, he feels safe in stating that in not many instances is it possible to reject a clean tailing coarser than 20-mesh.

The logical place for flotation in a mill flow-sheet is at the beginning of the separating process. That is, the first concentrate should be from flotation, and the values from the slime-portion of the ore removed, so that the tailing from flotation can be divided after classification into two products, viz., fines or slimes to be rejected as tailing, and the coarse products or sands to be the feed for concentrating tables, these tables making a clean concentrate, a middling to be re-ground and re-treated, and a barren coarse tailing to be rejected. This flow-sheet is simple and has been obvious to millmen for some time. The arrangement of a flow-sheet in this manner has been the practice of the millmen in the south-west for some time. However, they have been limited to the coarseness of their grinding, owing to the inability of the flotation machines to treat a product much coarser than that passing through 48-mesh screens. It has long been realized by the writer that a flotation machine that could successfully treat coarsely ground ores would be a valuable factor in simplifying and reducing the costs of the milling process. Numerous experimental machines have been constructed and tried out, and eventually a machine was developed that has proved satisfactory. This flotation cell embodies the principles of the ordinary hydraulic classifier and of pneumatic flotation. It is automatic in operation, the water-level being maintained at the desired level by means of an overflow tailing discharge. The banking of the pulp is prevented by a continual discharge through a spigot at the spigot at the bottom of the cell. Air is introduced through a hose-type of air-grate, inside of which is a spiral copper-wire coil to prevent the hose from collapsing. The hose is coiled into the flotation tank in such a manner as to leave spaces of approximately one inch between the coils, so as to allow free movement of the pulp. This Peterson cell has been in successful operation at Anyox for a period of two years.

There is no question, but that the type of flow-sheet described will be applicable in some modified form to the treatment of the gold and silver ores of the Alice Arm and Stewart districts. However, from experiments conducted at Anyox, the writer is of the opinion that flotation and gravity concentration, with the cyaniding of the tailings, and possibly the concentrates, will ultimately be the processes used for the recovery of the gold and silver.

SMASHING "SMELTERS" STOCK.

ALEXANDER GRAY, Montreal.

Speculators have been trying to shake public confidence in Consolidated Mining & Smelting stock.

The "bears" have it that conditions do not warrant the market price and that dividends may be suspended.

As the incident was to be expected, because "bears" fatten upon misfortune—and speculatively are not an unmixed evil—it is not inopportune to direct attention to the fact that this company is somewhat beyond the ken of the dolorous.

Whatever the immediate course of share markets may be, the Consolidated Company has become an outstanding feature of Canadian mining industrialism. Its capital expenditure is about ended; its mines are unexcelled ;its metallurgical problems have been solved —and the control rests with a directorate that is vitally interested in the development of British Columbia as a whole.

Undoubtedly there have been periods since the Armistice and metal markets were disrupted when the company did not earn the dividend. That did not deter the administration and management from the financing of plants, the development of power and mines—and from the quest for more mines. Dividends were maintained, for shareholders were patient throughout lean years, and the directors felt assured that the accumulating assets and earning capacity counted for more than temporary industrial reverses. The mining position became so strong, the metallurgy of the complex ores predominating, had to be perfected—and that goal having been reached, plant extensions were completed with all the greater confidence.

At any time, the Consolidated Company of late could dispose of its Sullivan Mine for a sum greatly in excess of its entire capital liabilities. The company, however, has no intention of selling a property with sufficient ore in sight to feed a mill for fifty years at the rate of one thousand tons per day—especially when it is understood that the metalliferous contents of those ores are being recovered in increasing quantities. Within this year, owing to the metallurgical advances due to flotation. the Sullivan moved higher in the list of the world's larges mines—and there are other properties held by the company which reinforce the optimism of the Board. If Sullivan ores did not appeal to American metal market masters when their refractory nature was unquestioned, that objection having been surmounted —half a century of activity at least being assured from that source—the vagaries of share markets need not disconcert shareholders familiar with the affairs of the company.

On the other hand, the attempt to unsettle sentiment toward "Smelters" securities is a national offence. Without Trail outlays and perfected metallurgy, British Columbia mineral resources might be relegated to future decades, whereas recent developments give to those resources a very much more profitable status. There is nothing exotic about Trail. It is as much of an institution as the contemporary metallurgical works of magnitude elsewhere. Through the medium of its expansive programme the Pacific Coast province has been given fresh impetus—and only now is this into effect. Consolidated zinc, despite high costs, onerous freights and slow metal markets, is going to Europe and the Orient. Consolidated products in more varied forms and greater quantities will remedy merely momentary influences. Trail is on the map—to stay there.

Legislation Relating to the Regulation of Mines in Canada

A Comparison of the Various Provincial Laws on the Subject.

(From November "Labor Gazette".)

This article is the fourth and last of the series examining and comparing the laws in force in the several provinces of Canada on the subjects covered by the Dominion-Provincial Commission on Uniformity of Labour Laws which met at Ottawa in April 1920.

This Commission found that many minor provisions in the various Acts throughout Canada were made necessary by local conditions and that concerning these no real uniformity was possible. They therefore directed their attention to those principles of a general character which are applicable to all provinces, and recommended that uniform standards be adopted as follows:—(1) A minimum age of 14 years for boys working above ground, and 16 years for those below ground; (2) A minimum age of 18 years for those in charge of power machinery for moving material and 21 years for those in charge of such machinery for moving persons; (3)The adoption of the 8-hour day; (4) The semi-monthly payment of wages and the prohibition of such payment in hotels and the cashing of pay cheques on licensed premises; (5) Legislation providing for miners' liens; (6) No deduction to be made from wages except sums for powder, coal, oil, rent and such doctor's and hospital fees as may be approved by the Workmen's Compensation Board, and supplies necessary to the carrying on of work; the prohibition of deductions for payment of any debt due by the employee without his written consent given individually or by collective agreement; (7) Where certificates of competency are required, examinations to be conducted by a board composed of a government inspector, a mine manager and a working miner; (8) All candidates for certificates as mine managers, pit-bosses, etc., to have at least five years' mining experience, to produce evidence of ability, sobriety and good conduct, and to be at least 23 years of age; (9) Mine inspectors to be holders of mine managers' certificates, with at least seven years' mining experience in the class of mine concerned. (10) Without limiting the powers of inspectors, an inspector to have power to enter, inspect and examine any mine or any part thereof at all reasonable times by day or night, to examine into ventilation and safety, and to give notice in writing of any thing which he considers dangerous and defective and of its immediate remedy; if disagreement follows, the defect to be referred to a board of arbitration consisting of a judge and representatives of the interested parties, the decision of the tribunal to be final; (11) All mines to be adequately ventilated and examined before the entry of the workmen, a report of such examination to be entered in a book which shall be always available to any employee of the mine; (12) The health of employees in mining camps to be fully protected and laws on this subject unified as far as possible; (13) Present laws regarding special investigations to be continued and extended to the other provinces; (14) Provision for first aid and mine rescue work to be made by the Workmen's Compensation Board of each province and special provisions to be made in those provinces where no such board exists.

The present article deals only with those sections in the mining laws which refer to the subjects covered by the Commission's report.

Application.

Inspection and regulation of mines is provided for by law in the Territory of the Yukon and in all Canadian provinces except New Brunswick and Prince Edward Island. Nova Scotia and British Columbia have each two Acts the one referring to coal and the other to metalliferous mines. In the former province the Coal Mines Act applies also to mines of stratified ironstone, shale and fire clay. The Ontario law covers all mines, including those of coal and salt and all oil and gas wells. The Mining Act of Alberta applies to mines of coal, stratified ironstone, shale clay and other minerals, also to all places where coal is extracted by removing the overlying strata. If any question arises, otherwise than in the course of legal proceedings, as to whether any mine comes within the scope of the Act, the Minister of Public Works is empowered to decide. Manitoba excludes stone quarries and all mines where not more than six persons other than the owner are employed underground. Saskatchewan and the Yukon include all mines, and Quebec all mines and quarries.

Employment of Women and Children.

Quebec, Ontario, Saskatchewan and Alberta forbid the employment of women and girls in mines except for office work. The Metalliferous Mines Act of British Columbia prohibits their employment below ground, and the Coal Mines Act of the same province allows them to perform clerical and domestic duties only. The laws of Nova Scotia, Manitoba and the Yukon have no provisions on this subject.

With regard to boys, Ontario fixes 16 years as the minimum age of employment above ground and 18 years below ground. The Coal Mines Act of British Columbia and the Mines Act of Alberta prohibit work above ground by boys under 14 years of age, and below ground by those under 15 and 16 years respectively. The latter province, however, provides that no child under 16 years may be employed at all unless he holds a school certificate. This rule is in force also in Quebec where the minimum age for employment underground is 15 years and in Nova Scotia and the Yukon, where no boy under 12 years may do any work in a mine. Saskatchewan fixes 14 years as the minimum age for employment in any mining work and the Metalliferous Mines Act of British Columbia forbids work below ground by any boy under 12 years. The Mines Act of Manitoba has no provisions on this subject, but the Children's Act prohibits the employment of any child under the age of 16 years in any dangerous or unwholesome occupation.

Operation of Power Machinery.

The Territory of the Yukon does not demand any particular qualifications or fix any age limit for persons in charge of hoisting machinery, but all the provinces have made rules in this regard. In Saskatchewan and Alberta and in the metalliferous mines of British Columbia the minimum age for this class of employees is 18 years, while in coal mines in the latter province

no one but a man of 22 years of age or over may be in charge of machinery used to hoist persons, and he must have a medical certificate renewed every six months to the effect that he is physically and mentally fitted to perform his duties. Hoists for moving material may, however, be operated by a person 16 years of age. In the coal mines of Nova Scotia machinery used for conveying persons must be in control of a man 21 years of age or over who holds at least a third-class certificate as a stationary engineer. The Metalliferous Mines Act of this Province fixes 18 years as the minimum age for operators of any machinery used for moving persons. The Ontario law provides that no one under 20 years of age and no person who has not had at least one month's experience may have charge of any machinery used for moving persons, but a lad of 18 years may operate an engine for hoisting material. All operators must, however, be physically and mentally fit for their work. Twenty years is also the minimum age fixed in Quebec for employees in charge of a hoist used to convey persons in a mine.

Hours of Labour.

The Territory of the Yukon and all the Canadian provinces except Manitoba and Saskatchewan have limited hours of labour for some or all classes of mine employees. The Yukon has adopted the 8-hour day and the 48-hour week for workers under 16 years of age, while Quebec has fixed the same limit for those under 17 years. Nova Scotia allows employees under 16 years to work 10 hours a day and 54 per week in both coal and metalliferous mines. A week in all cases means the six days from midnight on Saturday until midnight on the following Saturday.

The 8-hour day and 48-hour week for certain adult workmen in mines is enforced by law in Alberta, British Columbia and Ontario. In Alberta it applies to all underground workers and in British Columbia to all workers, both above and below ground, except persons employed in the office, boarding house or bunk house of the mine. In Ontario it governs all underground workers, (except shift bosses, pumpmen, cage-tenders, hoistmen, persons engaged solely in surveying or measuring, and workers in a mine where the number of persons working in a shift does not exceed six), in districts that are without county organization, which includes nearly all those parts of Ontario where mining is carried on.

In Ontario the 8 hours must be reckoned from the time the workman arrives at his place of work in the mine to the time he leaves it. In coal and metalliferous mines in British Columbia and in Alberta the period between the time a workman leaves the surface and the time he returns must not exceed 8 hours. In Alberta, it is provided that the time for the raising and lowering of each shift must be arranged by the owner, agent of manager of the mine in such a manner that every workman shall have an opportunity to return to the surface in the specified time. A conspicuous notice of the time so fixed must be posted at the pit head and all arrangements made for the observance of the schedule. The time allowed for the raising and lowering of each shift must not exceed what is reasonably required and must be approved by the Chief Inspector. The owner, agent or manager of a mine must appoint one or more persons to direct at the pit head the raising or lowering of workmen, and a book must be kept in which is entered the time of such raising and lowering, and any cases in which a workman is below ground for a longer time than is allowed by law, and the cause of his remaining under ground. The workmen may, at their own expense, station one or more persons at the pit head to observe the times of raising and lowering the workmen, and such persons are to be appointed in the same manner as the check weigher and bear the same relations to the owner, agent or manager of the mine.

In all provinces, with the exception of Quebec, overtime may be worked in case of accident or emergency. Nova Scotia and the Yukon, where, as in Quebec, the legal limitation applies to boys only, recognize no other grounds on which longer hours are permissible. In Ontario a Saturday shift may work more than 8 hours for the purpose of avoiding work on Sunday, or for changing shift at the end of the week, or to give any of the men a part holiday or to make necessary repairs. In the event of any grave economic disturbance the Lieutenant-Governor in Council may suspend the 8-hour law for such time as he deems advisable. The Mines Act of Alberta contains a similar provision. This province allows a repairing shift for the purpose of avoiding Sunday labour to commence their work period on Saturday before 24 hours have elapsed since the commencement of their last period, provided that at least 8 hours have passed since its termination. A workman may also remain below ground for more than 8 hours if any exceptional work requires to be done without interruption, in order to avoid serious interference with the ordinary work of the mine. The British Columbia Coal Mines Act provides that where more than two shifts are worked, the outsetter, bottomer or cager, pumpmen, stablemen and engineers in charge of constantly running machinery other than that directly used for the mining of coal at the face, and the fire boss or shift boss in charge, may be relieved at the place of duty, but in no case may any person remain underground for more than 8½ hours except when extra hours are necessitated by the weekly change of shift where more than two shifts are worked. A pumpman or engineer in charge of constantly running machinery may also be below ground for more than 8 hours to deal with anything which requires immediate attention, and which, if neglected, might necessitate the closing of the mine. The overman or manager may enter the mine at any time and remain there in the discharge of his duties. The Metalliferous Mines Act of British Columbia allows overtime in case of accident or emergency only.

Wages.

The mining laws of Ontario and Alberta direct the semi-monthly payment of wages, and in British Columbia the Semi-monthly Payment of Wages Act applies to all mines, while the Mineral Survey and Development Act of 1917 makes provision for this method of payment of workmen on mining properties under bond or option. In Nova Scotia all wages except those fixed at a regular monthly rate must be paid weekly in all mines to which the Coal Mines Regulation Act applies. The other provinces make no rulings on this subject.

The Truck Act of British Columbia and the Coal Mines Regulation Act of Nova Scotia direct all wages to be paid in currency, but there are no rules to this effect in the other provinces.

The Coal Mines Regulation Act of Nova Scotia and British Columbia, and the Mines Act of Alberta provide that where the wages of miners depend on the amount

of mineral produced by them, they shall be paid according to the weight of such mineral, which is to be weighed as near the entrance to the pit mouth as is practicable. These three Acts and the Mines Act of Saskatchewan contain sections permitting the employees thus paid to station at their own expense a representative called the check-weigher at the place appointed for the weighing of the mineral. In Nova Scotia the check-weigher is elected by ballot at a meeting of the employees interested, and cannot hold office for more than one year unless re-elected. The British Columbia law does not demand any special qualifications for this position, but the other provinces require that candidates should be working miners with at least three years' experience. In Saskatchewan and Alberta appointees must be residents of the province, and in Nova Scotia they must have certificates and at the time of their appointment be employed in the colliery in which they are to serve. In all cases the check-weigher must be given every facility for the proper discharge of his duties, and Nova Scotia, Saskatchewan and Alberta direct the owner, agent or manager of the mine to provide him with a shelter from the weather and a desk at which to write. The laws of these provinces forbid the check-weigher to impede in any way the working of the mine, or to interfere with the weighing. There need be no delay on account of his absence. If he is guilty of misconduct, the owner, agent or manager of a mine may, on sufficient evidence, have him removed by order of a court of competent jurisdiction, and another check-weigher may be elected or appointed in his place. In Saskatchewan, Alberta and British Columbia the owner, agent or manager of the mine may, at the request of the majority of the miners, make a "pro rata" deduction from the wages of each miner sufficient to meet the wages of the check-weigher, and may then pay him in the same manner as the other employees. Wherever in these four provinces the workmen are paid by order of the Minister or by mutual consent, otherwise than according to the amount of mineral produced by them, they may at their own expense employ one or more persons to check the correctness of the measurements or method according to which payment is made, and the provisions in the Act applying to check-weighers shall apply to such persons.

The Mining Act of Alberta and the Coal Mines Regulation Acts of Nova Scotia and British Columbia permit the owner, agent or manager of any mine to agree with his employees that deductions be made in respect of stones and other material, such deductions to be determined by mutual agreement or by some person or persons appointed by the employers and employees for the purpose. In Nova Scotia and Alberta provision is made that where the representatives of the two parties fail to agree, they or the Minister or Commissioner, may choose a third person to act with them, and a decision of the majority of the three shall be final. In a mine where employers and employees have failed to appoint anyone to determine deductions, the Minister or Commissioner may appoint some person on their behalf.

With regard to other deductions the Alberta law allows any workman to authorize the employer in writing to apply the whole or part of the wages due him to the payment of any debt owing by such workman. The employer may also retain sums due by any employee for coal, oil, rent or other supplies. The Coal Mines Act of Nova Scotia adds to this list check-weighers' and doctors' fees, church, hospital and society dues, but forbids deductions for school or other rates, except with the written consent of the workman. This prohibition appears also in the Metalliferous Mines Act of this province and is the only reference to deductions from wages found therein.

In 1919, British Columbia passed an amendment to the Coal Mines Regulation Act providing for the appointment of a Board to fix minimum wages for coal miners. The Board consists of one representative each of employers and employees, with the Chief Inspector of Mines as Chairman.

Ontario, the Yukon, both Mining Acts of British Columbia, and the Metalliferous Mines Act of Nova Scotia, forbid the payment of wages in any tavern or place where liquor is sold. The Quebec Act does not contain any reference to this subject, but prohibits the sale of liquor within a radius of seven miles of any mine, and gives the Inspector of Mines control of all licenses in his district. This province also forbids the cashing of pay cheques in any tavern. In many provinces the clauses relating to this subject have been repealed by the temperance laws passed during the last few years. This has been the case in both Alberta and Saskatchewan where the prohibition of payment of wages on licensed premises and cashing of pay cheques in hotels was contained in the Liquor License Acts repealed in 1918 and 1917 respectively. The Ontario Temperance Act of 1916 repealed the Liquor License Act of that province which prohibited the cashing of pay cheques in hotels and the sale of intoxicants within six miles of any mine. Nova Scotia omitted from the 1918 Coal Mines Act the clause which in the old law forbade the payment of miners in hotels, etc. This was presumably done owing to the passing of the Temperance Act of that year, which is a prohibition measure.

In Ontario and the Yukon every person who performs labour for wages in connection with any mine mining claim or mining lands, has a lien thereon. The other provinces have no legislation on this subject.

Certificates.

The Coal Mines Regulation Acts of Nova Scotia and British Columbia, and the Mines Acts of Alberta and Saskatchewan contain sections relating to the examination and licensing of workmen.

In Saskatchewan examinations are held from time to time by an inspector of mines, while in the other three provinces they are conducted by a Board of examiners. The Nova Scotia Board consists of the Inspector of Mines with one mining and one mechanical engineer. In Alberta two managers and two working miners, and in British Columbia one representative each of the coal miners and the mine owners act with the Chief Inspector in conducting examinations for certificates.

There is considerable difference in the laws of these four provinces with regard to the classes of workmen for whom certificates are required and the qualifications demanded. Nova Scotia requires certificates of competency for a manager, underground manager, overman, mine examiner and stationary engineer; British Columbia for a manager, overman, shift boss, fire boss, shotlighter, and mine surveyor, and Alberta for a manager, overman and mine examiner. In Nova Scotia a candidate for manager, underground manager, or overman must be a British subject at least 21 years of age, with four years' underground working experience, part of which must

have been at the working face. A candidate for manager must have a certificate of competency as underground manager, or have had at least three years' practical experience and a degree as mining engineer from some approved college or university. A candidate for underground manager must have a certificate of competency as an overman. Those qualifying as first class stationary engineers must be at least 24 years of age and holders of second class certificates. In addition they must have served one year at mechanical work on machinery, or in charge of a hoisting or haulage engine or steam plant, or two years in charge of some other type of engine, or three years at mechanical work in a machine shop. Candidates for second class certificates must be certificated third class engineers with one year's experience, and have reached the age of 21 years, while anyone entering for the third class examination must be 18 years of age and have served six months as a licensed fireman, twelve as engineer, assistant engineer, pumpman, oiler or locomotive engineer, or eighteen months at mechanical work in a machine shop. A British subject, 21 years of age who has had at least three years' practical experience in a coal mine, holds a certificate of competency as a coal miner and has a practical knowledge of gas, explosives, ventilation and timbering, may present himself for examination as a mine examiner. All candidates must give satisfactory evidence of sobriety, experience and general good conduct.

British Columbia requires of a candidate for a mine manager's certificate that he be at least 25 years of age, and have either five years working experience or a degree showing a course in scientific coal mining at an approved university or college, together with four years' practical mining. Any person entering for examination for a certificate as overman must be at least 23 and have five years' experience, while candidates for shift boss, fire boss or shotlighter must have a similar age qualification and three years' practical mining; a certificate in first aid work is required of all applicants.

Both Nova Scotia and British Columbia provide for the holding of examinations for the granting of certificates as coal miners. In the former province the Commissioner of Public Works and Mines appoints for this purpose local boards of two persons having practical experience as coal miners in Nova Scotia, and one underground manager. In British Columbia the Inspector of mines for the district and one representative each of mine owners and miners from the Board of Examiners. Examinations must be held on at least one day in every sixty at each colliery designated by the Minister. Both provinces require one year's working experience of all candidates, and British Columbia adds the provision that they must be familiar with the English language.

The Alberta law requires that a candidate for manager's certificate shall have at least five years' practical experience either wholly or partly in Canada, or he must hold a diploma showing a course of two years or more in scientific or mining subjects at an approved college or university, together with three years' experience in a coal mine as above. He must also be at least 25 years of age. An applicant for a certificate of overman or examiner must be 23 years of age and have three years' working experience. All candidates must produce evidence of good conduct and sobriety, and also a certificate from a medical practitioner or a recognized ambulance society showing him to be qualified to render first aid, and applicants for certificates of the second and third classes must satisfy the board that they are able to speak and write English. All three provinces direct that a register of all holders of certificates be kept. They also provide that in case complaint is made to the authorities that any holder of a certificate is guilty of incompetence, gross negligence or any offence against the mining law a public inquiry into his conduct may be held, and if the charge is sustained, the Minister may cancel or suspend the certificate of such employee. The British Columbia law permits the granting of a certificate without examination to the holder of a certificate granted in any British Dominion if the standard is equivalent to that required by the Act. Saskatchewan allows the same privilege to holders of satisfactory certificates from the United States, and Alberta extends it to persons from any country where the standard is equivalent to that demanded by the Act. Permission is also given for the granting of provisional certificates.

Inspection.

The mining laws of Nova Scotia, Ontario, Manitoba and the Yukon do not contain any reference to qualifications of inspectors. In Quebec these officers must be mining engineers who have practised their profession for at least five years and are possesed of sufficient knowledge of mineralogy and metallurgy for the satisfactory discharge of their duties. The Coal Mines Act of British Columbia and the Mines Act of Alberta and Saskatchewan require all inspectors to be holders of mine manager's certificates, while the the Metalliferous Mines Act in the first named province demands seven years' practical experience in mining. It also confers on the Provincial Mineralogist all the powers of an inspector. This law forbids an inspector to act as manager, agent or lessee of any mining or other corporation, or to make any report on a mine or mining property with the object of promoting its sale. The Alberta law stipulates that inspectors may not act as mining engineers or mine managers within the province while the Coal Mines Act of British Columbia and the Mines Act of Quebec disqualify any person who has any interest directly or indirectly in any time in his district.

In all the Canadian provinces and in the Yukon the inspecter may enter the mines in his district at all reasonable hours in the performance of his duties but may not unnecessarily impede the working of the mine. In Nova Scotia and British Columbia he must visit each mine and every part of it at least once a month, but the other provinces and the Yukon do not contain any reference to frequency of inspection. The Yukon and all the provinces except Quebec have sections relating to the powers and duties of inspectors. They may examine into and make inquiry respecting the state and condition of any mine or any part thereof, the ventilation, the sufficiency of any special rules, and all things affecting the safety of the persons employed therein. In coal mines in Nova Scotia and all mines of British Columbia and Alberta the inspector must, after each visit, cause a copy of his report to be posted in a conspicuous place at or near the mine. In the Yukon and all parts of the Dominion, except in Quebec and the coal mines of Nova Scotia, the inspector must give notice in writing to the owner or manager of the mine of anything which he finds to be dangerous or defective and direct that it be remedied within a specified time. The Ontario, Saskatchewan and Alberta Acts and the

Coal Mines Act to British Columbia authorize any inspector to order immediate cessation of work and the departure of all persons from any mine or part of a mine which he considers unsafe, or to direct work to be carried on in such place with any precautions he may deem necessary. The British Columbia Coal Mines Act, the Metalliferous Mines Act of Nova Scotia and the Saskatchewan and Alberta laws provide that, in case of disagreement following such notice, the matter shall be arbitrated by one representative of each of the interested parties and an umpire. In British Columbia this third member of the Board is chosen by the other two, while in Alberta and Saskatchewan a judge acts in that capacity. The Nova Scotia Act names the Commissioner of Mines as umpire.

The Coal Mines Act of British Columbia empowers the inspector on his own initiative, or on written application of any three miners, to examine any employee of a mine in order to ascertain whether he is physically and mentally capable of performing his duties, and if he finds that the incapacity of any workman impairs the efficient working of the mine or endangers the safety of the other persons employed, he may order his removal.

Both Mining Acts of Nova Scotia, the Coal Mines Act of British Columbia and the mining laws of Alberta, Saskatchewan and the Yukon permit the workmen to appoint one or more competent inspectors to examine thoroughly the mine on their behalf and such inspectors must be allowed every facility for the carrying out of their duties.

Ventilation and Inspection.

All the Mines Acts except that of Quebec require that every mine shall have adequate ventilation. Saskatchewan fixes a standard of 100 cubic feet and Alberta 200 cubic feet for each person and animal, while the Coal Mines Act of British Columbia demands 100 cubic feet for each man and 300 for each animal. All air must travel free of stagnant water, stables and old workings. The inspector may, if necessary, direct that more air be supplied, and in this event the British Columbia law requires him to post a notice at the mouth of the mine stating the quantity of air which is necessary for health and safety. The Ontario law provides that where the ventilating current is not sufficient, mechanical appliances must be installed and operated, while the Coal Mines Act of Nova Scotia provides for the use of brattice where the natural air current does not suffice to keep working places free of all inflammable or noxious gases. All cross cuts made for width and height between the openings which they connect. The Coal Mines Act of British Columbia directs that where ventilation is provided by a mechanical contrivance the apparatus must be so placed that it will be uninjured by an explosion. This Act and the Saskatchewan and Alberta laws make provision for the division of each mine into districts or splits of not more than 70 men, each district being supplied with its separate current of fresh air, and in the two former provinces every place must be bratticed up to within four yards of the face. In British Columbia and Alberta these rules apply to all mines, but in Saskatchewen they need not be complied with where safety lamps are not necessarily used. In such mines, however, narrow working places must not be driven so far ahead of ventilation that the air becomes visibly foul, and in no case more than 40 yards.

Examination of all working places in a mine is provided for in the Yukon, Alberta, Saskatchewan and in both Mining Acts of Nova Scotia and British Columbia. The Yukon law and those governing metalliferous mines in Nova Scotia and British Columbia state that all working places must be thoroughly examined by a competent person at least one in every 24 hours, and the British Columbia Act requires the examiner to make a report which is recorded in a book kept for the purpose. The Coal Mines Act of Nova Scotia and British Columbia and the Saskatchewan and Alberta laws make provision for the appointment of stations at the entrance to the mine or to any part of it, and all portions of the mine beyond such stations must be examined before the workmen are permitted to enter. This inspection is to take place at least once in every 24 hours and in British Columbia and Saskatchewan immediately before the commencement of work. The Nova Scotia and Alberta laws stipulate that it must be made within three and four hours respectively of the time the workmen enter the mine. In all cases the examiner must make a report which is recorded in a book. In Alberta and British Columbia a copy of such report must be posted immediately in a conspicuous place ,while the other two provinces stipulate that the book bearing the record of examinations shall be open to employees at all reasonable times. The British Columbia law and those of Alberta and Saskatchewan make provision for a more frequent examination of any mine where inflammable gas has been found at any time during the preceding 12 months. If at the time of any examination dangerous gas is found to be present in any mine, Nova Scotia, British Columbia, Saskatchewan, Alberta and the Yukon authorize the withdrawal of all workmen until the danger is over.

Health of Employees in Mining Camps.

The question of health of employees in mining camps is in every case dealt with by the Public Health Acts, and all parts of Canada except the Yukon have laws on the subject. In Nova Scotia no person may establish, conduct or maintain a camp without a permit from the Medical Health Officer to the effect that its sanitary conditions are satisfactory. The Superior Board of Health of Quebec may by by-law require the employment of duly qualified practising physicians by proprietors of mining camps employing 25 or more men. In Ontario and British Columbia employers in camps may by regulation be required to retain the services of a qualified medical practioner, and in addition to provide permanent or temporary hospitals. Houses and premises for the accommodation of workmen are subject to inspection, and the British Columbia law further empowers the inspector to visit all camps in his district during the months of April and May in each year to examine the sanitary conditions and the water supply. The Public Health Act of Alberta provides for the sanitary control of all public places and all houses, temporary or permanent, and regulations covering mining camps have been issued thereunder. The Provincial Board of Health of Manitoba and the Commissioner of Saskatchewan are empowered to make regulations relating to mining camps. Although no mining act appears on the statute books of New Brunswick, the Public Health Act of 1918 protects the health of employees in mining camps, making provision for regulations regarding the inspection of all houses and places connected therewith, and for the erection of permanent or temporary hospitals and the services of duly qualified physicians. A 1919 amendment requires special precautions to be taken against smallpox.

Special Investigations.

All the mining laws except those of Quebec and Saskatchewan contain clauses authorizing the holding of special investigations. In Alberta and in both classes of mines in Nova Scotia, the Minister or Commissioner may appoint one or more persons possessing legal or special knowledge to act with the inspector in holding an investigation into any accident, or into any matter connected with the working of any mine. The Inspector may make the investigation in the way he considers most effectual, and he has right of entry to any place and power to require production of any document, and to take evidence under oath. He must make a full report of the inquiry which may be made public. The Mining Ordinance of the Yukon authorizes a similar investigation to be made by the inspector unaided. The British Columbia Coal Mines Act empowers the Minister to appoint any person scientific or other qualifications to make a special investigation and report upon any mining operations so far as they relate to the safety of life and property in any mine, such person to have right of entry and access to records. The report of such inquiry may also be made public. Under the laws of Ontario and Manitoba and the Metalliferous Mines Act of British Columbia, the Minister may require the inspector to make a special report of any accident which has caused loss of life or serious personal injury to any person, the first named province giving him power to take evidence on oath and compel attendance of witnesses and production of documents. Under the British Columbia Act, the report of such investigation may be made public.

The Canada Explosives Act provides for an investigation into the cause of any accident from explosion of an explosive occurring in any mine or quarry in provinces whose laws make no provision for such inquiry.

First Aid and Mine Rescue Work.

The Workmen's Compensation Acts of Nova Scotia, New Brunswick, Alberta and British Columbia provide that employers in any industries may be required to maintain such first aid appliances and service and transportation for injured workmen as the Board may direct. The Coal Mines Act of Nava Scotia also contains a clause to the effect that properly constructed ambulances or stretchers with splints and bandages shall be kept at all mines ready for instant use. The same law empowers the Commissioner of Mines to make any necessary regulations for the purpose of ascertaining the fitness and qualifications of and the granting of certificates to persons skilled in the use of mine rescue apparatus. Alberta requires every applicant for a certificate as manager, overman or mine examiner to produce a certificate in ambulance work from a qualified medical practitioner or a recognized ambulance society.

The Ontario Mining Act directs that a properly constructed stretcher and the first aid service prescribed by the Workmen's Compensation Board, and, where poisonous or dangerous compounds, solutions or gases are used or produced, proper antidotes plainly labelled with explicit directions for use, must be kept in an accessible place. Life lines, and belts in good order are to be kept ready for immediate use. At all blast furnaces, breathing apparatus and portable resuscitating apparatus of approved type with an adequate supply of oxygen and absorbent material must always be maintained. In each working shift one or more workmen appointed by the Superintendent and trained in the use of this apparatus must be always on duty.

The Mining Act of Alberta authorizes the Lieutenant-Governor in Council to make arrangements for the intallation and operation of mine rescue stations and cars, and to make regulations regarding the provision of emergency hospitals and any other matter that he may consider advisable in the interests of safety. This Act directs that properly constructed stretchers with splints and bandages be kept ready for immediate use.

The Ambulance Act of British Columbia requires that any employer of labour directly or indirectly operating any mine, (except those operating under the Coal Mines Act) or any camp, employing more than 30 persons situated more than 6 miles from the office of a physician, shall employ at least one person possessing a certificate of competency to render first aid, and also provide one or more good ambulance boxes. The employer must forward to the Provincial Secretary the name of the person in his camp who is qualified to render first aid and the number of such person's certificate.

The Coal Mines Regulation Act requires the owner, agent or manager of every colliery to establish such number of oxygen helmets or some form of mine rescue apparatus as may be approved by the Minister, and to keep them in workable condition and so placed as to be immediately available when wanted. This Act empowers the Lieutenant-Governor in Council to establish mine rescue stations for the purpose of supplementing, in case of need, the colliery installations of mine rescue apparatus, and also for the training of holders of certificates of competence in the use of such apparatus, and the owner, agent or manager of every mine must see that all physically fit certified officials, and such number of workmen as the Chief Inspector may direct, receive such training. The rescue stations are, subject to the order of an inspector, available in case of emergency for the use of any trained corps of mine rescuers, qualified medical practitioners, or trained first aid corps.

Conclusion.

From the foregoing account it will be seen that none of the mining laws of the Dominion conforms on all points to the standard set by the report of the Commission on Uniformity of Labour Laws. Two provinces have fixed the minimum age for boys at the age named in the report and five have adopted the 8-hour day either wholly or in part. Two provinces have laid down all the rules regarding payment of wages that the Commission considered desirable, and in one province and the Yukon provision is made for miners' liens. In two provinces examination of candidates for certificates are conducted by a board of three members, but only one province demands the qualifications which the Commission deemed necessary for such candidates. Two provinces give full power to inspectors and arrange for arbitration in case of disagreement. Four provinces provide for adequate ventilation and inspection, and all have some measure of protection for the health of employees in mining camps. Five provinces and the Yukon make some provision for special investigations. The standards laid down by the Commission regarding deductions from wages, qualifications of mining inspectors and the minimum age for workmen in charge of power machinery are not attained by any province. The administration of first aid and mine rescue work is in no case entirely in the hands of the Workmen's Compensation Board.

Northern Ontario Letter

The Cobalt Field.

Although at the time of writing, no rain of any importance is reported, yet the comparatively mild weather is having a favorable effect on the hydro-electric power supply. With considerable snow on the ground, and with more or less warmth still in the ground, the flow of water in the innumerable streamlets has increased, and this has at least prevented any further lowering of the water in the main waterway from which the hydro-electric energy is generated.

The Beaver Consolidated, which was the only producing silver mine to curtail operation is preparing to resume work, according to official advice to the Canadian Mining Journal. Advantage was taken of the slack period to make certain repairs to the mill, and the fact that work is now to resume is taken as an indication that the management anticipate the worst may be over in the power situation.

Following negotiations between members of the Temiskaming Mine Managers' Association and members of the Central Council of Workmen of the Cobalt mines, it has been arranged to organize an Employees' Sick Benefit Fund. It has been provided that the men shall each contribute 75 cents a month, this amount being deducted from their pay. The mining companies shall each pay an amount equal to that of their employees. The benefits to be provided will consist of $2.75 per day for the first 13 weeks of illness, and half that amount for a second period of 13 weeks. In no case will the benefit apply for more than six months in any one year. At death, the dependent of the deceased shall be paid $250.

In connection with the sick benefit scheme, a vote of the workmen was taken and resulted in a vote of 658, to 120 in favor of the plan. This vote included eleven of the more important operating properties. Incorporation is proceeding and a charter is being applied for at once so as to get the Fund in operation as quickly as possible.

After having been closed about five years, the transfer books of the Bailey-Cobalt Mines, Ltd., have been opened, and holders of stock are now given an opportunity to have it registered in their own name. Litigation involved the Bailey during the years in question, and the purchaser of stock found it impossible to record his holdings. This was one of the points of contention when contentious matters came up for trial, it being claimed by a certain faction of the litigants that control actually lay in different hands than would appear on the strength of the old records of five years ago. It is intimated in semi-official circles that W. J. Wright of Buffalo may be elected to the directorate of the Bailey at the next meeting. As regards the transfer of Bailey-Cobalt shares for stock in the newly incorporated Bailey Silver Mines which now controls the Bailey-Cobalt and the Northern Customs, nothing of a definite nature appears to have been sent out. The basis of transfer is ten of Bailey-Cobalt for one of Bailey Silver Mines.

Officials of the Chambers-Ferland mine of the Aladdin-Cobalt Company have declared it is their belief the recent new discovery of ore at the 385-ft. level may make a new mine out of the property. The extent of the mineralized zone is broadening out accordingly as work proceeds, and by basing calculations on former experience under somewhat similar conditions, the find is regarded as being among the most important in the history of the mine. The area under exploration and development is largely virgin territory and offers big scope for important results.

A report has just been issued on the Oxford-Cobalt Silver Mines. The statement is conservative throughout, and points out that low silver values have been encountered from time to time, with small sections showing high-grade milling ore. Particular emphasis is placed upon the similarity of the geological conditions as compared with the geological structure in the Beaver-Temiskaming area where large silver deposits have been found. The management is optimistic in regard to the future outlook on the property.

Gowganda and Elk Lake Areas.

The Sanderson Mines Syndicate is numbered among the new organizations which aims to develop mining property in the Gowganda district. This syndicate is preliminary to the incorporation of a $3,000,000 company which plans to take over and operate ten mining claims situated in the district, in the townships of Nicol, Haultain, Lawson and Chown. Representing the syndicate is a committee made up of Messrs. W. H. D. Miller, Chas. Ritz, and A. C. Wieland. This committee has added P. K. Brown to their number, and these four together with Stewart Troop will constitute a committee of management for the syndicate. The syndicate has its head office at Room 202, Southam Bldg., 128 Bleury St., Montreal.

Additional camps have been erected on the Cane Silver Mines, situated in the township of Cane. It has not yet been definitely decided as to whether a plant will be installed this winter, although the matter is now under consideration. No statement has so far been issued relation to returns from the recent shipment of about five tons of high-grade ore. The company's mine address is Kenabeek, Ont.

During the week ended Nov. 26th, ore shipments were again low from the Cobalt district, the Bailey and La Rose being the only two shippers, as shown in the following summary:

Shipper	Cars	Pds.
La Rose	1	87,289
Bailey	1	62,890
Total	2	150,179

During the corresponding period, the Mining Corporation was the only bullion shipper, this company sending out 60 bars containing 60,772 fine ounces.

Ore shipments over T. & N. O. Ry., during Oct. 1920:

SILVER ORE.

Cobalt Proper.

Ore shipments over T. & N. O. Ry. during October 1920.

		Tons.
1.	Coniagas	96.08
2.	Dominion Reduction	76.50
3.	Hudson Bay	31.87
4.	Kerr Lake	30.57
5.	LaRose	43.66
6.	Mining Corporation	520.17
7.	McKinley-Darragh	183.64
8.	Nipissing	554.94
9.	O'Brien	32.01
10.	H. F. Strong	30.00
11.	Temiskaming	139.79
		1,739.23

The above shipments were made to the following Companies:

Canada.

Deloro Smelting & Refining Co., Deloro Marmora	1,390.58
Coniagas Reduction Co., Thorold	160.69
Ontario Smelters & Refineries, Nigara Falls	30.00
	1,581.27

United States.

American Smelting & Refining Co., Pueblo	64.68
American Smelting & Refining Co., Perth Amboy	93.28
	1,739.23

Price of Silver.

Oct. 1st.	Highest	91.500
Oct. 19th.	Lowest	76.250
	Average	83.480

The Kirkland Lake Area.

The Lake Shore mine set another record in October by treating ore from which an average of $29.98 per ton was recovered. The report shows a total of 1,570 tons treated and a production of $47,078. The mill operated 89 per cent of the possible running time. The October output compares with $40.15 in September and $35,361 in August. Total output to date from this property amounts to $1,098,808. The main shaft has reached a depth of about 550 feet, the objective being to establish a main development level at a depth of about 550 feet, the objective being to establish a main development level at a depth of 600 feet and another at the 800-ft. level.

One of the new mining companies which promises to become active in the mining districts during the coming summer is the Thackery Gold Mine. This company has property in the Lebel township section of the Kirkland Lake gold area, as well as holding other groups of claims, in Thackery, Maisonville, and James townships. The company is capitalized at $2,000,000 made up of 2,000,000 shares of the par value of $1 each. The company's head office is in Toronto.

THE GOLD MINES

The Porcupine Area.

Mild weather has extended right up to the end of November, and the flow of water in the rivers is being maintained by an increase in the water flowing from the small streamlets which are fed by slowly melting snow. The power supply is not adequate to operate at full capacity, but the outlook is re-assuring.

This week the Hollinger has disbursed its 8th dividend so far this year, making a total of $1,968,000 for the period, with another $246,000 expected Dec. 28th. These figures are especially significant owing to the company having been able to secure less than two-thirds of the required number of workmen.

Attention has recently been directed to the fact that on the Millerton side of the Hollinger Consolidated, and less than the width of one claim from the boundary of the adjoining Moneta property is an ore body which measures 126 feet in width where crosscut at a depth of 55 feet, and with average gold values amounting to $4.80 to the ton. Forty feet of this averages $6.30 per ton, while 22 feet assays $6.50. The enormous width of this ore body would indicate the likelihood of the "glory hole" system of mining being adopted when dealing with it at some future date. This system of mining greatly reduces the cost, and the margin of net profit indicated is large. The large deposit is of more or less significance to the Moneta property in that its general strike is in that direction.

The question of increasing the capitalization of the Northcrown Mines is again being discussed. The large acreage held and the extent of the exploration and development scheme is believed to warrant adding another million shares and thus increasing the capital from $3,000,000 to $4,000,000. During the past summer, following the consolidation of the Porcupine Crown and the Thompson-Krist properties, difficulty was experienced in securing enough men. Later on, a shortage of power occurred. The result has been that revenue from milling operations has fallen below expectations. This encourages the belief that a capital increase might be resorted to as a means of preventing any modification of the extensive plan of operation outlined.

A recreation hall is being constructed on the McIntyre-Porcupine mine, the building being 50 by 110 feet, and being entirely modern. The basement will contain the heating plant, lockers, etc. The main floor will have two bowling alleys, two billiard tables and two pool tables. A lunch counter where light refreshments may be obtained will also be found on this floor. The second floor will be given over to a dance hall 50 by 80 feet, and quarters provided for the local G.W.V.A., for their exclusive use.

The McIntyre is also constructing a large store. It will be of modern design, among other things including a refrigerating plant for summer use. The ground floor will consist of a store of two departments, groceries and dry goods. The second floor is to have a large dining room with all the latest appointments and operated on a cost basis for the benefit of the employes of the company.

It is understood the Schumacher Gold Mines will resume full operations in the early spring. The underground workings, which are already down 700 feet will be extended to a depth of at least 1000 feet. The mill will also pressed into service as quickly as possible following a resumption of mining. The Schumacher mill is the fourth largest of its kind in the gold mining districts of this country, having a capacity for treating approximately 200 tons of ore. The company's plan is to dispose of 100,000 treasury shares so as to cover the cost of re-opening. A by-law passed two years ago authorized the sale of 100,000 treasury shares at 45 cents each, but no definite action was taken owing to the time being considered inopportune to start work.

Work is to be resumed early in December on the North Davidson property at Porcupine. Arrangments have been made to do 250 feet of sinking and approximately 1000 feet of drifting. Mr. George Henderson will be in charge of the work.

Arrangements are being made to commence an aggressive program of development and exploration work on the Davidson Consolidated property about the end of January or early in February. The plan includes sinking the main shaft to a depth of 1000 feet.

Barytes Mining.

A report has been issued to the shareholders of the Premier Langmuir Mines, Ltd., a company owing property in the township of Langmuir, some twelve miles or so south-east from Porcupine. In the report it is shown that the company has hopes of getting out of the financial difficulties which formerly developed. The scheme to extricate the company completely from this handicap is to sell five-year bonds,

bearing 8 p. c., these bonds to be exchangeable at the end of five years for shares in the company at the rate of 10 cents per share, or a case refund of the amount subscribed, and the property to be offered as security. Up to the present about $20,000 has been subscribed for bonds and the most pressing liabilities have been retired. It is stated in the report that: "Unless sufficient money comes in to meet the requirements of the company, your property will go into the hands of a receiver and be sold, which will mean that your stock will be worthless. The property then will belong to either the bondholders or someone else who might buy it."

It is announced that J. H. Dunsmore, of the Toronto Testing Laboratory, Ltd., made an examination of the property and made the following report:—

"We have made an examination of the Premier Langmuir mine, including buildings and equipment, and find same to be in very favorable condition.

"The barytes ore is located in a vein running through an immense body of rock characteristic of the Porcupine district. We estimate that there is about 150,000 tons of barytes available, with good prospects of locating a further supply.·····

"The equipment is adequate for the purpose intended and is satisfactorily installed, and at small expense could be put in operating condition. The Stroud Air Pulverizing Machine will not produce a marketable product, but we find that this machine in conjunction with a suitable bolting machine, will give you a marketable product containing a high percentage of pure barium-sulphate. The buildings and equipment installed in their present location could not be duplicated for less than $75,000.

"The present plant with a capacity of two tons an hour and equipped with a suitable bolting machine, and working on one shift for the year round, should yield a profit of about $100,000 a year, with ore selling around $35 per ton. The price of ground barytes to-day is around $45 per ton.

"Under proper management and with suitable bolting equipment, in our opinion, this mine could be made to produce a marketable product of good commercial value."

MINE EXPLOSION AFTER TEMPORARY SHUTDOWN.

A despatch from Jasper, Alabama, states that preceding a mine explosion near that place men went into the mine in the morning "when operations were resum-"ed following a shut-down of more than a week, and "when the first squad of workmen had progressed "about a half mile underground, a terrific blast oc-"curred. Rescuing parties were immediately organiz-"ed and fought their way into the wrecked mine, "removing the dead and injured."

How often has it been exemplified that the self-sacrificing heroism of the miner is greater than his realisation of the necessity of explosion prevention? The tale of the explosion of a coal mine that has been temporarily closed down has been all too often told. If half the wit, and half the willingness to rescue the victims of mine explosions were expended on their prevention it would be better. The man who will dare death to rescue a fellow-workman is also too often the same man that will use a naked light underground, and fight for the privilege.

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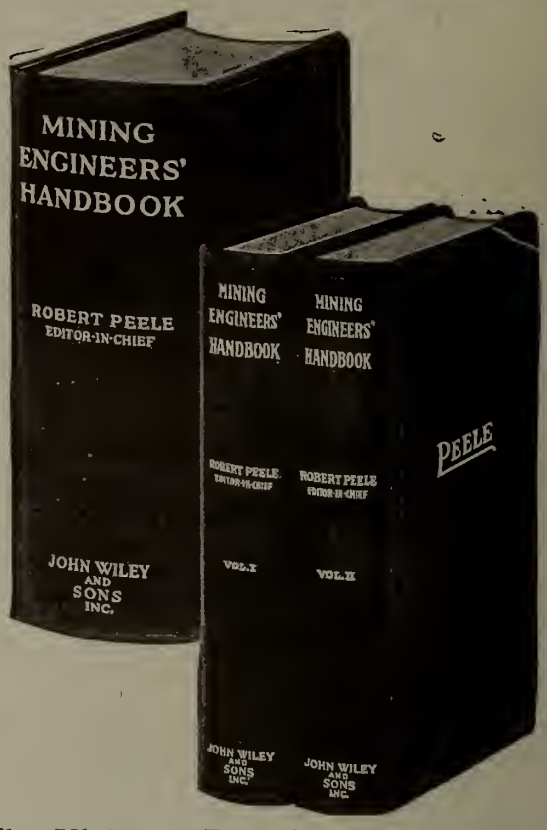

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LABOR AND WAGE CONDITIONS AT THE NOVA SCOTIA COLLIERIES.

Since the Wage Scale Committee of the United Mine Workers refused to accept the responsibility of accepting the agreement to which the executive officers of the union are parties, and decided to refer the issue to a referendum of the members of the union, there have been no developments. Although much opposition to the so-called Montreal agreement has been voiced, the unqualified recommendation of the international officers in its favor, and the growing feeling that the Secretary of the Union did not indulge in hyperbole when he said "the last cent had been wrung from the operators," indicate that there will be no stoppage of work at this time at the collieries.

The referendum is to be taken on December 14th.

The strike of the railwaymen at the Sydney Steel Plant and at Sydney Mines still continues.

At Sydney, the Steel Company has endeavored to maintain men at work in those operations requiring a minimum of transportation, such as the work of the Nail Mill, but the number of men for whom work can be found under the existing conditions is daily growing less. The seven hour ultimatum of the railwaymen threatened the equipment of the plant with disaster, and although, by the help of scratch crews of officials and others, the blast-furnaces, open-hearths and coke-ovens were cooled off gradually, yet the Company has issued a statement indicating that the No. 4 Blast Furnace may sustain a burst in the crucible portion as a result of expansion of the limestone in the furnace, which under the enforced stoppage of movement of coal and coke, it was not possible to flux off in the available time.

The railwaymen claim the status of passenger and freight line employees, and ask for adjudication of the dispute by the Adjustment Board provided for railway disputes, but the Department of Labor does not consider the employees on the steel plants to come within the category of railwaymen, and suggests a Board of Conciliation, which the strikers refuse.

The employees of the Sydney & Louisburg Railway, a subsidiary of the Dominion Steel Corporation, were given the advances prescribed under the McAdoo schedule during the Summer, and have recently also obtained the further advances under the so-called Chicago award. It is unlikely that any cessation of work will take place on this railroad, or that the operations of the collieries will be interfered with from this cause. At the present time, the strike of the steel railwaymen is causing a lessened demand upon the collieries for cooking coal to the extent of between 2,000 and 3,000 tons daily.

At Sydney Mines, where previously to the action of the railwaymen, the blast furnace and open-hearths had been closed down through trade conditions, the volunteer crews are keeping the collieries in operation, and little inconvenience has resulted from the precipitate strike.

Coal production has improved markedly during the past two weeks. The officials of the Dominion Coal Company look for an output in November of 295,000 tons, which, if obtained, will be the largest single month's production since August 1917. Outputs running over 13,000 tons daily have been obtained on a number of recent occasions. Should the improvement in production continue, the output of the Glace Bay collieries for 1920 may reach 3,250,000 tons, which will exceed 1918 by 170,000 tons, but will be smaller than any year of the war period, or its immediate predecessors.

The production from the Springhill Mines expected in November is 40,000 tons, a figure that has not been attained since 1909. Indications are that Springhill outputs may reach 420,000 tons in 1920, a figure that has not been approached since 1912.

For the first time since 1916 there is noticeable a strong upward trend to production of coal in Nova Scotia.

With the existing demand for coal, should the United Mine Workers accept the rate of increase proposed by the Montreal agreement, their opportunity for earning large wages has no precedent in Nove Scotia annals.

VANCOUVER NOTES.

Dr. Dolmage Farewelled by Vancouver Branch, C. I. M. & M.

Dr. Victor Dolmage, before leaving Vancouver for Ottawa to take up new duties there, was given a farewell luncheon by the Vancouver Branch of the Institute. Dr. Dolmage has been in charge of petrographic work in the Vancouver Office of the Survey, for two years, or since the office there was opened.

The luncheon, presided over by Dean Brock, was attended by members of the Institute and friends of Dr. Dolmage. Dean Brock said he regretted that Dr. Dolmage was leaving because his work has been of public benefit. Dr. McKenzie also spoke, referring to his first meeting with Dr. Dolmage in the field in Queen Charlotte Islands.

In reply Dr. Dolmage said there were three types of mining men to which the Vancouver office sought to help, namely, the mining engineer, in regard to branches of science in which he might not have specialised; the prospector, to whom great assistance could be rendered—and they were always an interesting type of men to help;—the small investor, to whom advice as regards a particular property was a delicate matter, but who could always be advised regarding the securing of proper reports from reliable parties. It had been his experience, Dr. Dolmage believed, to be of assistance to all these types. He would like to see the mines owned by Canadians, and not altogether by New York or Spokane people.

To Hold Monthly Meetings.

The Vancouver Branch is to hold a luncheon on the first Wednesday in each month beginning in December. The aim of these luncheons is to create greater interest in the Institute.

The February Meeting of the Institute.

Attention is being concentrated upon making the 2nd. Annual Vancouver Meeting a successful one, and it is hoped that any members of the Institute from the East who may plan on being within reach of Vancouver in February will endeavor to be present at the meetings. The invitation is extended to members of the American Institute of Mining Engineers also.

B. C. Chamber of Mines Popular.

The rooms of the B. C. Chamber of Mines, and the mineral exhibit there, attracts much attention, and visitors during one month, selected at random from the register, include well-known mining men from White Horse, Yukon, Prince Rupert, Ontario, Alberta, Quebec, Los Angeles, Arkansas, Arizona, England, and all the camps in the province itself.

EXTENDED

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Realizing the Development which is bound to take place in trade between Canada and the United Kingdom, the

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TORONTO MINING STOCK QUOTATIONS.

Following are the closing quotations for active gold, silver and oil stocks on the Standard Mining Exchange for 1st December:

SILVER	Ask	Bid
Adanac Silver Mines	1⅞	1¾
Bailey	4½	3⅞
Beaver Consolidated	35	34
Chambers-Ferland	5½	4
Cobalt Provincial	45	..
Coniagas	2.20	..
Crown Reserve	19	..
Gifford	1½	1
Great Northern	2	1⅞
Hargraves	1⅞	1⅜
Hudson Bay	40	..
La Rose	..	24
Lorrain	5	..
McKin.-Dar.-Savage	44	42
Min. Corp. of Can.	1.66	..
Nipissing	9.50	9.00
Ophir	2¼	1⅝
Peterson Lake	11½	10½
Silver Leaf	2¼	1½
Temiskaming	27	25½
Trethewey	20	18¼
GOLD		
Apex	1¾	1
Atlas	19	17
Dome Con. Mines	..	12.75
Dome Lake	3½	2¾
Gold Reef	3¼	2¾
Hollinger Cons.	5.65	5.60
Hunton Kirl'd G. M.	9	..
Keora	15½	15
Kirkland Lake	40½	39½
Lake Shore M. Ltd.	1.06	1.02
McIntyre	1.92	1.91
Moneta	10	8
Newray	5	3¾
Porcupine Crown	19	..
Porcupine V. N. T.	..	19
Preston East Dome	3	2⅞
Schumacher	20	17
Teck-Hughes	..	7
Thompson Krist	6⅛	5¾
West Dome	6	5¼
West Tree Mines, Ltd.	8½	8
OILS		
Ajax Oil	25	..
Eureka	35	..
Petrol	40	35
Rockwood Oil, Gas	4	3⅛
Vacuum G.	26	24

METAL QUOTATIONS.

Fair prices for Ingot Metals in Montreal Dec. 1st 1920. (In less than carload lots).

	Cents per lb.
Copper, electro	18¾
Copper casting	18½
Tin	43
Lead	7¼
Zinc	8
Aluminum	34
Antimony	8

HIGH ASSAY VALUES REPORTED FROM PAINKILLER LAKE ORE.

La Santa Lucia Gold Mines, one of the group of Cartwright Gold Fields in the Painkiller Lake gold mining district, is attracting considerable notice just now by reason of the excellent showing made by numerous assays of ore taken from an exceedingly promising vein.

This vein which has been opened up for a distance of one hundred feet has an average width of eighteen inches and carries free gold for the entire length.

Recently ten bags containing six hundred pounds of ore picked up promiscuously from the vein were shipped to the Provincial Testing Laboratory at Cobalt and the report gave $84.15 in Gold and 7.43 oz. of Silver, proving that the main vein contains ore of a very high grade.

Numerous samples have been taken and indicate that the values are consistent.

It has been known for some time that gold was plentiful on these properties and a six and a half pound sample of ore tested recently at the Kingston School of Mining averaged $1,374 per ton in Gold and 9.6 ounces in Silver.

No less than seven veins have been opened up, all carrying visible gold and the veins vary in width from twelve inches up to three and four feet.

A contract has been let for diamond drilling to a depth of 2,000 ft, and if results justify, further operations will be carried on. Simultaneously with the diamond drilling surface work will be prosecuted with vigor.

Main Vein of La Santa Lucia Gold Mines from which sample tested at Government Laboratory was taken.

The camp is now well advanced in the way of equipment and working staff and work is proceeding rapidly. The main shaft is down 100 feet.

The Cartwright Gold Fields and La Santa Lucia Gold Mines control 520 acres around Painkiller Lake and it is fully expected that this camp will be the scene of great activity in the Spring of 1921 for the excellent results obtained are encouraging many other properties in the vicinity to consider operations.

Vein seven feet wide, on Cartwright Goldfields Property carrying high assay values.

GOLD INDUSTRY PROBLEMS.

ALEXANDER GRAY, Montreal.

Doubtful as it is whether American gold producers will accomplish their avowed purpose to push to passage the bill by which they would be bonused and encouraged that much to increase their output, it is manifest that more of the yellow metal will not be forthcoming unless operating conditions are altered, whether by the more plentiful supply of efficient labor, the lower cost of materials and metallurgical essentials, or by the modifications of taxation.

Artificial stimulants, however effective, are not included in Bankers' creed. Banks are jealous of their prerogatives when it comes to the gold standard. The market for gold is theirs. Special legislation that would tax gold used in the ornamental arts and the jewelry trade in general, meets with the objection that an open market is preferable. What premium there is upon the metal by reason of international exchange cannot be denied to those who are producing it—or whose grade of ore is such that they can produce it—that concession really is undeniable—and it does not assist low grade properties.

Were it not for this premium fewer gold mines would be working. In many instances the premium has provided something for shareholders who otherwise would be subjected to war-time conditions which still obtain. How close is the margin of profit at established gold fields is revealed in the October figures for the Witwatersrand where 26 mines milled 1,196,100 tons valued at £2,057,256, for an average profit of $2 per ton. In the eastern section of the Witwatersrand, 11 mines milled 591,000 tons valued at £1,531,881, for an average profit of about $6.50 per ton. All told, in October, 37 mines of the Witwatersrand milled 1,795,100 tons valued at £3,589,137, and were it not for the 11 mines of the eastern section the return available for dividends would not furnish enthusiasm enough to attract capital

to gold mining. A dozen mines were operated at a loss. Others reported a profit per ton of 25 cents to $1.00.

Calculating the value of the refined gold at £5, 17 shillings and 6 pence, the October output was at the rate of £43,069,644 per annum, without which exchange would be more demoralized than it is. Of course, as the Bankers contend, this gold is to be had by those who can buy it, and is available when they want it. American producers have talked of a Gold Bank for their own purposes, and yet the last word would rest with Threadneedle and Wall streets. Possibly a tax on gold diverted to jewelry could be allocated for the relief of lower grade properties. There, again, the special provision might prove obnoxious as a precedent.

Less taxation and the co-operation of labor really are the surest remedies for all precious metal mines. Once the equilibrium of international exchange is nearer to normal, the premium upon gold will not be so remunerative. It is what will happen meanwhile toward a lower level of working costs that gold producers are thinking about. Certainly shareholders are weary of being penalized by combined adverse circumstances beyond their control. Their capital is nearly "frozen"—their millions are too inactive to arouse further interest in mineral resources.

BOOK REVIEW.

Geology of the Non-metallic Mineral Deposits other than Silicates. Vol. I. Principles of Salt Deposition. Amadeus W. Grabau. First Edition, 9¼ by 6¼ inches by one inch; 435 pages with Index. McGraw-Hill Co., New York. Cloth Boards.

This book is really a hand-book of salt geology, if the term is used in a sufficiently broad sense to include nitrates, borates, phosphates and similar deposits. Consideration is chiefly given to modern deposits, now forming, or but recently formed, and line of study that it is hoped may lead to successful elucidation of the origin of older deposits.

A list of the chapter headings will give the best idea of the volume, which covers a world-wide range, and is extensively illustrated by maps, tables and photographs.

After reviewing the chemistry of salts and the physical characteristics of non-metallic salts, the chapters deal with the sea as a source of saline deposits, the condition of deposition of sea salts in nature, including salt secretion by organisms; sea-margin deposits of salt, salt deposits from evaporation of a cut-off portion of the sea; salts of terrestrial origin, connate salts, their origin and mode of concentration; salts leached from older deposits, and from decomposition products of older rocks; concentration of salt by plants. Similar arrangement is followed in discussing nitrates and phosphates. Salt deposits of mineral springs and fumaroles, or circulating ground water, and of igneous origin are dealt with. The concluding chapter discusses the conditions under which salt deposits formed in former geological periods.

Canadian references are not numerous, but include the Laramie lakes on the South Saskatchewan border, and notes on J. W. Dawson's theory of the origin of the Nova Scotia gypsums and the occurrence of gypsum in dolomites overlying the salts at Goderich, attributed to alteration of limestones by acid sulphate waters.

Canadian phosphates are referred to in the second volume, which is not yet pulbished. T. Sterry Hunt is quoted a number of times in connection with Canadian salt deposits.

The volume is well indexed, and has been carefully edited.

ASBESTOS PRODUCTION, GRADING & PRICES.

New York advices still forecast higher prices for all grades of asbestos fibre.

The following interesting table of the production of asbestos rock, the resulting tonnage of various grades of asbestos fibre and the increase in values during the past eleven years, is compiled by the Asbestos & Mineral Corporation of New York, and published by permission.

In explanation of the statistics it is stated that a classification of the selling price has been adopted which divides the Crude into two grades, and the Mill Stock, or fibre, into three grades. The crude is hand-cobbed, and the fibre recovered by mechanical grading after crushing, no two mines grading alike.

Fibres are divided into three classes, namely, Mill Stock No. 1, long or spinning fibre; Mill Stock No. 2, shingle and magnesia stocks; Mill Stock No. 3, paper stock and "short fibres".

The tables show the striking advance in the selling-prices of Canadian fibre, which is altogether out of proportion to the tonnage of fibre produced, this not having responded to the brisk demand and high prices in any very striking manner.

As was pointed out by the Superintendent of Mines for the Province of Quebec in the Report for 1919, the tonnage of asbestos fibre in 1919 was 4.6 per cent below that of 1918, but because of increased selling prices, the value was 21.2 per cent greater.

Tables of Production and Values of Asbestos produced in Quebec 1909-1919 (compiled by Asbestos & Mineral Corporation, N.Y.)

Year	Crude No. 1 Tons	Crude No. 2 Tons	Mill Stock No. 1 Tons	Mill Stock No. 2 Tons	Mill Stock No. 3 Tons	Total Production Fibre Tons
1909	1,087	1,471	5,757	19,029	36,620	63,965
1910	1,817	1,612	10,313	44,793	22,071	80,605
1911	1,400	3,382	6,340	35,991	55,111	102,224
1912	1,941	3,766	3,682	32,689	69,097	111,175
1913	2,140	2,870	14,056	29,525	88,018	136,609
1914	1,336	2,812	10,485	32,847	59,921	107,401
1915	2,734	2,631	12,502	36,945	58,303	113,115
1916	3,073	2,885	11,768	43,870	71,743	133,339
1917	1,761	3,603	13,197	54,072	64,609	137,242
1918	1,808	1,896	13,559	32,412	92,700	142,375
1919	1,103	2,991	13,764	69,868	48,136	135,862

Year	Total of Value $	Average Value Per Ton $	Total Rock Milled Tons	Rock Mined and Hoisted Tons	Per Cent Fibre Per Ton Rock Milled
1909	2,296,584	35.90	977,452	1,163,634	6.54
1910	2,667,829	33.10	1,709,992	2,035,705	5.03
1911	3,026,306	29.60	1,477,613	1,759,064	6.91
1912	3,059,084	27.52	1,571,310	1,870,608	7.08
1913	3,830,504	28.04	2,123,024	2,527,410	6.43
1914	2,895,935	26.96	1,808,285	2,127,395	5.94
1915	3,544,362	31.33	1,813,961	2,134,073	6.23
1916	5,182,905	38.87	1,947,424	2,291,087	6.84
1917	7,198,558	52.45	2,239,249	2,634,410	6.12
1918	9,019,899	63.35	2,078,883	2,445,745	6.85
1919	10,982,289	80.47	2,502,436	3,061,690	6.22

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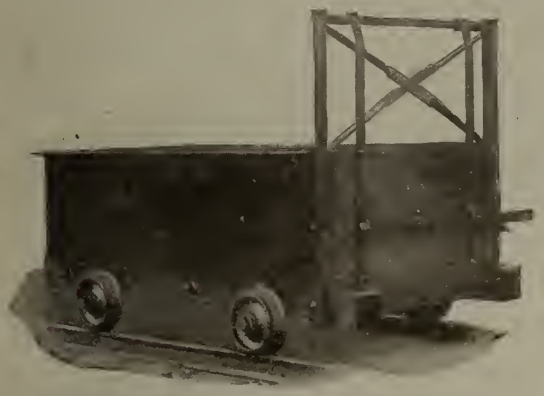

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PORT ARTHUR NOTES.

By J. J. O'CONNOR.

Members of the Port Arthur and Fort William Boards of Trade, had a conference with the Hon. Harry Mills, Minister of Mines, in the Mayor's office Fort William, on Nov. 27th. The subject under discussion was the advisability of the Province granting a bounty on the mining and marketing of iron ore, without restriction.

The Hon. Mr. Mills stated that as a Minister of the Crown he would not advise against the granting of a bounty, but as an individual giving his personal opinion, he did not think the granting of a bounty would result in a solution of the iron ore problem of this Province, that something more was required, more preparation for the securing of additional knowledge of the various ranges, as to quantity, grade and variety of the ores, and the various forms of treatment to which they would be amenable. He made certain suggestions that he thought could be worked out to advantage. These suggestions amounted to a complete survey of the whole situation regarding the iron ranges of Northern Ontario, and the best methods to be adopted for their development and use in the furnaces of the Province.

The Hon. Minister's suggestion to have such a survey made is a good one. Aside from the question of a bounty or no bounty, it is clearly in the interests of Ontario to have the fullest and most complete knowledge of its iron-ore resources, and there is no more direct or efficient manner of arriving at that knowledge, than by such survey by competent men.

This policy has been advocated by mining engineers who are familiar with the iron ranges, and their requirements.

Captain H. E. Knobel, who has had a wide and intimate association with the iron ranges of Northern Ontario, estimates that such a survey could be made by a party of five live men, under a competent directing head, in one summer season. He, and many others, are strongly of the opinion that when such survey is undertaken, it should be in the hands of, and under the direction of, experienced iron-ore operators, men who have had actual commercial experience in the beneficiation of iron ores, such as may be found on the iron ranges of Minnesota, where beneficiation has been carried to the highest efficiency yet attained. No survey of this kind would be of value, unless it were carried out by men with the capacity and experience to enable them to forge the necessary link between the technical and commercial end of the iron-ore problem. Either our iron ores are of value, or they are of no value. If they have value, that value is immediate and present. If of no value, the suggested survey would demonstrate that feature, and end the matter. If, on the other hand, it proves their value and availability for our own use, no time should be lost in their exploitation.

The Hon. Mr. Mills would be well advised to proceed at once with preparations for the survey under the right auspices, so that the work may be undertaken in the Spring of 1921.

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EDITORIAL

"The Extension of the Institute's Scope of Usefulness"

The Annual Meeting of the American Mining Congress at Denver has received much deserved publicity in the trade journals of the United States. This organization, which had its birth in Denver, had last year an income of $150,000, comparing with only $5,000 in 1910. It has become a political power of first rank, and a perusal of the text of the numerous resolutions adopted will sufficiently indicate how large a proportion of the deliberations of this Congress deal with applied politics, or what is usually termed legislation. No doubt this phase of the work of the Mining Congress is at this time brought into unusually sharp relief because of the manner in which the mining industry has been controlled by governments under war-measures enactments, and because of the unconscionable length of time occupied by bureaucratic control in accomplishing much-to-be desired death. Out of twenty-five resolutions adopted, there was only one, namely that relating to Minerals Separation Ltd., that it is possible to regard as non-political, and even this lone exception was a resolution asking for government action.

The American Mining Congress is, we gather, an organization of persons financially interested in mining, representing exclusively the corporate aspect of mining affairs, but numbering among its members men of wide technical experience. Such organization appears to fill a necessary part in the domestic economy of our neighbors, one that has a necessary corollary in Canada. The crowded programme of the Denver Meeting, and the multiplicity of political matters which were crystallized into formal resolutions, and others that presumably were not so crystallized, although discussed; is evidence of the absorption, exclusive of all other matters, that would result from frank adoption by the Canadian Institute of Mining and Metallurgy of such duties as come within the scope of the Mining Congress's charter.

The Ontario Mining Association was formed for much the same purpose as the American Mining Congress, and is functioning along much the same lines, but within smaller limits, and being frankly an operators' organization, it can with propriety advocate the interest of the operator and the purely commercial side of the mining industry, as is evident from the statement presented by the Association to the Tariff Committee.

The desirability of the Canadian Institute of Mining and Metallurgy adopting a more aggressive political stand, and the augmentation of its revenues to enable it to employ in its service men of high executive and technical standing, was freely urged at the last Annual Meeting in Toronto by gentlemen who were prominent in the counsels of the American Mining Congress at Denver. The need for an organization to represent the business interests of Canadian mining is great, and just how far Canadian mine operators can find it possible to work with the American Mining Congress it is difficult to state, as in some matters, such as those connected with tariffs on the so-called "war minerals", the interests of the Canadian and United States operator are opposed.

The endeavors of a technical society to advise the Government in connection with legislation is fraught with difficulty, but it is a service that up till now the Canadian Institute of Mining and Metallurgy has performed with commendable discretion, probably because it has been realised that its political advice was tempered by a realisation of its honorable traditions and professional ethics.

It is possible that at forthcoming meetings of the Institute there will be discussions that will reveal differing conceptions among the members of the Institute as to its functions. One section of thought will regard the traditional policy of the Institute as negative and timid, and will press for out and out political aggressiveness such as is being displayed by the American Mining Congress. Others will continue to regard a judicious admixture of technical wisdom and business acumen as a golden mean, not

to be departed from without injury to the future of the Institute; in which, of course, every member is genuinely interested, no matter what his views as to its functions.

The mining industry in the United States is large beyond all historical precedence. The value of the mineral products of the United States in 1918 totalled five and a half billion dollars. National records do not disclose any previous approach to such stupendous figures, and it is patent that the American Institution of Mining Engineers could not, without injury to either interest, any longer attempt to supervise the technique and also the business of mining in the United States. The load is too great and the divergence of interests is too great. In Canada, however, we have not yet attained to such eminence in production, nor to such divergence of interests, and in considering the work of the American Mining Congress some thought should be given to its juvenility.

This journal does not desire to express a decided opinion on what course the Canadian Institute of Mining and Metallurgy should pursue, except to voice the belief that the Institute should receive the fullest and the most unstinted support from its members. The sum of individual endeavor will be the measure of united achievement, and the far from satisfactory financial outlook for many branches of Canadian mining render it more than ever necessary that the Institute should be increasingly active.

We would, however, call the attention of the members of the Institute to the work of the American Mining Congress, to the wide extent and difficult character of the field it has undertaken to cultivate, and suggest that thought might be usefully devoted to the problems of the Canadian Institute in advance of the coming meetings of 1921, which it is understood will include a meeting of the British Columbia Division in February, the Annual Meeting of the Institute at Ottawa in March, and the Annual Meeting of the Mining Society of Nova Scotia (really the eastern meeting of the Institute) in May.

In this connection a careful perusal of the speech of the President, Mr. O. E. S. Whiteside, at the Winnipeg Meeting* is recommended. Mr. Whiteside's subject was "The Extension of the Institute's Scope of Usefulness" and there will be pretty general agreement with his concluding words, namely: "Inaction on our part, or an attitude of mere complacency with the position and reputation for good work we have won, with no desire to improve it, would be fatal and uncondonable. I need scarcely say that there is little likelihood of the Institute falling into that grave error."

Nevertheless it may.

Note: See C. M. J. page 896, issue 5th Nov, 1920.

EFFICIENCY AN OFFENSE.

The United States Government has won its suit against the Lehigh Valley Railroad, a so-called anthracite trust road, for violation of the anti-combine law, enacted in the days before the war, when the efficacy of unified control was not so recognised as it later became under the compulsion of national danger.

If there is one fact more patent than another in connection with the problem of coal supply in North America it is the deficiency of transportation and the notorious inefficiency and waste—not to mention profiteering—connected with the distribution of coal. The source of coal supply is more than adequate, except as regards anthracite, nor has the capacity of the coal mines of either the United States or Canada for output been at any time intensively tested. It is the complaint of the coal miner at the face that his coal is never taken away from the working place fast enough, a complaint that is not always justified. It is the just complaint of the coal operator that the railways have never been so equipped as to take away coal from the mines at all seasons as fast as it is consigned to them for delivery. Under these circumstances it has for a long time been evident that ownership by the coal operator of the means of coal distribution would lead to maximum efficiency. Efficiency in the production of coal is marked up to the yard limit of the colliery, but beyond that point the reserve is not infrequently true. No combination could logically obtain greater efficiency in coal production and coal distribution than one which places under centralised control both inter-related operations. Greater efficiency spells cheaper selling prices, and the classic exemplification of the benefits that follow centralised control of production and distribution together was the history of Standard Oil. The success and stability of United States steel rests on similar grounds. The operation of the anthracite mines have in recent years been marked by greater stability, more vision and truer conservation (using the term to imply maximum utilisation of resources) than has the operation of the bituminous colieries in the United States.

In Canada, in connection with the mooted British Empire Steel Corporation, much stress was laid upon a centralised control of production and transportation. This factor was not unduly emphasised, but it is singular that logical combinations which are welcomed in Canada should be regarded as inimical to the public weal in the United States. The term "restraint of trade" is used in the United States, and elsewhere, as though it were synonymous with "restriction of competition" the words "trade" and "competition" being assumed to have identical meanings. The assumption is not an accurate one. During the war period it was recognised by governments—if their actions are to be accounted an expression of their convictions—that the fullest amplification of trade could

be secured only by the extinction of competition, which was the effect sought to be achieved by control of key industries.

Is it not just possible that the elimination of competition—useless, wasteful competition—is required before efficiency, and consequent maximum cheapness, of production can be achieved, and that the principle expressed by the Sherman Law is untrue in fact and disastrous in operation?

IT PAYS CANADA TO PRODUCE NEW GOLD.

A correspondent to the "Mining and Scientific Press" states rather epigrammatically that the price of gold today is $20.67, its value being $45 per ounce, "the price marked on gold coins being a mask to hide the value."

This is, of course, not precisely a correct statement. In those countries where the statement might be considered correctly made, the gold coin is not in circulation, for quite obvious reasons. The paper "equivalent" of the gold coin is a sham, partially or wholly corresponding with the extent to which it is backed by gold bullion, stamped as coinage or unstamped. The discount on the paper equivalent of any country expresses the view of financiers as to what are the chances of that country ever paying its debts in gold, and when. When the Hollinger Mine, for example, ships gold to New York, it receives, under present circumstances a substantial premium on the shipment, expressed in terms of the Canadian paper dollar, but that premium is only a gain, more or less apparent, if spent in Canada. The more gold our gold mines can export to the United States, the smaller will become the premium, but in such event no one in Canada would grumble, the gold miners least of all, because the purchasing value of our paper dollar in Canada would buy more labor and more material than it does today. Intensive production of gold, whatever may be its effect in the United States, is obviously one of the best directions in which Canadians can expend their national energies. It approaches the dignity of a national duty.

WHAT CONSTITUTES A NON-ESSENTIAL IMPORT.

The annual addresses of the officers of the Bank of Montreal in presenting the Annual Statement of the institution review the industrial situation in the several Provinces tersely, with deletion of all non-essential statements, and supply an annual corrective of a less restrained literature with which newspaper readers are familiar. Sir Frederick Williams-Taylor cannot be accused of exaggeration in his references to mining in Quebec. "With the exception of asbestos, there is little mining done in the Province. Asbestos shipments show an increase, and prices have advanced." That is all. Similarly, throughout the whole of the references to mining in the Provinces, the relatively small attention attracted by mining is reflected by the extent of the bankers' mention.

There is no desire to criticise or be captious in this connection, but merely to take an opportunity to look at the mining industry through other eyes, a not unprofitable proceeding at times, particularly when the other man is in a position to view all Canada's economic features from the elevated and impartial stand of the banker, a pinnacle of judicial observation that but few can hope to attain.

Sir Frederick made one statement which it would be interesting, and no doubt profitable to have enlarged, namely; "What is wanted (to correct trade balances) "is rigid economies in the purchase of non-essentials, "with an increase in our own exports."

A definition of what constitutes a non-essential, from the mineral producers' point of view, is much to be desired.

Is a mineral product essential when it can be produced at home, in lieu of importation from outside, under circumstances where home production entails a higher apparent outlay in money to the individual? To the state, and to the general mass of people that compose the state, the individual saving may actually be a collective loss. A definition of "essential" from this point of view would be welcomed. It would throw needed light on the tariff debate. The poverty of our natural resources, opposed to the plenitude of the resources of our neighbors, is the condition that necessitates a protective import tariff in Canada. How far does cheapness constitute essentiality? Nothing, of course, is cheap that can be done without, but is anything really cheap that can be produced at home and is bought abroad, if purchasing abroad depopulates Canada, drains its finances, chokes its volume of production and depreciates its currency?

THE FLYING GEOLOGIST.

A newspaper item intimates that airplanes may be used to take Dominion geologists from Peace River Landing to Fort Norman next Summer, thereby avoiding much arduous foot-travel. It was pointed out in an April issue by Mr. R. E. Hore that the presence of numerous lakes in Northern Canada might assist in providing alighting places if the seaplane type of machine were used. Canada has many aviators, with wide experience, who can give the best of advice as to the feasibility of the proposal, and, should the yield of oil in the Mackenzie Basin fulfill its present promise, much expenditure in mapping an air-route and providing intermediate stations will be fully justified. If the dirigible type of lighter-than-air machine were used, Canadium helium might be employed!

If the proposal is approved by the Air Board, its practical usefulness in many directions requires little emphasis.

CORRESPONDENCE.

DEPARTMENT OF COLONIZATION, MINES AND FISHERIES.

Bureau of Mines.

Quebec, December 7th, 1920.

The Editor,

Canadian Mining Journal.

Dear Sir,—

The Canadian Mining Journal in its issue of December 3rd, reproduces an article of the "Labour Gazette" comparing legislation relating to the regulation of Mines in Canada.—As regards the Province of Quebec I find some inaccuracies, which probably have arisen from the fact that the "digester" may have consulted copies of the old Mining Laws of Quebec, instead of up to date copies with changes and amendments.—For instance I note that the writer says:—"The Yukon and all the provinces **except Quebec** have sections relating to the powers and duties of inspectors.—..... In the Yukon and all parts of the Dominion, **except in Quebec** and the coal mines of Nova Scotia, the inspector must give notice in writing to the owner or manager of the mine of anything which he finds to be dangerous or defective, and direct that it be remedied within a specified time".

The following quotations of articles of the Quebec Mining Law, refute the above statements and show that the phrase "except Quebec" is *de trop.*

Article 2189.—"Every inspector, constable or peace "officer in a mining division, may, at any time, enter "upon private or public lands that are being mined in "the said division, and examine the pits, shafts, "tunnels, subterranean passages or other mining works "or excavations constructed or commenced in any "manner whatsoever, and require from the proprietors "of such pits, shafts, tunnels, and other mining works, "and from their employees, all the facilities and assist-"ance necessary for that purpose.

Article 2114.—"Regulations may be made by the "Lieutenant Governor in Council, respecting the "sanitary condition and safety of the work in mines, "so as to protect the life and health of the workmen "therein employed.

"Such regulations, after their publication in the "Quebec Official Gazette, shall become law, and a copy "of the same shall be posted up in the most conspicuous "places of the mine in conformity with the instruc-"tions of the mining inspector."

Article 2214a.—"It shall be the duty of the inspector "to make such inspections of mines, quarries, and ore-"mills for the reduction of minerals, as may be necess-"ary to ensure the observance of all regulations made "under article 2214.—The inspector shall have power, "further, to order in writing any owner of a mine or "his agents, to have remedied, within a certain lapse "of time, specified by the inspector, any state of "affairs, or any practices which he may consider bad or dangerous in the operation of any mine, quarry or "mill for reducing mineral.

"Any failure to obey such notice within the time "specified shall be an offence, punishable by the penal-"ties provided by article 2207".

Very truly yours,

THEO. DENIS,

Superintendent of Mines for the Province of Quebec.

OBITUARY.

Peter Christianson, Sydney Mines.

Mr. Peter Christianson died at his home at Sydney Mines on November 27th after a year's illness. Mr. Christianson was a sailor on a Norwegian sailing-vessel which touched at Sydney Mines when he was about eighteen years. This vessel was a "coffin-ship", which the young man thought it advisable to leave. When the ship sailed out of Sydney Harbor it did not have one particular member of its former crew aboard. Mr. Christianson who was ignorant of the English language, found work at the collieries at Sydney Mines, and by dint of perseverence learnt English and rose to be Assistant General Superintendent of the Dominion Coal Company. He was a student of the International Correspondence School of Scranton, and his rise from an unlettered sailor to a high official position was deservedly one of the favorite quotations in the I. C. S. advertisements. Mr. Christianson left the service of the Dominion Coal Company in 1910 and went with Mr. Charles Fergie to the Yellowhead Pass coal-fields, where he contracted from exposure the sickness which shortened his life. He returned to Cape Breton, and at the time when his failing health rendered it necessary for him to relinquish active work, he was Manager of the Jubilee Colliery of the Nova Scotia Steel Company.

Peter Christianson was a man of sterling character. Quiet and retiring, but very thorough and loyal, he had many friends. During his work as a colliery official he had to deal with many dangerous underground situations and always proved himself to be a dependable man. Mr. Christianson at all times retained the confidence and respect of the workmen, a fact that was noticeable during the troubled times of the strikes in Cape Breton during 1909 and 1910.

Among those who regret Mr. Christianson's death, and who regarded his self-reliant and shortened life with admiration, the Editor desires to be numbered.

OIL SHALES. USEFUL PUBLICATION BY COLORADO SCHOOL OF MINES.

The October issue of the Quarterly of the Colorado School of Mines contains a comprehensive article by Dr. Victor C. Alderson, the President of this Institution, upon the Oil Shale Industry in Scotland and England. The information in this article was obtained by Dr. Alderson during a visit in the Summer of this year.

Dr. Alderson notes in his introduction that recent literature on oil shales in Great Britain is exceedingly scarce. He states that the English oil-shales which exist in large quantities are commercially worthless until some method of desulphurizing the oil they yield is discovered.

A Supplement to Dr. Alderson's paper contains a directory of oil-shales retorts, the information being given by the makers. These retorting systems include the Anderson retort, Balcom process, Bishop continuous process, Chew process, Colorado continuous retort, Day, Erickson, and Galloupe processes, Jenson stage-eduction process, Johns retort, Porter process, Randall rotary-retort and process, Scott process, Seaman rotary-retort process, Louis Simpson retort and process (172 O'Connor St. Ottawa), Stallman-Wells process, Wallace process and Wingett process, together with other processes listed, but not described.

A Bibliography of publications on Oil Shales is also appended.

STATEMENT OF THE ONTARIO MINING ASSOCIATION BEFORE THE COMMITTEE OF THE CABINET ENQUIRING INTO THE EFFECT OF THE CUSTOMS TARIFF IN CANADA.

The Ontario Mining Association, through its Secretary, Mr. B. Neilly, presented to the Cabinet Committee on Tariff Enquiry at its sitting in Toronto, on the 6th December, a statement of the views of the mining industry, the text of which is given below.

The only question put by the Committee was in regard to the Wedge furnace, the Chairman remarking that the action taken by the Customs Board was rather the fault of the Tariff than of its interpretation by the Board, and intimated that the section would be amended to avoid future ambiguity.

The Chairman stated that the mining industry need not expect representation on the Customs Board.

The Statement.

This Association has within its membership, with some two or three exceptions, all the producing mines in Ontario, and can therefore speak with reasonable assurance on behalf of the Mining industry in this Province.

It is not our desire to enter into a discussion on the relative merits of protection, as against free trade, nor do we wish to make any general statement with reference to the present tariff. Unlike those engaged in Agriculture, who sell their products largely in the home markets, we sell ours almost exclusively in foreign markets, and absolutely at prices set by the law of supply and demand. In other words we cannot add the amount of customs duties to our selling prices, but on the other hand we must add the amounts so paid, to our cost of production.

The production from Canadian Mines in 1918 was valued at $211,301,897, and we presume it is hardly necessary to draw to your attention the fact that this amount is **new wealth in Canada.** The mining industry does not draw its raw material from another industry, and by a process of manufacture increase that value, but it takes raw material that without beneficiation is worthless, and turns that latent resource into something of value to mankind.

Measurable quantities of minerals can be found in nearly every substance that goes to form the earth's crust. But all such mineral is worthless unless the cost of mining, concentrating and refining that metal, is less than the selling price of the metal so recovered. **Cost of production must determine in every case whether or not an ore body is of economic importance,** and as we succeed in reducing costs of production, the volume of ore that can be treated at a profit, increases by leaps and bounds, and while the profit per ton to the operating company may be small the gross value of that production represents just that much new wealth to Canada.

To illustrate this point more specifically, let us assume that in a certain mine, the cost of production is $5.00 per ton. That means that all ore in this particular mine running less than $5.00 per ton, must be left in the ground, because it is for the time being without value. Next let us assume that for any reason, the cost of production in this mine is reduced to $4.50 per ton. Immediately the tonnage averaging between $4.50 and $5.00 per ton has economic value, and while the mining company then makes a maximum profit of 50c. per ton on this new available tonnage, Canada makes $4.50 per ton, or nine times as much, as the maximum profit that may be obtained by the Mine Operator.

It is apparent then that anything the Government can do to decrease operating costs will vastly increase the value of Canada's mineral wealth. We submit, having regard for the financial requirements of the Country, that it is the duty of the Government, in the interest of all Canadians, to use every facility at its disposal to reduce this operating cost, and, for example, to add, if possible, the above mentioned $4.50 ore to our immediately available wealth. One way that decrease might be brought about is by way of lowering the duties imposed on machinery and supplies imported, of necessity, from foreign countries.

Nevertheless we as an industry, do appreciate the heavy liabilities imposed upon Canada by reason of the part she played in the Great War. We know that your Government must obtain revenue, and mining operators as a class, are proud of the fact that we have never sought to dodge our fair and even generous portion of the common obligation.

Under the circumstances as above outlined we are inclined to leave with you the problem, of finding the critical point of Canada's advantage, with respect to the duties to be imposed on the industry's foreign needs.

Interpretation of Tariff Schedules Criticised.

While then we have refrained from adversely criticising the Tariff proper, we would nevertheless voice our objections in the strongest possible language, to the way in which that Act has been interpreted, by your Customs Board. With no change in the Act, as it affected the Mining Industry, your Board have varied their rulings time after time, on the same class of article. Through lack of knowledge and experience, or because of absolute indifference to reason, time and again have they drawn an arbitrary line in interpreting some certain section of the Act, where no such decision could be supported by a fair interpretation of the Act itself.

Illustrating this charge of unfairness or incompetence, let us take the experience of one of our members. Before finally deciding on the adoption of a certain kind of roasting apparatus, they asked for a ruling of the Customs Board as to whether or not a certain kind of fire-brick liner not made in Canada, would be permitted to enter Canada duty free. They were advised in due course that they were included in the free list and the Company installed this particular equipment on the above understanding. Until 1915 they continued to import these liners free of duty, but suddenly they were advised, that under tariff item No. 282, they were dutiable at a rate of 22½ per cent. The Company naturally protested and referred the Board to their original ruling, which all things considered was not unlike an agreement, but without avail, and they perforce continue to pay duty. It is apparent, we submit, that injustice is being done.

As another illustration, of, shall we say lack of confidence on the part of the Board, one of our members imported a Wedge furnace. Under tariff item No. 462 it was admitted, quite properly, duty free. When they later were forced to renew certain parts of the furnace these parts were declared dutiable at 27½ per cent, and protests were unavailing. Surely

such action on the part of the Board is without justification.

In 1917 mining operators asked, that grinding machinery when used for fine grinding in cyanide solution, should be admitted free under Article 460. The Commissioner of Customs in his file No. 92065, November 16, 1917, advised, that stamp battery parts where used for fine grinding in cyanide solution, should be admitted free. Some time prior to this, tube mills when used for the same purpose, had been added to the free list. On July 9, 1918, the Customs Board issued, without warning and so far as we know, without reason, a ruling effective at once, that tube-mill parts and ball-mill parts whether used for fine grinding in cyanide solution or not, should be rated for duty under tariff item 453.

You will note that under the same Act they are first dutiable, next declared free, and later again made dutiable. The uncertainty that such action engenders tends to confusion and makes it almost impossible to estimate costs accurately, and we have already pointed out that the costs of production is the main factor in determining whether or not an ore body is of economic importance. Moreover it illustrates well our point that inexperience or lack of knowledge, pertaining to this Industry, has led the Board into error in imposing duty, later in relieving the Industry from that duty and latterly in again imposing it.

These unsatisfactory interpretations of the present Act, were discussed at a full meeting of the Association, in August of this year, and the following resolution was passed unanimously:

> "Resolved that the Dominion Government, should be asked to appoint to the Custom Board, at least one member thoroughly familiar with the requirements of the Mining Industry.".

We ask that this request be granted in the hope that friction may be eliminated, so far as the administration of this Act affects the mining industry, and so that costs of equipment may be estimated accurately, and the operators enabled more definitely, and prior to the making of heavy expenditures, to ascertain whether or not, the ore under consideration is worth developing.

We ask that the onus of proof of manufacture in Canada, be placed on the manufacturer, where under a system of protection it properly belongs.

Mining the Pioneer Industry.

We further ask that when you undertake to review the present Act, that you will give careful consideration to the fact, that mining as a basic industry is doing more to open up the present unproductive areas in Canada than any other industry. It is risking capital and effort at all times, in the hope that the reward will be the great prize of the successful mining company, and merely suggesting that it, as an industry, is perhaps properly entitled to the same consideration as Agriculture, the Press Association and the Textile Industry, (see items 441, 442 and 468), we will close, by offering our whole hearted co-operation, in gathering and presenting any statistical details in connection with the mining industry, that in your estimation, might be useful in arriving at a scientific decision with respect to the points we have enumerated.

COMPLETION OF A LARGE MINE-PUMPING INSTALLATION IN SOUTH AFRICA.

..The S. A. Mining & Engineering Journal for October 23rd contains an account of a new pumping layout of the Randfontein Central group of mines. Under the superseded arrangement from 3½ to 4 million gallons of water per day were required to be pumped, which necessitated the employment of over 100 units, mainly electrically-driven three-throw units with a capacity of 12,000 gallons per hour against 750 ft. head. Twenty-seven pumping stations and pumps were in use. The pumping cost in 1919 was equivalent to 2.15 shillings per ton crushed.

The new arrangement contains only four units, these being Sulzer pumps, designed to deliver from each pump 84,000 gallons per hour against a head of 2,500 ft. Each pumping set consists of one five-stage right-hand suction pump, and one eight-stage left-hand pressure pump. The pumps are coupled in series, and driven by an electric motor arranged between the pumps on a cast-iron baseplate common to pumps and motors. Motors are 1,750 h.p., 1,470 revs. per minute. Delivery is through three 10-inch rising mains taken from the pumping station to the shaft at an angle of 50 degrees, and thence to surface.

The weight of the metal in the discharge columns is 270 tons, and expansion joints are provided at two points, which permits of two permanent points of support unaffected by expansion and contraction. The water temperature is 72 degrees F. (the original article states this temperature as being 720 degrees, but presumably this is a typographical error) and the shaft temperature 52 degrees, so that when pumping ceases some contraction takes place.

The net result of the new installation has been to replace 80 pumps by four, and 22 pump stations by one. Reserve capacity of the pumping plant has been increased and one hundred percent, and all the old plant above the 2,500 ft. level has been cut out. Running staff consists of one foreman and three shiftmen per 24 hours. A saving of over four shillings per ton of rock to the mill collecting-bins is estimated by the new installation, which has been in successful operation for five months. No parts have been replaced up to the present, and the only noticeable wear and tear is on the end of the blades of the first-stage guide-wheel.

These particulars are contained in a paper read before the S. A. Institution of Engineers by Mr. G. H. Beatty, General Manager of the Randfontein Central.

New Westminster, B.C.

It has been announced that the Acetate Products, Ltd., a newly incorporated concern, will commence construction of plant immediately for the manufacture of wood alcohol, acetate of lime and charcoal. The raw material will be alder wood from the Fraser River Valley of which there is an abundance.

Edmonton, Alberta.

The existence of an extensive field of high-grade salt at Port McMurray has been definitely established by drillers operating under the direction of the Provincial Government of Alberta. The drill has been driven through thirty feet of pure salt at a depth of 650 feet.

Detail Study of Forces in the Marcus Conveyor

JOHN S. WATTS, New Glasgow.

The writer came across a case where it was proposed to use a Marcus Conveyor, to deliver onto either one or both, of two picking belts, the general arrangement being as indicated in Figure 1. The gate shown on the delivery end of the conveyor, was supposed to be arranged to guide the coal to either side, while closing off the other side, or, if set in the central position, would allow a feed to both belts.

The arrangement was condemned by the writer, as being one that would cut down the delivery capacity of the conveyor, when the gate was set to close off one side, as shown in figure 1, if not stop it almost entirely. A study of the forces which act upon the material being carried, will show that an obstruction such as that of the gate, will retard the travel to a serious degree.

As the action of these forces seem to be generally only very superficially understood, a study of them at some length should be helpful to those who are or propose to be users of the Marcus conveyor.

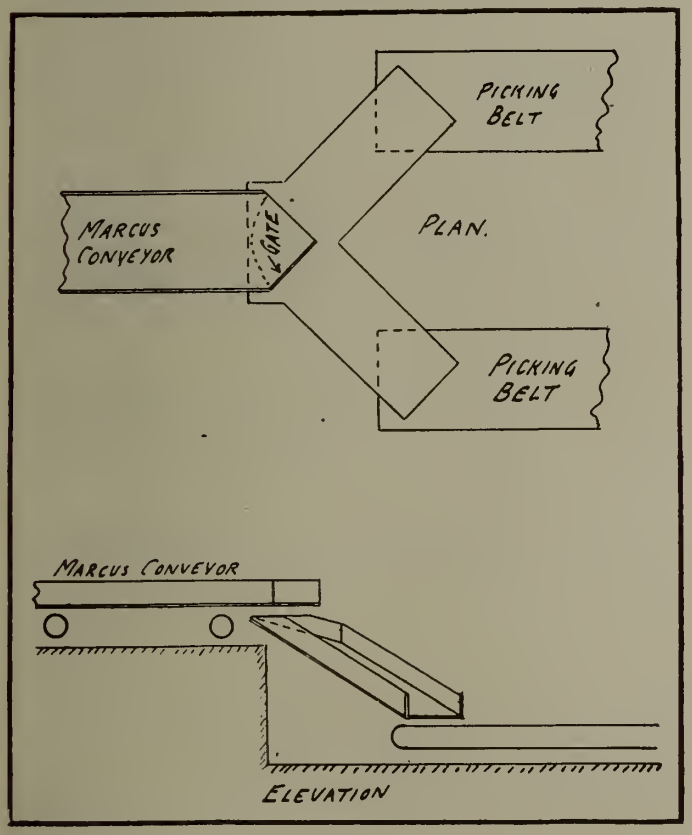

Figure 1.

The law upon which all shaking, knocking, or vibrating conveyors depend for their successful operation, is the law that the friction of a body at rest is greater than that of the same body in motion, all other conditions being the same. This law is well known, but it is not always appreciated that the difference is not great, and a very small obstacle will neutralise the small force available and prevent the forward motion of the material during the backward stroke of the conveyor.

To get a clear idea of the action, we will study in detail the forces acting during one cycle, starting with the conveyor at the commencement of its forward stroke. The material resting on the conveyor, will travel with the conveyor, providing that the frictional force, existing between the material and the conveyor, is sufficient to overcome the force of inertia in the material. Bear in mind that the friction during the forward movement is that of the material at rest, because the material travelling as it does, with the conveyor, is at rest, relatively to the conveyor.

Should the force of inertia, in the material, be greater than the effect of the friction, the material will slip relatively to the conveyor, or in other words will not gain the same velocity as the conveyor.

Whether this slipping will occur or not, depends upon the rate of acceleration given to the conveyor, as the inertia of the material varies with the rate of its acceleration, and with the mass of the material. The force of acceleration "R" required to give a velocity "V" is given by the formula

$$R = \frac{WV}{gT}$$

Where W is weight in pounds.
V is final velocity in feet per second.
g is acceleration due to gravity, 32.16.
T is time in seconds taken to acquire velocity V.

The force "R" is provided, or rather is transmitted by, the friction of the material, which will be 'W. x f.' where "f" is the co-efficient of friction at rest, from which it follows that "R" must be less than "W. x f."

To find the maximum velocity attainable, we combine the above formulae,

$$\frac{WV}{gT} = W. \times f.$$

$$V = g. \times T. \times f.$$

The maximum acceleration will be equal to the maximum velocity attained in one second as given by the above formula, which becomes,

$$V = g \times f$$

A theoretically perfect machine would have a uniform acceleration during the whole of the forward stroke, reaching its maximum speed at the end of the stroke. During the return stroke, the material gives out the energy acquired during the forward stroke, in over-coming the friction (of motion), and will slide forward relatively to the conveyor, until this energy is expended, which should not occur before the return stroke is completed.

As the friction is independent of the velocity, the rate of acceleration whether uniform or varying, would not, if the conveyor had a perfectly smooth surface, have any effect upon the sliding of the material on the conveyor. But in actual practice there are always slight inequalities such as joints in the plates, perforated screen plates, etc., which make it preferable to get the conveyor back quickly while the energy in the material is high enough to overcome any small obstruction. Therefore we have a quick acceleration at the beginning of the return stroke as the most desirable.

The most efficient motion, as described above may be shown graphically as in figure 2, the velocities being indicated by the heights of the vertical lines, and the divisions on the horizontal line representing equal periods of time. The vertical heights above the horizontal line are velocities in the forward direction and these below in the backward.

This theoretical motion is not practicable, as it involves a reversal at the end of the stroke, from a maximum velocity forward to a maximum velocity backward, instantly, which would throw too great a strain on the mechanism, even if otherwise possible of attainment.

The actual motion of a Marcus conveyor, can be laid out graphically on the same basis as in figure 2, and will serve as an indication of how close we are to the most efficient motion.

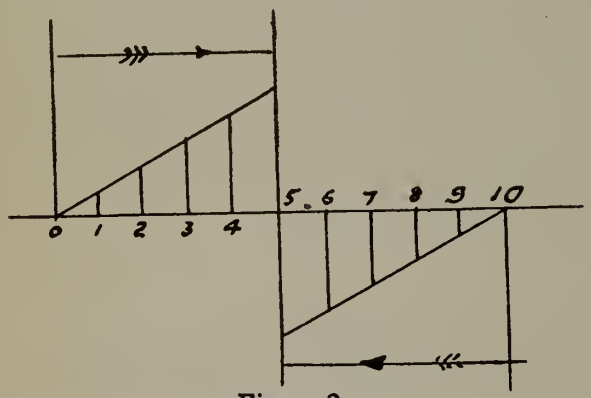

Figure 2.

First, we lay out a diagram of the propulsion mechanism, as in figure 3, to scale. Circle "A" represents the path of the crank pin on the pulley shaft, and is divided into ten equal parts, each of which parts will represent equal intervals of time, assuming that the pulley revolves at a uniform speed during a revolution. This assumption is not strictly correct, but is near enough to the truth for all practical purposes, as the pulley should be made heavy enough to hold the variation of speed during one revolution, to within two and one half per cent.

Circle "b" represents the path of the crank pin on the connecting rod crank shaft, and taking length ab, equal to the length of the drag-link, we lay off the points on circle "b", from those on circle "a", thus arriving at the position of crank pin "b" at equal intervals of time.

With the length of the connecting-rod as radius, from the points on circle "b", describe arcs, cutting the center line as shown in figure 3 the marks on the upper side of the line referring to the forward stroke and those on the lower side, the return stroke. The distance between each of these points will be, to scale, the travel of the conveyor, during one-tenth of a revolution of the pulley shaft.

We now proceed to lay out the curve of velocities, as shown in figure 4, the divisions on the horizontal line representing equal periods of time, those from 0 to 5, being on the forward stroke, and from 5 to 10, on the return stroke.

Raising verticals at each point, we mark on each the velocity at that point calculated as follows. Assuming that the pulley-shaft makes sixty revolutions per minute, each division will be one-tenth of a second, and the velocity at point I will be twice the distance from 0 to 1, in feet, multiplied by ten; this will also equal the acceleration during this period. From the length between points 1 and 2, deduct the travel due to the velocity at point I, and twice this amount multiplied by ten will be the acceleration during this period. This acceleration added to the velocity at point I, will give the velocity at point 2, and repeating this process we get the velocities at each point, in feet per second.

We can now find out what will be the theoretical movement of the material, and, referring to figure 4, so long as the acceleration is not more than V as shown above, the material will travel with the conveyor, up to that point where the velocity of the conveyor is at its maximum, and then commence to slide at a uniformly decreasing velocity, relative to the earth's surface, until either one of two things occur.

First, it continues to travel forward, at a continuously decreasing velocity, during the backward stroke, and during a part of the forward stroke following, until the decreasing velocity of the material and the increasing velocity of the conveyor, become equal, when the conveyor begins once more to accelerate the material.

Second, if the energy in the material is dissipated by the friction before the conveyor has completed its backward stroke, the material comes to rest, and is carried backward by the conveyor until the return stroke is completed, when the cycle is repeated.

These two results are shown graphically in the straight lines on figure 4, the full line indicating the first, and the dotted line the second condition.

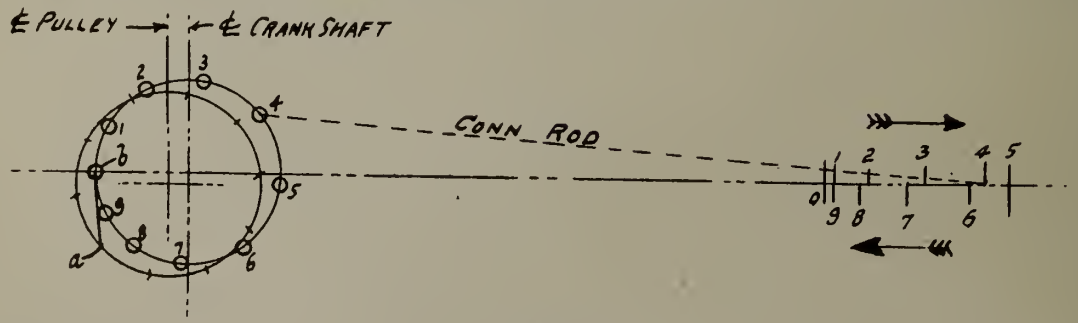

Figure 3.

The rate of de-celeration, or loss of velocity per second, is found by the same formula as we used to find the maximum acceleration during the forward stroke, namely,

$$R = \frac{WV}{gT}$$

"V" in this case being the actual maximum velocity, as found in figure 4, "R" being the available energy

in the material to overcome the force of de-celeration, which is the friction of the material in motion.

$$W \times f' = \frac{W\ V}{g\ T}$$

where f' = co-efficient of friction of motion

T = time required to bring the material to rest

Cancelling and transposing, we get

$$T = \frac{V}{f'\ g}$$

Measuring off this time "T", from the point of maximum velocity in figure 4, and drawing the straight line as shown, where this line intersects the velocity curve of the conveyor, is the point at which the conveyor again begins to accelerate the material, under the conditions outlined in the first case above.

If, however, the second case applies, the result will be as shown by the dotted line.

We can now determine the mean velocity of the material, by taking the mean height to the velocity line during one cycle, for case one, where the motion is continuously forward.

For case two, the effective travel will be found by taking the mean velocity, during the time the material is travelling forward, that is from point 0 to 8, and multiplying this by the time 8 seconds, will give the forward movement. From this must be deducted the backward movement during the time 8 to 10, found in the same manner, and the difference will be the net forward movement.

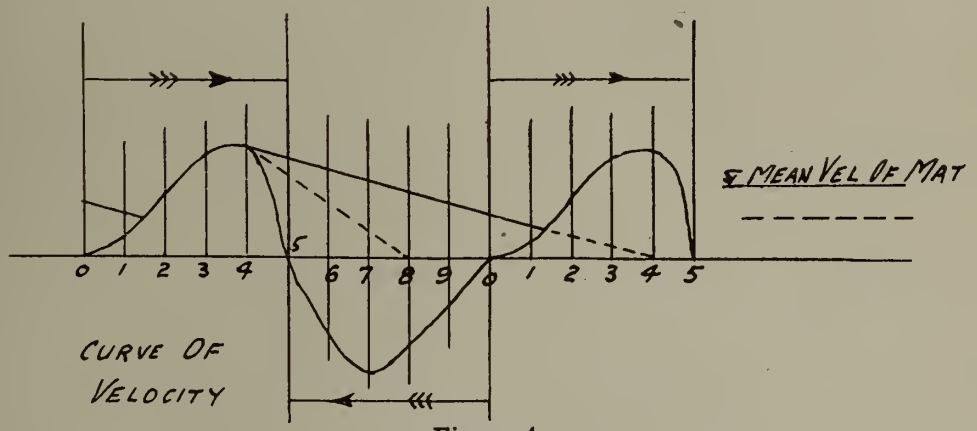

Figure 4.

Obviously the state of affairs outlined in case 2, is a very inefficient one, and is shown only to emphasise the effect of poor design. The mean velocity in both cases is shown in the figure by horizontal lines.

Knowing the mean velocity of the material, it is a simple matter to multiply this velocity by the area of the stream of material, and so calculate the theoretical delivery of the conveyor. For a plain conveyor with a smooth surface the actual delivery will closely approximate the theoretical, provided that the feed to the conveyor is uniform, and that the co-efficients of friction used in the calculations are correct.

Figure 5.

Generally however, the question is complicated by reason of the conveyor being used as a screen, and fitted with perforated plates, the exact effect of which upon the travel of the material, is very difficult to determine, and must be always largely a matter of experience. There are nevertheless, certain calculations which can be made to ensure that the obstruction will not entirely kill the velocity, and this point will be taken up now.

Referring to figure 5, the material is shown fallen partly into a hole in the screen plate, and the problem is to determine whether the energy in the material is sufficient, at the maximum velocity, to raise the piece out of this hole, or over an obstruction of a given height.

The energy is found by the formula

$$E = \frac{W\ V^2}{2\ g}$$

where "V" is the maximum velocity of the material relative to the conveyor, that is the maximum total velocity shown in figure 4, taking both above and below the horizontal line.

The energy required to raise a body a height "h" in feet, is, neglecting friction, $E = W \times h$

The available energy is $\frac{W \times V^2}{2\ g}$

Therefore $W \times h = \frac{W \times V^2}{2\ g}$

$$h = \frac{V^2}{2\ g}$$

It should be remembered that if an obstruction is allowed, approaching this height, the piece meeting this obstruction will be in the worst position, when it stops just at this obstruction, and this is just where it will stop, unless it happens to meet it when its velocity is at about the maximum. A particle thus held at an obstruction will stay there until the conveyor completes a cycle, as it can pass only when the maximum velocity is reached. On the other hand if the material is coming in a continuous steady stream, and the obstructions are not frequent, the material which is behind the piece at the obstruction will exert some of its energy in assisting the obstructed piece

over, at the expense, of course, of the velocity of the whole stream.

Returning now to the type of obstruction, by deflecting-gates, as shown in figure 1. The forces acting in this case are, that while the acceleration force is in the direction 1, the travel of the material is compelled to be along the line "m", see figure 6.

The force due to the energy is therefore, divided into two resultant forces "m" and "n", of which "m" is the only one effective. Not only is the resultant "n" wasted, but it still further reduces the effective force "m" by reason of the additional friction which it induces. The actual delivery is cut down still more by reason of the travel of the piece being in a diagonal line, the effective longitudinal travel being less than the actual travel. There will also be a tendency to jam the pieces together sideways, still further increasing the friction to be overcome.

To show approximately what would happen under

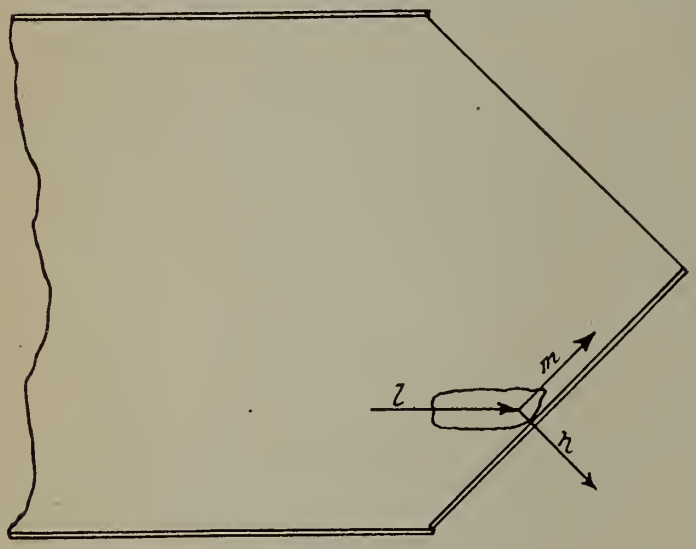

Figure 6.

these circumstances, will be simpler using an actual example, and for simplicity we will first calculate the results for the straight part of the conveyor, by the method outlined above, using coal as the material to be conveyed, and taking the stroke of the conveyor as twelve inches, at sixty revolutions per minute.

From figure 4, we find that the maximum acceleration is between points 1 and 2, and is at the rate of 1.7 feet per second. Taking .25 as the co-efficient of friction, and working out the formulae

$$V = f \times 32.16 = 8.04$$

we have a factor of safety of nearly 5. Probably the conveyor could be run faster, but would be likely to set up injurious vibrations in the structure of the building.

The material will begin to slide forward at a point between 3 and 4, figure 4, and will start with a maximum velocity of 3.3 feet per second, using the formula $T = \frac{V}{\sqrt{f' g}}$ and assuming f' at .2, we get

$$T = \frac{1.7}{\sqrt{.06 \times 32.16}} = 1 \text{ second.}$$

As the divisions represent each one tenth of a second, we join the point of maximum velocity to a point ten divisions (one second) from it, and thus indicate the velocity of the material during the backward stroke. Taking out the average velocity as already explained, we get the answer as being 2.3 feet per second.

To determine the maximum height of any obstruction, such as dead plates over screens etc., we use the formula given above, namely

$$h = \frac{V^2}{2 \times g}$$

Taking the maximum velocity from figure 4, at 4¼ feet per second, we get

$h = \frac{4\frac{1}{4} \times 4\frac{1}{4}}{2 \times 32.16} = .28$ feet or say 3", neglecting friction.

The friction will reduce this height by about 80 p.c. so that the maximum height will be about ¼", but as this would hold up every piece about half the time, such a height should be avoided if at all possible.

Coming now to the case shown in figure 6, and assuming an angle of the gate with the conveyor of 45 degrees, the force carrying the material along will be split into two resultants each equal to .7 of the total force.

The distance that the material would travel longitudinally, is therefore reduced to .7, and as the travel is to be at 45 degrees diagonally, the net longitudinal travel will be only .49 of that on the straight part. The re-action of the gate, is .7 of the total force and at a co-efficient of friction of .25, will account for .7 x .25 equals .175 of the total force, leaving only .525 of the orginal force as effective to produce movement, which multiplied by .7 results in an actual gain longitudinally of only .36 of the travel of the material on the rest of the conveyor. With a continuous stream, this would cause a congestion at the end of the conveyor, probably sufficient to entirely stop the flow.

VANCOUVER MEETING OF C. I. M. & M. FEBRUARY, 1921.

A Programme of Topical Discussions.

The program for the Annual Meeting of the C. I. M. M. in Vancouver, on February 9th, 10th and 11th next has been tentatively arranged. It is planned to have six sessions, one each in the morning and afternoon of the three days. At these sessions certain subjects will be introduced by men especially conversant with them, and discussion of these subjects is also being arranged.

By this method it is hoped to present matter of more general interest to the mining fraternity than if a series of specialized technical papers are read; to have a larger number take active part in the discussion, and to make the meeting correspondingly more profitable and interesting to all attending.

The six subjects decided upon, to each of which a session of about two hours will be devoted, are:

1. General Business and a Review of Mining in B. C. for the year 1920.
2. Fuel Supply.
3. Metallurgy—The Treatment of Complex Ores.
4. The Non-metallic minerals of British Columbia.
5. Geology and Mining.
6. The Relation of the C. I. M. M. to the Federal and Provincial Governments.

For each session a chairman and a leader of the discussion are being appointed.

The Executive Committee preparing for this meeting consists of:

H. Mortimer-Lamb, Chairman, R. W. Brock, E. A. Haggen, J. D. MacKenzie, F. E. Payson, P. W. Racey, S. J. Schofield and Nicol Thompson.

Relation of Standardization to Mine Management

By CHAS. A. MITKE, Chairman, General Committee.

Standardization, Metal Mines Section, American Mining Congress. (Author of "Standardization of Mining Methods," Published by the Engineering & Mining Journal, 1919.)

It has been well said that "great economies in any business of production result from careful and thoughtful attention to details, and mining is no exception to this rule. On the contrary, successful mining is one of the greatest embodiments of the principle. Just as the difference between the careful manager and the careless one is apt to be the difference between profit and loss, so the difference between standardization and non-standardization is very frequently the difference between good and bad management."

Estimates show that in metal mining over 50 per cent of the total cost of production is chargeable to labor, therefore, the proper directing and systematizing of the activities of labor, to eliminate the waste of human efforts, is a very important factor in the standardization of mining operations.

In mines where only a few men are employed and a small tonnage produced, the entire supervision can be accurately directed by one general foreman, and the question of standardization does not enter largely into the daily work. However, where great tonnages must be produced at a low cost, and where the entire supervision of all details by one man is utterly out of the question, but of necessity rests in the hands of a large organization; then the standardization of all operations not only becomes very desirable but absolutely essential.

The need for a scientific investigation of mining practices or mining methods, with a view to alleviating present conditions, (as regards high production costs), which have been brought about largely through high cost of supplies, increased advances in wages, and loss of efficiency due to the unemployment of unskilled or raw labor, has made itself felt throughout the entire mining industry, not only in the United States but also in Europe.

In one large camp in this country, wages, which in 1914 ran from $3.75 to $4.25, now range from $5.65 to $6.40 per 8-hour shift. Taxes, supplies, freight rates, etc., are also considerably higher than they were several years ago, with no immediate prospect of reduction. Moreover, inevitably, the grade of the ore in many properties will decrease as the years go by. This necessitates the mining of much larger tonnages in order to maintain the ultimate output at the same level.

It would also appear, as one writer states, that "whatever may be our desires or regrets, the present high wage level will endure at least for a sufficiently long period to warrant formation of a constructive plan to meet it."

"Therefore, the only remaining alternative for the mine management is to make the workers so efficient that their daily performances will warrant the maintenance of the present wage scales."

This can only be accomplished in the following manner:—

First:—Americanization, which merely begins with the teaching of the English language.

Second:—Education of employees (from heads of department right through the entire organization down to the miners and muckers) in the most efficient method of performing the daily task.

Third:—By establishing a standard program for all operations, in order that human efforts may be utilized to the greatest advantage.

Fourth:—By furnishing the men with standard equipment, in order to facilitate routine work and make their efforts more productive.

Fifth:—In order to encourage the miner to put forth his best efforts in attaining maximum production, an incentive over and above day's pay, should be offered by the management.

Another most important factor in developing a scientific organization is the "setting of standards for work done." A very vital question is—what constitutes a day's work? What was assumed to be a day's work five years ago cannot be adopted as standard today. The wage system, whether contract or bonus, must be based on actual knowledge and justice. Nothing is more discouraging to a workman, or productive of more ill feeling and discontent, than to have the standard bonus or contract rate cut, because he has performed his work exceptionally well and made a greater footage than the rating engineer ever anticipated could be made under the schedule. Cutting the bonus after it is once established, is responsible for the great feeling of distrust which many men show towards working under any system other than day's pay.

In order to achieve a universal success, time and thought must be devoted to an intensive study of the details of mining. Each operation must be divided into its component parts, and standardization applied to each unit. Experimentation is also a very necessary part of the program and should be encouraged and fostered by the mine management. The workers must be trained to perform their tasks efficiently and intelligently and labor-saving devices and equipment substituted for hand labor wherever possible.

Unskilled labor should be supplanted as far as possible by mechanical means. This should not be interpreted as meaning a loss of employment to many who are now engaged in this class of work. There is plenty of work for all and the performance by machinery of work which requires little or no intelligence, will release thousands of men who can be trained for better paying jobs.

Until recently, the systematization of metal mining operations was considered impracticable, particularly those operations carried on underground, from which natural circumstances have, to a large extent, excluded the light of publicity. The reserves of many of the larger mines have also been so rich and extensive that economy has not played as important part, perhaps, as it should. The ever present possibility of "sweetening the ore," or, in other words, bringing the daily output up to expectations by the addition of higher grade (kept in reserve for such purpose), has often tided over situations which, otherwise, might possibly have disclosed unsystematized methods and careless supervision on the part of underground bosses, to whom quantity plus quality at the moment, meant everything,

regardless of the disastrous effect their methods might have upon the future life of the mine.

Moreover, underground operations are to a large extent shrouded in obscurity, and the intimate details are known only to a few, whose business it is to make daily visits to the working places. The larger number of the employees are frequently ignorant men, whose main interest in their work is to get out the number of cars required by the boss, and to whom ore and waste are of very little interest, except as they add to the required tonnage.

The needs of the manufacturing industry, and the keen competition encountered, have developed a host of experts, and production engineers, who have delved into the intricacies of the different branches and brought to light innumerable operations which lend themselves well to the adoption of standard methods.

Unfortunately, in the mining industry, no sweeping changes can be effected, which, in the course of a short period of time, might be expected to revolutionize the industry at large, and produce the same gratifying results as have been obtained in industrial plants. This fact, in itself, has acted as a deterrent in the standardization of mining operations, and while, in individual cases, alert, wide-awake operators have made considerable progress along these lines, the industry as a whole does not reflect the same systematization of operations that may be found in manufacturing plants.

It is generally conceded that mining is a profession which should require a highly specialized training, but as a rule sufficient emphasis is not placed upon the practical application of such technical knowledge. Too much dependency is placed upon practical experience alone, and too little on scientific principles. Far be it from the writer to discredit practical knowledge. The mining industry in the past owes much to its practical men, but what it now requires is practical knowledge superimposed on a scientific basis, or in other words, the attention of men who have added years of practical experience to their specialized or scientific training.

The metallurgical branch of the profession has been the subject of much thought and study, and considerable research is continually being carried on in this branch of the profession. Contributions have also been made to the mining branch, but in the main these have consisted rather of descriptions of practices already in use in certain localities, than in the nature of original research work.

An X-ray analyses of mining operations as a whole, frequently disclose out of date methods which would not for an instant be tolerated in surface plants. What large factory owner, for instance would permit one o fhis operators to spend two-thirds of his day away from his machine, hunting parts, supplies, lubricating oils, etc.? There, the output is based on machine production for each man, and the amount he can turn out is calculated to a nicety, and it is the imperative duty of the shop foreman to see that everything required is present and the machine in good order before the man starts to work. It is, however, a very common occurrence underground, for a first-class drill machine operator to spend a large portion of his time walking through drifts and tunnels in search of sharp steel, or the right kind of steel to fit his machine, repair parts, oil cans, or returning defective machines to the tool house and carrying new ones to take their place.

In the factory, fatigue studies have been made, covering every action from the steps taken in performing certain duties, to the movements made by each hand of the individual worker in handling manufactured parts. In mining, however, it has come to be an unwritten law that so long as the machine man drills a round of holes (special allowance being made for unusually hard ground), he has performed his daily task, regardless of the fact that (like Taylor's handler of pig iron), providing his operations are studied and systematized, he might be made to double his performance with comparatively little additional effort to himself. This has been demonstrated in a number of instances, yet, as a whole, it still continues to be the general practice to consider one round of holes a day's work. The responsibility for this lies largely with the mine management. Formerly, in a great many instances, atmospheric conditions of working places, were such that men could not work consistently during an eight hour shift, and in many cases it grew to be the practice for men to work a certain period and then seek a better atmosphere in the mine where they cooled off and rested for an equal period of time. Also, in years past, the ventilation of mines was so bad that no blasting could be allowed during the shift, and consequently, after the miner drilled his round of holes, he would merely while away the remainder of the shift until quitting time, and fire the shots when leaving the mine. With the improvement that has already been made in metal mine ventilation, it has been demonstrated in exceptionally well ventilated mines that shots can be fired at any time during the shift without inconveniencing the men, and as a matter of fact, in one large mine, which is exceptionally well ventilated, there is a shot fired every minute during the shift, with little or no resulting delay to the underground force. Now that every effort is being made to attain underground working atmospheres as nearly as possible approximating those on surface, this custom, of considering one round of holes a shift's work, (regardless of its depth), which is really nothing more than habit, must be overcome if mining operations are to be placed on an equal footing with those on surface.

This is but one example of the lack of systematization in mining operations. Much benefit could also be obtained by the devotion of careful thought and study to the question of explosives, their use and handling; the correct placing of machine drill holes; handling of timber, both underground and on surface, where much unnecessary labor is involved in handling and re-handling each piece as it comes from the cars, the writer having observed as many as twelve men employed at the same time in handling one stick of timber.

The distribution and care of underground supplies is another subject which would react most favorably to research.

The standardization of equipment and supplies is closely linked with the systematization of operations, and of necessity the one must be studied along with the other.

The industry at the present time is burdened with a multiplicity of machine drills, of varying types, sizes and weights, the difference in weight in some instances not being more than one to two pounds. The production of these machines follows each other with such rapidity that in an effort to stock up with the best equipment available on the market, many machines in good condition must be scrapped, and as parts are not interchangeable, a considerable investment in such supplies, must continually be charged off to profit and

loss. The development of these machines is, of course, carried on by the manufacturer to meet the needs of the industry, but unfortunately, these needs are often the individual ideas of various operators rather than the combined views of the majority. What may appeal to one does not appeal to the other, and consequently the necessity for purchasing and trying out this variety of types becomes an ever-increasing burden on the operator.

During the past seven years the necessity for drifting machine, permitting the use of water and air through machine and steel, became so evident to practically every purchaser of rock drills, that as a result, the manufacturers evolved the water Leyner. The self-rotating water stoper, which is now nearing perfection, is also the result of the combined needs of the mining industry, and many other improvements in drilling machines are possible, providing some research work is devoted to the subject of finding out just what specifications would meet the needs of the majority for the different types of machines, such as jackhammers, drifters, and stopers.

The chucks on all machines must become standard, so as to permit the interchange of different makes of steel. The lack in efficiency and the loss of time incurred at present through miners supplying themselves with steel which does not fit the machine they are using at the time, is such that this change has become an absolute necessity.

The sizes and types of steel should also receive attention. There are individual cases, where companies have standardized on the ¼ hollow octogon for all stoping and raising and find this type of steel satisfactory for all their needs. Other companies are achieving excellent results with the 1" hollow round. Research would bring to light many facts which might tend to prove that one or the other of these two was the more satisfactory.

The same is true of hose fittings, and various parts and supplies for machines.

Underground power shovels to supplant manual labor in mucking and shovelling, should receive attention, in order to avoid the creation of the multiplicity of slightly varying types, similar to that which at present exists among rock drills. It is inevitable that mechanical equipment must supercede hand labor underground to a large extent, if we are to overcome the scarcity of labor—both skilled and unskilled—and increase the tonnage per man shift, (at the same time maintaining the normal grade of the ore), which is the principal means of combatting the present high cost of production. Shovelling or mucking is one of the most important items which comprise underground operations.

Care and attention might profitably be devoted to underground transportation, the grade of tracks, weight of rail, etc. Also the possibility of standardizing on a few sizes and types of mine cars, rather than on the unusually large number now on the market. and the various methods of haulage, compressed air, electric, and steam.

The ventilation of metal mines is a subject of the utmost importance. Without good air no man can live, much less work, and upon the condition of the working-place depends very largely the efficiency of the worker. Much of the trouble resulting from bad air in metal mines at the present day comes from the deficiency of ventilation in dead ends in drifts and stopes. The ventilation of such working places can greatly be improved by resorting to systematized methods in regard to the use of certain types of small blowers and ventilating pipe, care and attention being devoted to the manner in which these are located and operated. The prevention of dust in mines necessitating frequent blasting during the shift, is another means of raising the efficiency of the miners. In the past, bad air, rock dust, and heated atmospheres were looked on as necessary evils, which could not be overcome, and the man who could not put up with a certain amount of such discomfort was rather contemptuously referred to as one who "could not stand the gaff." Today, such conditions are unnecessary, and the adoption and use of standard equipment and standard methods will provide the men with a working atmosphere to themselves. The systematic testing of mine air and the adoption of a standard atmosphere is one of the pressing needs of the industry.

Fire fighting equipment and systematized rules for combatting outbreaks in the mine are also of the utmost importance, as the profit and loss accounts of many companies show large sums charged off to disasters of this kind, which might possibly have been averted through the keeping in stock of a standard line of fire fighting equipment.

There are many other subjects in the mining industry, to which standardization can be applied, such for instance as cost accounting. Frequent discrepancies in the manner of keeping costs are encountered, even in properties owned by the same company. For instance, one mine will charge off the work of preparing an orebody for stoping, to development work or to a separate fund which has been laid aside for such purpose. Their production costs may then appear quite low, for the reason that this large sum which should necessarily be added to the stoping cost, as it all goes against the ultimate profits, is omitted, while other companies include development costs, but exclude overhead and supervision, and so forth.

The estimation of ore reserves is another matter for research, equitable taxation, and many other items, all come under the head of subjects to which standardization might be applied.

An objection frequently raised against standardization is that it regards progress, and that having once decided on a standard, there is no possibility of change and old standards must be adhered to even though newer methods have been developed which have outclassed the old. In this connection it may be well to quote from an authority on this subject who well describes the functions of a standard, in the following words:—

"A standard is simply a carefully thought out method of performing a function, or carefully drawn specifications covering an implement, or some article of stores or of product. The idea of perfection is not involved in standardization. The standard method of doing anything is simply the best method that can be devised at the time the standard is drawn.... Improvements in standards are wanted and adopted whenever and wherever they are found. There is absolutely nothing in standardization to preclude innovation. But to protect standards from changes which are not in the direction of improvements, certain safeguards are erected. These safeguards protect standards from change for the sake of change. All that is demanded... is that a proposed change in a standard must be scrutinized as carefully as the standard was scrutinized prior to its adoption. Standards adopted and protected in this way produce the best that is known at any one

time. Standardization practiced in this way is a constant invitation to experimentation and improvement." *

The standardization of mine equipment and mine operations in the various branches, are of vital interest to the mine manager who is responsible for the ultimate cost of the product. In order to work out these problems, to accumulate the correct data upon which to base conclusions, and finally to introduce standard methods, it is absolutely necessary that the mine manager effect this change through the medium of his organization, composed of heads of departments, foremen, bosses and engineers. Their intelligent co-operation is therefore an essential part of the program. These are the men who represent the company, or mine management, and interpret the policies and desires of the company to the great mass of employees. They are also intimately acquainted and associated with the multiplicity of operations, which combined, form the activities of the mine. If their interest and enthusiasm is directed towards a study and systematization of the details which form the various groups of operations, then through the standardization of many small tasks, which by themselves may not appear important, under the careful supervision of the mine management, larger economies will result which, in turn, will ultimately have the desired effect of reducing the production costs.

* Morris L. Cooke, Bull. No. 5, Carnegie Foundation Series.

A MONTREAL LETTER.

ALEXANDER GRAY

The Opportunity of the Gold Mines.

Evidence accumulates that gold-mining is about to have its turn, when multiple costs become less onerous.

Labor is more affirmative toward employment underground where ventilation is sanitary and housing accommodations at surface are what they should be.

It is not difficult to discern why this is so. The lower price of silver and temporary shortage of power have caused at least two Cobalt companies to suspend operations. No doubt others are not pressing production. This, and the number of men laid off elsewhere, has afforded a long-deferred measure of relief to operating gold mines, which are also assisted by reductions in provisions and supplies.

The resultant benefits to producing companies may not be manifest to a great extent in the yearly output —but crews are larger and the efficiencies are greater.

Such mines as the Hollinger, Dome, McIntyre and Lake Shore, therefore, are freer to proceed with development and increase the tonnage milled without unnecessarily encroaching upon their ore reserves.

Before properties removed from the milling stage—and "prospects"—however inviting, pursue other than make-haste-slowly policies they must have reasonable assurance as to the quantity and grade of ore, co-operative labor, and working capital. Once the labor problem is solved, if capital is attracted upon equitable terms the proving of tonnage at a number of properties is foreseen. Not "every prospect pleases", consequently the first order of business is to avoid a recurrence of speculation in the cheaper class of shares. It is desirable to have crushing mines regenerate interest that waned, rather than to have a crush of shares of the 10-20-30 variety traded in. Of course the resumption of normal conditions will be taken by the more venturesome as a signal to start the printing presses; yet the integrity of the respective gold fields is at stake, and confidence ought to be maintained if the requisite capital is to be obtained. Competent Mining Engineers — not the catch-penny species—should have the say-so.

Profits Tax to Go?

Mines, as perishable assets, are particularly susceptible to Profits Taxation, so mining companies unanimously will welcome the seemingly semi-official announcement that the special War-time surtax will be discontinued.

Without questioning the necessity for extraordinary revenue when the Western World was crazy, it is equally admissable that precious metal mines were adversely affected by the superimposed levy. For that matter, metal mines already were heavily burdened with direct and indirect taxes and costs, and not all of them by any means were enabled to benefit by War prices for their products. Silver, copper and zinc mining companies—and certain non-metallic producers—had a period of exceptional prosperity. Gold and Nickel mines did not share in this to any great extent, in fact the former were harrassed in every direction and the latter refrained from profiteering. Operating costs and taxes throughout were so onerous as to be almost intolerable.

It has not been indicated whether or not there will be some other medium of raising revenue substituted for the irksome National Profits Tax. If such is to be enacted, the hope is that due consideration will be shown for Mineral Industries. Those industries are loath to seek or to expect exemption from equitable assessments. They are going to play a larger part in the impending struggle for trade, and they deserve more encouragement than they have received in official quarters.

Contrary to the impression prevailing in what should be well-informed circles, all mines are not "holes in the ground with Liars on top." They are foundation stones in our economic structure, and without them parts of Canada might be pastorally beatific, but elsewhere there might be "nobody home".

Mining made the States from the Rockies to the Pacific, until it was discovered, there were soils and climate for semi-tropical and temperate zone fruits. The "lumber-jack" and prospector—not Mining Stock Exchanges—gave Northern Ontario its impetus. Is it possible to have highly-placed politicians in power who will recognize the true relationship of the pick to the plough? Before Comstock, Nevada had little excepting the cactus and the coyote. The Aztecs could have had Mexico to themselves were it not for its minerals. California placers and the Motherlode established the Golden State. Central City and Leadville preceded cattle-ranching in Colorado. The corollary need not be carried further.

Before the Mining & Metallurgical Club of the University of Toronto, Mr. James McEvoy said that in the event of serious labor trouble in the American coal fields, or of strained international relations between the United States and Canada, Canadian industry would inevitably suffer from an inadequate supply of coal unless some provision for such an emergency is started at the present time. Should such an emergency occur in Ontario, from an industrial standpoint the effects would be appalling, he said.

NOTES FROM NOVA SCOTIA AND NEWFOUNDLAND COLLIERIES.

Progress is being made at the Hiawatha Coal Mining Company's mine near Morien, Cape Breton. Some 6,000 tons of coal has been raised and stocked. Deepening of the loading ground for vessels is being effected by dredging, and sufficient draft for schooners and small steamers will be available by the Spring. Some cargoes have already been shipped to Halifax by barges.

The November production of the Dominion Coal Company in the Cape Breton district exceeded expectations, reaching 296,367 tons, the largest month's output since August 1917.

Individual colliery production was as follows:

Mine.	Tons.
No. 1	31,383
No. 2	47,440
No. 4	26,996
No. 5	9,665
No. 6	25,413
No. 9	24,193
No. 10	11,707
No. 11	14,778
No. 12	13,902
No. 14	21,881
No. 15	9,863
No. 16	12,905
No. 17	3,539
No. 21	17,323
No. 22	18,544
No. 24	6,835
Total	296,367

A slight underground blaze occurred near the electric-pumping station in the No. 9 Colliery of the Dominion Coal Company, but was fortunately discovered and extinguished before it had made headway. Overheating of the controller is stated to have caused the fire.

Extensive additions are being made to the equipment of the Springhill Collieries, including a new bankhead recently completed. A new hoisting engine, and additions to the boiler equipment are also in progress. As was noted in last week's issue, production is being well maintained at these collieries.

The coal production of the Nova Scotia Steel Company at Sydney Mines in November reached the high figure of 55,304 tons, the best month's output of coal since December 1916. Individual colliery production was as follows:

	Tons.
Florence Mine	18,892
Princess Mine	16,789
Jubilee Mine	14,402
Scotia Mine	5,221
	55,304

The development of a new colliery near Bonar Head is progressing satisfactorily.

The Newfoundland Government is proceeding to develop the coal seams along the Codroy Valley, on the West Coast. A road is being opened up from the first mine opening to the nearest railway point, about three miles distant, and it is proposed to use five-ton motor trucks to take the coal from the mine to the railway, as a first means of transportation.

Systematic examination of the Carboniferous basin at St. Georges, situated further to the northward on the West Coast and not far east of Grand Lake, is being undertaken with a view to further mine openings.

Labor, Wages, Production and Disposals.

No new developments have taken place in the labor situation. Production is being increased, largely as a result of unemployment in other industries. The action of the miners union with regard to the so-called Montreal Agreement will be decided by a referendum on the 14th December. In the meantime the question is the subject of hot debate in the locals and in the newspapers of Nova Scotia. The ex-President of the United Mine Workers, Mr. John P. White has expressed unqualified approval of acceptance of the agreement, stating in a letter to the Nova Scotia District that "industrial conditions are becoming very serious in many sections of the United States, and the chances are that they may affect our wage standards before we anticipate." Mr. White presses for acceptance of the agreement "because, from what I know of the situation, everything was secured that could be under the circumstances."

The railwaymen employed in inter-departmental transportation at the Sydney steel plant and at the collieries and steel plant of the N. S. S. & C. Co. at Sydney Mines are still on strike, about 40 men at Sydney Mines and 120 at Sydney being on strike. Full operation of the collieries at Sydney Mines is being found possible, and at Sydney the plant is working in departments other than those occupied in steel production. The Dominion Steel Company takes the stand that no strike is in existence, and that the men in the railway department of the steel plant who have absented themselves from work are no longer employees.

The non-use of coal for the coke-ovens and other metallurgical requirements at the Sydney Plant releases between 3,000 and 4,000 tons of coal daily for shipment to outside points, and this, combined with the larger production of coal now found possible, leaves no further excuse for the embargo on coal exports, seeing that the St. Lawrence route is closed. Although no public announcement has been made by the Railway Commissioners it is understood the embargo has actually been lifted.

It is likely that Nova Scotia coal will appear on the Montreal market in 1921. Enquiry among firms who formerly used Nova Scotia coal for steam-raising purposes discloses that there is a general tendency in the St. Lawrence market to welcome back the Canadian product, the temporary deprivation having shown up the relative quality of Nova Scotia coal to great advantage in comparison with imported coal. By next Summer, however, it may be taken for granted that the prices asked for imported coal in Quebec Province will be very much less than recently current prices and less than prices now ruling. Canadian coal should also be helped by the discount on Canadian funds, now almost as great as it ever was and seemingly little likely to materially decline, and by the increased railway rates. This presumes, of course, that freighting rates from Nova Scotia to Montreal will decline a little, and that marked reductions will be

possible in the pit-mouth costs of Nova Scotia coal. Nova Scotia coal operators are likely to hesitate to bank coal heavily during the present Winter, in view of the general uncertainty of the industrial outlook.

It was pointed out to the Railway Commission during the Summer, and previous to the imposition of the embargo on coal exports, that such a procedure could only be justified if the Government was in a position to guarantee full work for the collieries in supplying domestic needs during the coming Winter and the Summer of 1921. It was further emphasised that the amount of coal available for next Summer's domestic requirements could only be obtained by full work of the collieries during the Winter, and that the capital outlay and risk of banking out large tonnages of coal was only justified by contracts given at this time for next season's railway and other requirements controlled by the Railway Commission.

It is very doubtful if the additional quantity of coal made available for domestic requirements by the operation of the coal embargo has justified its imposition. The embargo has certainly entailed great monetary losses on the coal companies, and has acted as a deterrent to production, or perhaps it would be more correct to say, has acted as a deterrent to capital expenditures intended to enlarge future production.

British Columbia Letter

The incorporation of a $15,000,000 company for the establishment, presumably near the City of Vancouver, B.C., of an Iron and Steel Industry; the announcement that British mining engineers have been quietly making a survey of the iron ore resources of the Province on behalf of British capital; and the further assertion that the Rothert Process Steel Company, of Seattle, Wn., proposes the construction at or near Seattle of an electric furnace and auxiliary plant at a cost of between $300,000 and $400,000 are the outstanding happenings of the past ten days in British Columbia.

For years the idea of actively developing the iron ores, Magnetite, Hematite, and Limonite, of the Pacific Northwest has been simmering in the minds of local promoters who at intervals have busied themselves in bringing the possibilities of such an industry to the attention of British and American financiers. Heretofore they have had no pronounced success but now, it would appear, there is a prospect that something will be done.

It is said authoritatively that the $15,000,000 Company is a British Company, that all the capital is being subscribed in England, and that, as a result of favorable reports from competent engineers, the work of launching the industry will go forward without delay, the $3 a ton bounty on pig iron produced in the Province from provincial ores having been guaranteed.

A similar project, it seems, is contemplated by another group of British capitalists. It was on the latter's behalf that Walter Dennis Rock, a steel expert of England and a mining engineer of prominence, was in this Province. He was quietly pursuing his researches, and it is said with satisfactory results, when stricken with an illness resulting in his almost instant death. Prior to his tragically sudden demise he had arranged for the shipment to England of a carload of Pacific Coast coal and the understanding is that, if this

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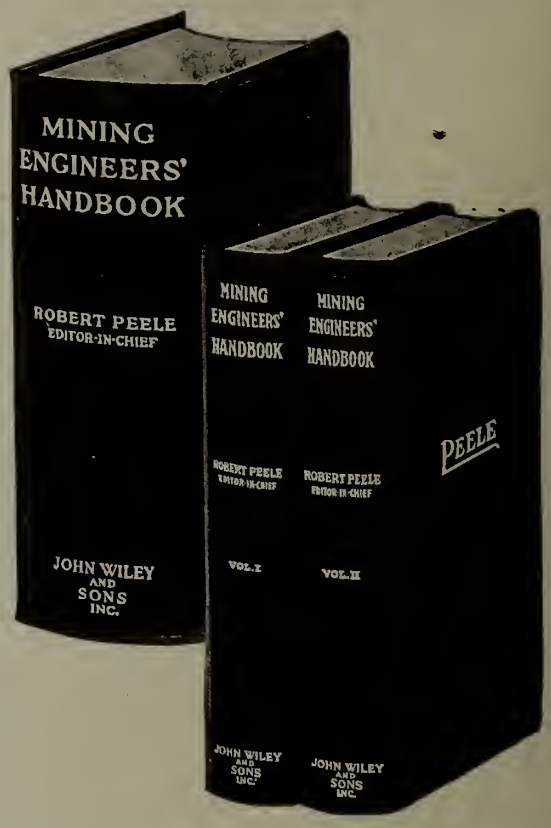

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upon test proved to be satisfactory coking coal. Mr. Rock's recommendation would have been that conditions in every respect were suitable. The British Government retained Mr. Rock during the war in connection with experiments then continuously carried on in conection with the by-products of coal.

The Rothert Company's enterprise cannot be said to have been definitely decided upon, if it is the intention to use the iron ores of British Columbia, because it is impossible to say what attitude a Provincial Government would take on the export of its mineral for refinement outside the Country. It is known that the Oliver Government, khich now is before the electors seeking further endorsation, discourages such a practice, but it is possible that another administration will be returned to power in which event the promoters of the Seattle plant might be able to come to an arrangement for the export of the material necessary to keep their plant in operation.

Princess Royal Island.

Considerable excitement has been created by recent discoveries on Princess Royal Island. There has been quite a bit of staking and reports are to the effect that some of the claims have as good showings as those of the now well-known Surf Inlet Mine, one of the largest gold producers of the Province. Development on some of these new properties will go forward throughout the winter. Where this is impossible work will be started in the Spring so that it will be next Summer before it is known whether the sanguine expectations of the prospectors are to be realized.

Alice Arm.

The Moose Group Mining Company Ltd., of Vancouver, B.C., has done much work in the opening up of its properties and in the construction of a permanent camp. During the summer a trail has been constructed, winter quarters built, and exploration and development pushed forward, the latter being by means of open cuts and the driving of tunnels. There are two veins so far proved, one intersecting the other. The main vein has a width of 20 feet. The upper tunnel is in 40 feet with the face in ore averaging about 25-oz. silver per ton. By extending the tunnel 80 feet further the two veins will be opened out at the point of intersection. On November 1, the lower tunnel was in 21 feet and the vein now is being cross-cut, with a showing of from 8 to 10 feet on ore on the downward extension of the ore-body. The main vein has a strike approximately east and west and the smaller vein strikes east and north. The dip is northerly. There is a difference of 310 feet in the elevation of the two tunnels. The main vein outcrops near the south end of the property. The veins occur in the so-called andesite braccia characteristic of the upper Kitsault section of Alice Arm. The mineralization shows grey copper with which the high silver values are associated; a little galena, and a considerable amount of manganese.

Rossland, B.C.

There is little mining activity as yet in the Rossland Camp, once the leading metalliferous mining centre of the Province. Few men are employed on the properties of the Consolidated Mining & Smelting Co. and there are same leasers engaged at the Velvet Mine. While the plans of the Company's proposed large concentrating mill are complete and although the site for the plant is chosen, the work has not begun, doubtles owing to the decision of the Company to wait to see whether building costs will fall and perhaps also to permit the metal market to become more stable. Rossland's future depends on this Mill. When it is in operation the mines of the historic camp once more will become superlatively active and residents of the town are impatiently waiting for the Company to take definite action.

Hazelton, B.C.

The Silver Standard Mine of the Omineca District has been closed down for an indefinite period, the reasons given being excessive freight costs, high cost of all material, and the steadily declining value of metals. There is no disguising the fact that this a blow to the Hazelton district of Northern British Columbia because this is one of its most promising mining properties, its development has been progressing with satisfactory indications and there was reason for the hope that it soon would be placed on a permanent producing basis.

Sandon, B.C.

At the Noble Five Mine, near Sandon, a new bunkhouse has been under construction for some months and now is complete. It cost $20,000, is electric lighted, steam heated, and fitted with shower baths provided with hot and cold water. There also are a reading room and a steam-heated drying room. The accommodation provided is for 55 men. Undoubtedly it is the most modern bunkhouse in the Interior, in fact it seems slander to refer to it as a "bunkhouse"; much more appropriate would be the "miners' residence".

Moyie, B.C.

The Society Girl Mine again is among the shipping mines of the Interior. Leasers have uncovered some very rich ore and intend to continue work all winter. After working little over three months they have taken out $3,000 worth of ore. The news of this development has been received with enthusiasm by people of the district, who have of late been plunged more or less in gloom owing to the common report that the mine sof Moyie have played out never again to figure as producers of importance. Their confidence has been revived and predictions now are freely made that Moyie will come back.

Golden, B.C.

Much is expected of the Bunyan silver-lead property situated on Bunyan Mountain, near Lake Windermere. A crew of from 100 to 150 men is to be employed as soon as weather conditions permit next spring in further development. For their accommodation bunkhouses, etc., are to be built with all possible dispatch, preparations already being underway. This property recently was taken over from the owners on lease and bond after having remained dormant for 19 years. The showings having satisfied the new operators, a 600 foot tram was installed, connecting the working tunnel and the new ore bunkers. Powerful motor trucks have been imported to transport the ore from the bunkers to the nearest rail point and an early shipment is to be made to the Trail Smelter.

Mining continues active in the Windermere District. Australian interests have opened the Isaac Mine at Birscoe and the same people have re-opened the Nip-

and-Tuck. From the latter a considerable tonnage of high grade ore has been packed down from the Mine for shipment. It is expected to return about $150 a ton.

The Paradise Mine still is producing. It is the most consistent producer of the District.

Trail, B.C.

The Consolidated Mining & Smelting Co., of Trail, received shipments of ore during the week ending November 7th aggregating 11,149 tons. Ore came for the first time this year from the White Bear, Rossland; the Horn Silver, Similkameen; and the Knob Hill, of Republic Wn. This brings the shipments for the year up to the date indicated up to 307,771 tons, so that the $300,000 mark is well passed.

Poplar Creek.

Ores of the Poplar Creek region are being tested by the Tacoma (Wn.) smelter. Returns have gone as high as 624 pounds of arsenic to the ton. Without considering the gold values this makes the material of commercial value.

Squamash, B.C.

The districts traversed by the Pacific Great Eastern Railway are being subjected to intensive prospecting and reports are being to come to hand of results. For instance what is known as the Soda Mining and Products Co., of Vancouver, has been formed to develop and exploit the carbonate of sodinm contained in many of the lakes found in the vicinity of this new railroad. One lake sixty miles in extent has been found to contain not less than 7 per cent pure carbonate of sodium. The necessary plant is being installed for its treatment. Every cubic foot of the lake contains over four pounds of carbonate of soda, and evaporation is a rapid and simple process.

EATING WITH FOREIGN KNIVES

The editor of "The Canadian Mining Journal" complains that food eaten by Canadians "is cooked by Pennsylvania coal in a stove made from United States ore and served on a platter that came from Europe, or Japan maybe. It is eaten with a Sheffield or Connecticut blade, and the platter is washed with soap from Chicago."

We do not think the situation is as black as painted. Would it not be better to say, for example, that the food is eaten with spoons and forks, rather than knives, plated with Ontario silver on base metal made up of Canadian copper, British Columbian zinc, and Ontario nickel? Furthermore, the food, even if partly foreign, is paid for with Ontario gold or with credit secured by the export of Quebec pulpwood or Saskatchewan wheat.

With the domestic population profitably employed, it is no disgrace to purchase what someone else can produce more cheaply, provided the supply is adequate. In the case of coal we admit, it is not. "Engineering & Mining Journal."

NOTE:—Our comment has suffered in quotation. The "food" referred to was New Zealand butter and lamb, the consumption of which by the exclusive use of spoons and forks is not recommended.

If our contemporary considers that "it is no disgrace to purchase what someone else can produce more cheaply" why does the United States maintain a high protective tariff?—Ed.

TORONTO MINING QUOTATIONS.

Following are the average quotations for active gold, silver, and oil stocks on the Standard Mining Exchange, for week ending 4th December, 1920.

Silver.	High.	Low.	Last.
Adanac Silver Mines, Ltd.	2	1¾	1⅞
Bailey	3½	3½	3½
Beaver Consolidated	34¾	30	30¾
Chambers-Ferland	5½	5½	5½
Cobalt Provincial	47	44	44
Coniagas	2.00	2.00	2.00
Crown Reserve	19	18	18
Great Northern	2	2	2
Hargraves	1½	1½	1½
Kerr Lake	3.35	3.35	3.35
La Rose	25	22	23
McKin.-Dar.-Savage	44	22	22
Mining Corp. of Can.	1.67	1.10	1.10
Nipissing	9.70	9.00	9.25
Ophir	1⅝	1⅝	1⅝
Peoples Silver Mines	10½	10	10
Temiskaming	26½	23	25
Trethewey	23	17	17¾
Gold.			
Apex	2	1½	1½
Atlas	22	15	16
Boston Creek Mines	15	15	15
Dome Extension	47	41½	42½
Dome Lake	2¾	2½	2½
Dome Mines	13.25	13.00	13.25
Gold Reef	3¼	3⅛	3⅛
Hollinger Cons.	5.70	5.55	5.55
Inspiration	3	3	3
Keora	15¼	14¾	14¾
Kirkland Lake	40	38	38
Lake Shore M. Ltd.	1.05	1.02	1.02
McIntyre	1.92	1.85	1.88
Moneta	10	9	9
Newray Mines, Ltd	4	3¾	3¾
Porcupine Crown	20	18	19
Porcupine V.N.T.	22	18½	18½
Preston East Dome	3	2½	2½
Teck-Hughes	7⅛	7	7
Thomson Krist	6	6	6
West Dome	6⅛	5¾	5¾
West Tree Mines Ltd	8	7¼	7¼
Oils.			
Eureka	30	30	30
Petrol New	40	37	37
Rockwood Oil Gas	3¾	3	3⅛
Vacuum G.	25½	22	22

METAL QUOTATIONS.

Fair prices for Ingot Metals in Montreal, Dec. 8, 1920. (In less than carload lots).

	Cents per lb.
Copper, electro	18¾
Copper casting	18½
Tin	43
Lead	7
Zinc	8
Aluminum	34
Antimony	8

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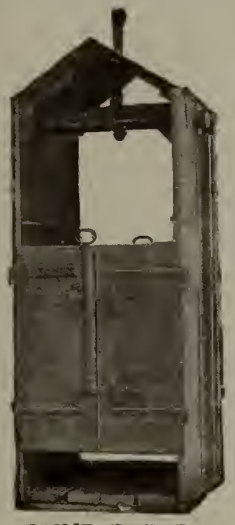

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Northern Ontario Letter

THE SILVER MINES.
The Cobalt Field.

In view of the weakness in quotations for silver, the operators in the Cobalt district are confronted with problems quite similar to those which in recent years beset the gold miners. There is no longer the feeling of security that, in spite of high costs, the margin of net profit is satisfactory. This does not apply seriously to the leading producers which are still able to produce at or under fifty cents an ounce, but it does fall with full force upon mines of second class rating.

Reflecting the changed condition, the Mining Corporation of Canada has announced that in view of the unfavorable hydro-electric power situation as well as the low price of silver it will not disburse the regular dividend for the current quarter. The indications are said to point toward net earnings being below dividend requirements. The announcement has caused more or less pessimism, entirely out of proportion to the seriousness of the situation. The fact is that economic conditions are improving rapidly and that in the future there are reasons to believe the cost of production will decline and the desired margin of profit again established.

The Northern Ontario correspondent of the Journal has made an effort to find an explanation for the slump in quotations for silver, which seems to be contrary to what the excess demand over present supply would indicate. What appears to be one logical cause is the defeat of the present United States government. Should this change in administration bring with it opposition to the continued operation of the Pittman Act, which authorizes the United States to buy its domestic output at one dollar an ounce, it is possible the leading metal authorities may even now be discounting such action. This would account to a large extent for the recession in quotations, and taken together with the exceedingly hard times in the Far East, especially in China, may constitute a full explanation of the unexpected downward turn in the price of silver. At any rate, this appears to be about the most logical explanation at this time.

President J. P. Bickel has made the following announcement relative to the decision of the directors of the Temiskaming Mining Company to suspend operations until next spring:—

"It has been decided by the directors to close the mine at the end of November, the contingent causes for this step being the shortage of power and present low price of silver.

"The scheme of development undertaken by the Company in the early part of this year included opening up for commercial working a considerable tonnage of low grade ore, the mining and milling of which would leave a good margin of profit at the higher price of silver then ruling. The reduction in market value to present low level has left no encouragement for continuing the development and breaking out of ore that, under existing conditions, would prove unprofitable. For the past two months the mill has been running on broken ore in stopes which it is necessary to select to obtain a payable grade thereby unduly depreciating the value of the remainder.

"To increase the recovery an oil flotation plant has

been added to the mill, one unit with a capacity of 125 tons per day being practically completed and a second unit for treating accumulated tailings being in course of erection.

"The shortage of power allows no possibility of working profitably on a reduced tonnage basis even with the additional revenue from oil flotation, and the Company are therefore compelled to stop operations until Spring. Owing to the difficulty of treating accumulations during the winter, the whole of the tailings plant cannot be operated. On the resumption of work in the mine, when sufficient power is available, both units will be ready, thereby ensuring greater profit than if the tailings treatment were carried on alone."

The date for the usual declaration of a regular dividend of 3 per cent on the McKinley-Darragh payable January 1st has passed, and it is believed this company may also have decided to fortify its financial position during the winter months, pending an adjustment of its operation to the changed economic conditions, and the lowered price of silver.

On the Chambers-Ferland a station has been opened up in the exploration cross-cut recently driven along the 385-ft. level and a winze is to be put down into the conglomerate formation. The cross-cut lies in a layer of slate, and the conglomerate is believed to lie not more than ten or fifteen feet below the cross-cut. The good milling values encountered in stringers extending up into the slate are taken to indicate the presence of high-grade ore in the underlying conglomerate. The next week or so will determine the accuracy of this belief.

Announcement is made that the Casey-Cobalt Company, holders of property in the township of Casey, some twelve miles north-east from New Liskeard will sell their assets. The property is equipped with considerable machinery, but has not been operated in recent years.

No further developments have been reported this week in relation to the manner in which the Ontario Department of Mines will deal with the recent Order-in-Council which certain portions of the press have criticised as being confiscatory as applied to patented mining claims. It has been officially stated that certain phases of the situation have been placed before the Government's legal adviser for consideration.

At the time of writing, mild weather continues in Northern Ontario, the settlers in some of the districts having been able to continue plowing their land during the first week of December. This mild weather is beneficial to the power situation in the mining districts, and if followed by a reasonable amount of rain would soon make it possible to increase general operations to full capacity, and would thereby provide employment for another 1,000 men at least.

Ore and Bullion Shipments.

During the week ended Dec. 3rd, two Cobalt companies shipped ore, the following being a summary:—

Shipper	Cars	Pds.
Temiskaming	1	109,624
O'Brien	1	64,000
Totals	2	173,624

During the corresponding period, the Nipissing and the Mining Corporation were both heavy bullion shippers, the Nipissing alone sending out over a quarter of a million ounces and the Mining Corporation also sending out a large consignment as shown in the following summary:—

Shipper	Bars	Ounces
Nipissing	193	250,865
Mining Corp.	60	60,772
Totals	253	311,637

THE GOLD MINES.

The Porcupine Field.

Conditions which are proving to be adverse to the base metal industry, and also unfavorable for silver mining, are having just the opposite effect on the mining of gold. The general depression in all parts of the world, which has set in on this continent, is operating in favor of gold mining. Given adequate hydro-electric power, there is nothing to prevent the mines from carrying on all branches of work at full blast.

Just what such an improvement signifies in connection with the gold mining industry is difficult to briefly summarize, and readers of the Journal will be presented with a more or less detailed statistical review a little later in the month. Figures will be presented showing the extent of the probable growth of the production and prosperity of the gold mines during the coming year or two.

It is intimated in usually well informed circles that the intention of the directorate of the Dome Mines is not to increase the present rate of dividend disbursement of 10 per cent annually, but, instead, to make a certain annual "capital return" to the shareholders. For instance, it is intimated the return of $2 a share may be possible before the end of the New Year, in addition to the dividends of 10 per cent. This would make $3 a share in all or equal to 30 per cent on the issued capital. The plan to make a capital return is said to be for the purpose of shielding the enterprise from too heavy taxation, such a return being exempt from taxes. The par value of the shares would thereby be reduced to $8 per share instead of $10 as at present. The company may pursue such a policy from year to year until the complete return of the par value.

A large amount of coal has been transported to the Porcupine district, and in the case of the Hollinger reserve of power will in this way be made available. Although no official statement has been made as to the extent of the auxiliary power which may be developed, it is understood the total will amount to close to ten per cent of full requirements at present capacity. This will greatly relieve the hydro-electric power shortage. As to the power shortage, there seems to be no doubt but that the situation has been exaggerated in certain quarters, and the depression caused has been far greater than may be warranted by the facts.

Plans to resume work at an early date on the North Davidson, and the prospects of similar action on the Davidson Consolidated about the middle of Winter, offers promise of the north-east part of Tisdale township becoming reasonably active again. These properties have usually been regarded as prospective. On the Davidson Consolidated a large amount of work has been done and a report recently issued would appear to give reason for a more or less optimistic view with regard to its future. Should success eventually be achieved, a comparatively large area would be given added prospective merit. The Davidson Consolidated lies some three or four miles north-east of the McIntyre mine.

The Indian Crushes no more —

Like the horse-drawn vehicle, the Indian has been eclipsed by modern science. Though this historic American may entirely disappear, many of his creations will probably live for centuries. Take, for instance, his feather like canoe and his famous corn flour.

When grinding materials, the Indian used the same grinding principles as did the early Greeks and Romans; reducing a softer material by crushing it with one that was harder and heavier. This identical principle, marshalled into a commercial force by modern engineering science is the basis of the stage reducing action occurring in the Conical Mill.

One Hardinge Mill contains as many as 3600 steel balls of various sizes which strike the material being ground at an average of 90,000 times a minute exerting a reduction force of approximately 360,000 ft. lbs. of energy. Compare this mighty crushing force with the two lb. blows of the Indian and you can readily see what an appreciable part modern engineering has played in commercializing this gigantic power.

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The present influx of men, and the possibility of a surplus of workers during the coming Summer is taken as an indication that the promising areas lying north-west, west, and south-west of the producing Porcupine area may receive considerable attention from prospectors, beginning with next spring. The theory which carries most in connection with exploring for new deposits is that the best place to search for prospective mines is in the vicinity of proven mines. The area lying almost on every side of the producing area of Porcupine constitutes an ideal field, and one in which aggressive exploration work may reasonably lead to valuable discoveries.

The Kirkland Lake Field.

Construction work on the Wright-Hargreaves mine has been about completed and within a very short time the big new mill will be in readiness for operation. The date of opening, however, will be regulated by the power situation, the Kirkland Lake field receiving its energy over a transmission line from Cobalt and therefore suffering a similar shortage to that existing in the silver camp. At the time of writing a little rain is reported and the weather predictions offer promise of relief. Should a heavy fall of rain occur, the large amount of soft snow lying in the woods would be quickly washed down into the rivers and would likely provide ample power throughout the Winter. The new mill on the Wright-Hargreaves mine will be equal in size to the fourth largest of its kind in Northern Ontario, being only exceeded in size by the Hollinger, Dome and McIntyre. The plant is a model of construction, and the equipment of the most modern design.

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EDITORIAL

The Price of Silver and other Commodities

The collapse of the price of silver to below sixty cents per ounce in New York, is a most serious blow to silver producers in Canada. During the war period, and for some time after the close of hostilities, it looked as if the return of silver to whatever may turn out to be its post-war normal level would be a gradual process reflecting the restoration of the gold standard, and it appears probable that the price of silver has now fallen below its intrinsic value, as has also fallen the price of other commodities, such as copper, sugar, lead and tin. The price of a number of commodities seems not only to be scraping bottom, but to have gone below bottom, if that term is used to express cost of production.

Various explanations are offered for the slump in silver value. One is that sixteen major governments in Europe have discontinued the use of silver in coinage, and are offering the metal for sale that is thereby released.

The factor that is probably most responsible for the lack of demand for silver is the desperate state of political affairs, the poverty, hunger and disease, and the entirely miserable condition of a territory that stretches from the Carpathians to the Sea of Okhotsh and from Ceylon to Archangel. The condition of China in particular is one of famine, and that great absorber of silver is now desirous to part with silver for bread.

The London "Financier" contains the first of a series of articles on the complexities of China's silver currency, which, as it throws some light on the silver market, is reproduced in part in this issue.

The writer of this article, Mr. T. Bowen Partington, speaks Chinese languages, and is said to have a unique knowledge of his subject. In view of what has happened this week to the price of silver there seems some incongruity in Mr. Partington's insistence on China's great need of silver, and his statement that the world's available supplies of silver metal are "getting scarcer and dearer every day."

So far as China is concerned, and that country is one of the most important in the world when the price of silver is in question, the situation appears to approximate to national bankruptcy occasioned by calamitous famine, and aggravated by political disunion. Under such circumstances, the sale rather than the purchase of silver is indicated.

India's financial position is weak, and political disunion is again an unsettling factor.

Turkestan and European and Asiatic Russia seem likely to slip back into a dark age, and political peace with material prosperity are not in sight.

One hopeful feature about the Chinese situation is the formation of the Chinese Loan Consortium, a combination of interests representing the United States, Great Britain, France and Japan, formed for the assistance of China's internal development in communication and industry. As this Consortium has the approval of the Governments of the countries named, very substantial assistance to China will be forthcoming, and a combined effort will replace international rivalries. This development is a cheering one, and should in particular help the silver market to recover.

The position of silver resembles that of many other commodities, including articles of clothing and food, that are now being offered below the cost of production, even if that production cost is reckoned upon pre-war figures. This condition has come about despite an actual shortage of many commodities, and arises from sheer inability of nations to pay their way.

The world is nowadays so small that the sickness of one nation weakens all other nations, and while it is flattering to national pride to have currencies at a high premium, if that premium becomes too high it opposes an insuperable barrier to trade, and extension of credits and even barter may have to be resorted to on a scale not yet apprehended. The reported decision of Bolshevik financiers to abolish money has been greeted with much derision, but its

real meaning may be that over large parts of the world barter is replacing international coinages and currencies.

Reduction of silver production must necessarily follow a continuance of existing quotation levels, and the silver mines will have to follow the same procedure of curtailment and conservation of liquid assets that has been adopted by miners of copper, zinc, lead and tin. As is the case with steel, wheat, cotton and other staples there exists a lack of demand concurrently with an actual physical shortage. The likelihood of an abrupt upturn of demand is therefore not a distant thing, but it all depends on the Old World and the Far East.

The participation of Canadian delegates in the councils of European nations is therefore a proper proceeding, and the sooner it is found possible for the United States also to take similar action the better it will be for the world at large and for North American commercial prosperity. Mr. Rowell at Geneva told no less than the truth when he said that Canadian lives had been sacrificed to European stupidity, but the harshness of truth will not alter the fact that if Europe is sick Canada and the United States will suffer, and that assistance extended to Europe is also self-help at home in North America.

METALLIFEROUS PRODUCTION OF ONTARIO.

The figures issued by the Ontario Bureau of Mines showing the metalliferous production of the Province for the first nine months of 1920 are pleasant reading, and show that the production for the whole year 1920 will be much larger in quantity and in value of the minerals marketed than the figures of the first quarter promised.

Silver, to the end of September, more than held its own, notwithstanding that at the end of March it was 800,000 ounces below the record of 1919. Later developments will tend to restrict production during the closing quarter, but, when the year's figures are complete they will prove relatively satisfactory.

Gold production in Ontario has features that permit of much optimism, and an increase of 58,000 ounces over the corresponding period of 1919, when compared with the record of other gold-producing countries, is a matter for genuine congratulation. Commodity prices are decreasing, labor is becoming more available and more efficient, and the need of Canada for new gold is clamant and insistent. Production of gold in the concluding quarter of the year should give 1920 a further lead over 1919. The conditions seem propitious, and expansion of gold production in Ontario seems a very probable feature of the coming months.

The imposing increase in the yield of platinum metals, nickel oxide and cobalt oxide, is a result of refining in Canada, and is so satisfactory that there will be general agreement that a little more of this kind of thing would be very welcome.

It is not unworthy of note, moreover, that the nine months figures show an increase in copper production of over 500,000 pounds, which, in view of the depressed condition of copper demand, is again satisfactory.

The comparison between the amount of iron ore mined in Ontario and that used at Ontario blast-furnaces is not pleasing, but it has at least this feature of satisfaction for Ontario that it is the only province of Canada that is at this time even attempting to utilize domestic iron ores. While nearly ten per cent of the iron-ore used in Ontario was of domestic origin, the figure for all Canada is about four per cent. That is to say, Ontario is doing more than twice as well as any other province in smelting domestic ore.

The total value of Ontario's mineral production for nine months exceeds that of 1919 by some eight million dollars, and indications are that Ontario will bulk even larger in the total figures of the Dominion for 1920 than was the case in 1919.

"INDUSTRIAL LEADERSHIP AND THE MANAGER."

Our contemporary, "Mining and Scientific Press" contains no more interesting feature than its correspondence columns, which, thanks to the magnetic personality of the Editor, are able to attract thoughtfull communications from men who have really something to say.

A recent issue contains two strikingly constracted viewpoints from Northern Ontario — a circumstance that provokes to breach of the last Commandment—namely, from Mr. C. V. Corless of Coniston, and Mr. F. J. Bourne of Cobalt, dealing with labor's share of produced wealth and the human factor in management.

Mr. Bourne expresses a viewpoint that has unfortunately only too often become the settled conviction of managing executives who have found their attempts at understanding and conciliation interpreted by labor unions as signs of weakness, and it is not possible to deny that in recent times some aspects of trades unionism have borne all the earmarks of selfishness usually attributed to employing capitalists. The short memories of labor unionists, and their quick ingratitude is pointed out by Mr. Bourne, who instances Lloyd George and the Welsh miners as an example. Ingratitude is a characteristic of labor union politics because it is a characteristic of mob physchology, and must be expressed in all forms of democratic leadership. No persons suffer so severely from the ingratitude of labor unions as their own chosen leaders, and it is an old story that men kick down the ladder up which they have climbed. The well-meaning executive often emerges from his attempts at conciliation a chagrined and disillusioned man, ground between the clamant demands of his subordinates and the unyielding, non-understanding attitude of his directorate. Mr.

Bourne's conclusion is that labor can only be bargained with on terms of equal strength. "The solution is for all the employers to organise and meet organised labor on its own ground."

Whether this is a solution or not would form matter for much debate, but it must be admitted that it foreshadows a great danger, for it is a course that at once devides the citizens of a democratically governed country into two irreconcileable camps, and emphasises the principle that guides the O.B.U., namely that any member of a labor union "who enters into relations, or bargains, or receives any favor from the bosses, is a traitor to the working class."

A line-up of organised labor and the representatives of employing capital was seen at Ottawa some fourteen months ago, and it was neither a helpful nor an edifying spectacle.

The experienced executive knows that the last thing he should invite is a crisis, or any situation that forces either party to a dispute to fight on the issue of a principle. The development of crises are by all means to be prevented, as is, we earnestly believe, any attempt to line up the battle array of those who work for wages, and those who work for interest and profits upon invested capital.

Mr. Corless proposes another way, that of the leaven and the lump. He supports Mr. Sam. Lewisohn's plea for executives that will act as a buffer between capital and labor, men that can mediate between the greed and mulishness that too often are characteristics shared pretty equally by the employee and the directorate. Taken in the mass the ideality and humaneness of the employer will not be found to rank higher than that of his employees, especially when conveyed through the chilling and dehumanizing channels of corporation procedure.

Mr. Corless believes that the world war closed an epoch of mechanical development of industrialism, but that in the epoch on which we are entering, "the development and application of the sciences that deal with human beings and their organization into industrial and other social groups—economics, civics, ethics, sociology, psychology, industrial organization, history, and the like—will receive steadily increasing attention." It is a propitious horoscope, and a thoroughly modern exemplification of the ancient advice to do justly, love mercy and walk with humility.

The saving grace of Mr. Corless's method is its appeal to the individual, as opposed to the agitation of a mob whether that mob be named capitalistic or proletarian. He combats the pernicious theory that brains are the monopoly of the industrial leader, and in this attitude Mr. Corless will have the support of many executives who have had occasion to measure their brains against the labor leader. "Probably the "most profound problem in industry," states Mr. Corless, "arises from the search for a method of organization that will result in enlisting in its service the highest degree of brain-power—intelligence, goodwill and will-power—of all those engaged in it." Such an organization can only come about through the contact of individual minds. The closest contact between the minds of the workers and the minds of the employers is found in the mind of the humane and understanding executive. May his tribe increase. So far, in the annals of recent Canadian industrialism, the name of our sage of Coniston leads all the rest.

NICKEL AND COPPER.

The poor market for nickel and copper is seriously felt at Sudbury. The producers were placed in an unenviable position when the war ended suddenly with large stocks of metals in the hands of the several governments. The absorption of these stocks was slow and the general slowing down in industries this fall has added to the metal sellers difficulties. Under the circumstances it is not surprising that production is being cut down.

In the United States several well known copper mines have been closed down and others are operating with much reduced forces. Until there is a general quickening of manufacturing again we may expect little activity in nickel and copper mining centers.—R. E. H.

COAL AND IRON PREPONDERATE IN MINERAL PRODUCTION IN GREAT BRITAIN.

The value of minerals raised in the United Kingdom during 1919 (at $4.87 to the pound) was approximately $1,634,720,000. The value of the coal raised was $1,530,000,000, or 93.7 per cent of the total mineral production value.

The value of the iron ore raised in the United Kingdom in 1919 was $36,176,000.

If the production of coal and iron-ore is added they account for 96 per cent of the total.

The preponderance of the production of coal and iron is the measure of Great Britain's economic stability.

The coal and iron production of Canada contributes between 30 and 32 per cent to our total mineral production value. The question obtrudes itself, to what extent is this lamentably insignificant percentage a measure of economic instability?

Britain imports no coal. Canada imports more than she mines. To the extent that such importations are unnecessary, they are also unwise. Great Britain's coal production is 4.5 tons per capita. Canada's is 1.5 tons per capita. Reams might be written to explain away this divergence, for which excellent reasons exist, but nothing will avail in extenuation of the fact that **Canada does not mine half the coal that she should and could mine at this particular time.**

CORRESPONDENCE.

Sir,—

To claim that the Mines Act of Ontario formerly held place with the most satisfactory mining law of any province or state, and to at the same time accuse the same law, when enforced, with being discouraging to prospectors and investors, is something only those used to receive special privileges are able to understand.

The law that swivel chair prospectors are so strongly objecting to, has been on the statue books since 1907 and had the Bureau of Mines done its duty to the Province, by collecting this tax when due, Mr. E. J. Morrison of Haileybury would no doubt have paid his tax and remained in possession of his property and so would Teck-Hughes and others. To imply, that a law enacted by the Legislature was not intended to be applied, is in effect claiming that the express will of the peoples representatives in Parliament is not to be considered the rule by which the officials and members of the Government should be guided, or the people governed. A mining act, that states what is to be required to be done in order to secure title and hold mineral land and is enforced in every respect, is after all the best security to title for both prospectors and investors.

Personally, I consider that the Hon. H. Mills has made a good beginning and wish to recommend, for his next considerations, Sections 183a and 192 The Mining Act of Ontario.

The limitations imposed upon the prospector, in the number of claims he can stake during the year for himself and others covers an area sufficiently large to include within that area any one of the following Northern Ontario mines,—The Dome, Dome-Lake, Dome Extension, Davidson, La-Rose, Peterson-Lake Schumacher, Teck-Hughes, Temiskaming, Tough-Oakes.

I would think, that if the above mentioned companies can get along with less than 360 acres each surely the prospector and his grubstaking partner can.

L. O. HEDLUND.

Gowganda, Dec. 7th, 1920.

The Bonusing of Iron -Ore Mining in Ontario.

Port Arthur, Ont., December 11th, 1920.

Editor, Canadian Mining Journal,

Sir:—

In your issue of December 3rd, 1920, there was an article by Mr. J. J. O Connor commenting favorably on the Conference of members of the Port Arthur and Fort William Boards of Trade, and the Hon. Harry Mills, Minister of Mines, on November 27th.

As the writer was one of the delegates mentioned, I would like to take up the reasons which called for this Conference, and the procedure advocated by the Minister of Mines for the development of the iron resources of Northern Ontario.

About a week before this Conference was called, the Minister of Mines, in an address to the Convention of the Municipalities held in Fort William, made the statement that he did not think a bonus was the most efficient plan for the working out of the problem. In his opinion electric smelting was a solution of the treatment of our low-grade iron ores. Electrical power at $10.00 or $12.00 H.P. per annum would, he claimed, compete with coal at present prices, and this procedure would really be the more efficient plan for the problem in hand. When asked where the $10.00 or $12.00 power was to come from, Mr. Mills was at a loss for an answer to the question, and apparently did not care to enter into any discussion on the matter.

When the Board of Trade delegates met him, he stated that while as Minister of Mines he would not advise against a bonus, his personal opinion was strongly aginst the granting of a bonus in any form, and he thought some other plan could be worked out that would be more efficient and more permanent than a bonus of iron ores for a more or less extended term of years. The writer asked if he was referring to electrical smelting as mentioned in his address at the Conference. I also pointed out that in a conference with American engineers in 1914, I took up the question of electrical smelting with these men, who were responsible consulting engineers for large iron companies. Their reply was a question, "What is power worth in Canada?" As Quebec then had the cheapest power in the Dominion I gave them $12.00 as being about the average cost of production in that Province. Their summing up was as follows:—When you can produce power at this time for $4.00 instead of $12.00, then you can consider electrical furnaces as an active factor in competition. With care I repeated this opinion to Mr. Mills, pointing out that our foremost experts declare we would want power at one-third the actual cost of production at any time, to compete with the present-day smelters.

That ended the discussion as far as electrical smelting was concerned.

The Minister then stated that he had what he considered the most efficient plan for the solution of the problem: that is a re-survey of, diamond-drilling and testing of all our iron ranges, this work to be carried on by a commission of experts who would teach us how to **mine, diamond drill, smelt, treat, refine** and **market** our ores. When the storm of commendation had passed over, one of the delegates from the Fort William Board of Trade, who had introduced himself as an engineer with practical experience in furnaces, made the suggestion that the Minister go even farther with his program, that markets should be established so that the farmer could market his ton of ore at the same time he brought in his load of wood, or a few sacks of potatoes. As the Zulus in Central Africa and the natives in the interior of India still carry their ores to the furnaces in baskets and rolls of matting, this gentleman showed that he, at least, was in favour of being progressive. I endeavoured to point out to the Minister that a survey such as he suggested would take twenty-five years to complete, and at the end of that time we would be standing exactly where we are now, but my comment was ridiculed, and the Conference was ended at that point, after the Minister being assured by the Presidents that he would have the solid backing of the Boards of Trade of both Cities.

In defense of my statement, I would like to point out just what tedious operations such surveys, drilling operations, and testing of various ores really amounts to. In 1901, I had charge of a section of the large exploring party, organized by the well known consulting engineers, Prof. Pumpelly and Prof. Smyth. This work was carried on by these men in the seasons of 1901 and 1902, and operations were confined to limited distance of Lake shipping in the Thunder Bay and the Rainy River Districts. On my section of the party I

had two expert cruisers, and our work during the season of 1901 was confined to the examination of about six square miles of territory. This occupied the whole season from the latter part of May, to the middle of October. This was a mere preliminary examination, to decide whether the iron range explored was worth acquiring from the Crown, or otherwise. No detail work was done at all and it was estimated at the time that the five square miles which were surveyed and purchased from the Crown, would take an engineer and three cruisers approximately five months to work out the details of the survey before making plans for diamond drilling. Lest we be accused of not being among the live men mentioned by your correspondent, I might mention that Messrs. Pumpelly and Smyth gave their entire approval to the method in which the work was being carried on and they still take my reports at par.

The United States Steel Corporation spent nearly two years in diamond drilling on the Atikokan Iron Range, and several months additional in the mining and treating of large-scale roasting tests.

J. D. Gilchrist of Denver, Colorado, spent the whole of the summer seasons of 1918 and 1919 in examinations and taking out samples varying from 100 to 1000 pounds for concentration tests of our low-grade ores. After spending the winter months of the same years on the working out of these tests on a laboratory scale, he advised me that he had found three ranges which he **hoped** could be treated with the one type of concentration plant, but he could not be sure of this until a suitable pilot plant had been erected and a commercial size test had been obtained.

Dwight Woodbridge, who was the founder of a testing plant in Duluth, Minnesota, had practically unlimited capital, expert help of every description, and the entire confidence of the Hayden Stone Company who had spent a quarter of a century in working out the problem of concentrating low-grade ores. Yet, over three years in time was taken up, and the plant had to be remodelled a number of times to devise the best method of concentrating the low-grade ores on one range alone.

As I have mentioned in a former letter to your Journal,* I have visited personally over 1000 lineal miles of iron ranges in Northern Ontario, all within shipping distance of Lake ports; of this 1000 miles I considered that there were at least 100 miles which were worthy of the close detailed survey that would precede any plan of diamond drilling. The performance of all this work mentioned should give the variest layman some little idea of the problem ahead of the Minister of Mines in carrying out his suggestions. As we have admittedly no visible ore-bodies of high-grade ore between the boundaries of Manitoba and Quebec but what need beneficiation in some form, beneficiation would seem to be our principal problem. (This does not mean that no high-grade ore bodies would be found on these ranges, on the contrary I am firmly of the opinion that merchantable grades of ore will be found, but the search for these will necessarily be costly and may take years to carry out.) Therefore, as I have estimated we have within a radius of 100 miles of the Twin Ports at least 300,000,000 tons of ore which might be concentrated commercially by some method or other. I would consider that if the Minister of Mines carries out his plan and teaches us how to mine, diamond drill, treat, market, etc., the ores in all this territory, of course erecting pilot plants as needed for the concentration tests of these ores, that when I mention twenty-five years as the time limit needed, I might still be a year or two under the mark.

As we have in the Thunder Bay District greatly diversified types of low-grade ores, the problem of concentration or other forms of beneficiation must be worked out by the operators on practically each range individually, and it is our opinion, and the opinion of the majority of our Canadian engineers, that a reasonable bonus, given over an extended term of years, would be the most attractive inducement to investors and producers of iron ores.

A direct vindication of the request of the Mining Committees of Northern Ontario for a bonus, is the mooted establishment of a 15,000,000 dollar steel plant in the Province of British Columbia. This has been undertaken after a careful survey of the situation by Mr. Sloan, the Minister of Mines; and it was owing solely to his recommendation and indefatigable efforts that the project for the establishing of a large iron and steel industry, in what is really a somewhat isolated Province in that respect, has taken definite shape. Owing to this isolation it was deemed a better plan to have this bonus given to the producer of pig iron, as he must necessarily equip steel works to use up his own product.

The problem for the Provinces of Manitoba, Saskatchewan, Alberta, and the North Western Territories could be worked out on somewhat similar lines. Sault Ste. Marie markets heavy iron and steel at Pittsburg prices, plus the duty. Duluth steel plants market their product at Pittsburg prices, plus the freight from eastern plants. All heavy iron and steel landed at the Twin Ports of Port Arthur and Fort William cost approximately 8 p.c. of purchase price from Sault Ste. Marie or Duluth, and over 20 p.c. from the eastern steel plants for freight alone. It is also admitted by the United States purchasers of heavy iron and steel that Duluth can manufacture practically at the same cost as Pittsburg. Let the Western Provinces combine in giving a bonus of from 3 to 3½ p.c. on actual capital invested, extending over a term of from 20 to 30 years to aid in the establishment of steel plants where iron, coal and power meet, at the Canadian Head of the Great Lakes. These plants could be bound to sell to the Western Provinces at Duluth prices, minus the freight from eastern plants to the Head of the Lakes, thus effecting a saving of from 8 to 20 p.c. Assembling and finishing plants could be erected at various points in the west to further cut down the westerly freight in all directions, in threshing outfits, farm implements, etc., and the districts where this material is marketed would also be greatly benefitted. The Provincial Government of Ontario and the Federal Government could combine in giving a reasonable bounty on iron ore, extending over a term of at least 15 years payable strictly to the operator of the mine. Do this and the annual import of nearly $200,000,000 worth of iron and steel products from the United States will dwindle more rapidly than did the production of iron ore in Ontario, and Tariff critics in the western Provinces will have less to complain of in defense of the claims of the agriculturist.

J. E. MARKS.

*See issue 21 May, 1920, page 424.

CHINA AND SILVER.

Complexity of the Chinese Currency.

In the London "Financier" of 22nd November, Mr. T. Bowen Partington, a business man of Hong Kong, possessing an intimate knowledge of Chinese methods, mentality and languages, writes the following article. It is interesting to Canadian producers of silver, in the current market conditions, because it maintains that a great scarcity of silver exists, and that China's first requirement for banking stability is large silver reserves:

Mr. Partington states:

The question of Chinese currency is an extraordinarily complex one, to-day more so than ever before. Most people in England only know that the country is on "a silver basis," and that the various trading centres on the seaboard have each its own particular brand of local currency dollar. If that were all the position would be comparatively simple, but this slender knowledge does not even touch the fringe of the problem. The trouble is that China is a very large country, containing many provinces and dependencies, each under a semi-independent administration and with commercial customs and standard which differ widely from one another.

No Recognized Medium of Exchange.

There is no common medium of exchange that is recognized throughout its wide domains, for in the Celestial Empire or Republic the Government has little or nothing to do with business.

There is the tael, of course, but the tael is not a piece of money at all, it is a weight—nominally an ounce of silver. Now an ounce in Tientsin is not necessarily an ounce in Hankow or in Canton, neither does it follow that a tael minted in Pekin is equal in fineness to one minted in Shanghai. In fact, there are no fewer than three distinct kinds of tael put out by the central Chinese Government, viz., the kuping, which is the standard tael of the public Treasury; the tsaoping or Government standard for taxes in some of the provinces, and the haikwan or Customs tael.

The standard of each locality is that particular tael in which wholesale transactions are conducted and in which exhange on other centres is quoted. Sometimes it is merely a nominal unit and may take the form of sycee or ingots, which are usually equivalent to 50 taels. These sycee ingots, or "shoes," are fantastically shaped silver castings of standard fineness, and are employed almost exclusively between banks and bullion dealers, being usually stamped by the banker or money changer with his individual "chop," which is accepted by the other parties to the transaction as a kind of endorsement as to weight and fineness.

Most banks doing their business in China import their own silver and turn out their own sycee "shoes" with their own particular earmark or guarantee; and all clearing transactions are done in these shoes as a matter of course. As for the different brands of taels in the various provinces of China it is sufficient to add that there are close upon 70 well recognised varieties, although the majority are not in circulation to any great extent.

Variety of Dollars.

The chaotic condition of Chinese currency has, if anything, been aggravated by the introduction of the various kinds of dollars—Spanish, Mexican and local currency—and to master the intricacies of this particular angle of the currency problem is a study in itself. The old Spanish "Carolus" dollar was introduced into the treaty ports from the Philippine Islands during the 18th century, and continued in common use until the middle of the 19th, when the Mexican dollar made its appearance and commenced gradually to crowd out the Spanish coin.

The Mexican dollar has retained its popularity to this day, and in spite of the existence of other competing coins, both native and foreign, is in every-day circulation. Chinese attempts at various times to oust the Mexican dollar with a locally minted coin have met with scant success, as the merchants seem to have acquired the ineradicable habit of treating native money by weight and fineness and not by count. The "Yuan" dollar (bearing the superscription of the late President Yuan Shi Kai), which was approved by the young Republic as a universal standard coin, has not so far proved a success.

The multiplicity and diversity of provincial taels, to say nothing of the many different dollars on the coast, has had its due effect, and before the Chinese mercantile community will consent to accept a common medium of circulation much water will flow down the Yang-tse-kiang. Perhaps, with the gradual growth of China's railroad system, one or the other dollar may acquire national ascendency; in any case, it is a matter of slow evolution and gradual education.

All we know is that the unification of China's silver currency upon a definite standard basis is of the utmost importance, and until it is achieved it is futile to hope that China will join the ranks of the "gold" countries.

Paper Money.

In passing we may allude to China's paper currency. Like many other countries, she has had her experience of unrestricted paper issues; indeed, it is an ancient evil which various dynasties and regimes have had to confront and have sought to remedy. In this the inherent love of the Chinaman for the silver and his distrust of paper money proved of considerable assistance to the authorities in their efforts to remedy the situation.

Down to the sixties of last century everything was going well, and the superabundant paper issues were being gradually called in and redeemed. Then the great Taiping rebellion broke out, and at once the financial situation took a turn for the worse. The Governments, both central and provincial, needed money—lots of it—and so, like the Bolshevik presses of the present time, the printing presses of Pekin and in the new provincial capitals, started working overtime turning out flat money.

For the moment the needs of the emergency were met, but by the time the rebellion had been repressed, the country was flooded with an irredeemable paper currency which circulated at a terrible discount, something like 97 to 98 per cent. Ultimately, of course, like the Assignats of the French Revolution and the American Confederate currency notes, it was withdrawn altogether, and in due time forgotten. Nevertheless, their Taiping experience did not deter subsequent Chinese Governments from playing with fire and repeating that disastrous performance.

The Bank of China Needs Heavy Silver Reserves.

It was not until 1911, shortly before the fall of the Imperial dynasty, that the Pekin authorities made a strong move towards swinging the position back to something like normal. They entered into negotiations with an international group of foreign banks for a loan of 50,000,000 dollars, with the avowed object of getting rid of the troublesome paper issues, but before the transaction could be closed the revolution broke out and shortly afterwards the dynasty fell.

Since that time the authorities have been issuing large quantities of "military notes," and until these have been called in there will be trouble in the land. Still, the Republican authorities mean well. Since they assumed sway a number of measures have been taken which promise well for the future, such as the establishment of the Bank of China, the Bank of Communications, and others whose declared policy includes the redemption of those military notes and others put out by the various Provincial Governments of recent years.

Doubtless the authorities mean well, but we know what place is paved with good intentions, and with the best will in the world we do not foresee an end to China's financial difficulties arising from the glut of paper currency. About the only true and lasting remedy would seem to lie in the creation by those Government banks of heavy silver reserves of such proportions as would inspire confidence among the public, especially the mercantile community.

Inevitably the accumulation in the hands of the banks of such a vast quantity of metal would constitute an additional big drain upon an already over-taxed silver market, and would automatically drive up the price to the levels which might baffle even the boldest of prophets. Again and again we are forced back upon the original aspect of the problem: How and in what manner is Great Britain to settle her adverse trade balance with China seeing that the world's available supplies of silver metal are getting scarer and dearer every every day.

A Montreal Letter

By ALEX. GRAY.

SILVER MARKET CONDITIONS.

Silver has slumped to below sixty cents. More of the Ontario mines are about to cut down or to curtail production. To have the metal at 59¼ cents—half a cent below the average price in 1913—leaves the mines in general no alternative other than to go slow, stop—or hold their production until the market rights itself.

At the moment "silver is demoralized on Chinese and Eastern selling". Millions are starving and trade throughout the East is in a state of collapse, hence the cancellation of orders placed in the European markets—and the liquidation of silver holdings. So, between the shortage of power and the Asiatic debacle—which began with Japan—the penalties of inflation, speculation and liquidation are acutely in evidence.

The onward sweep of the wave of so-called deflation cannot be stemmed instanter. Throughout the Orient funds are inadequate with which to buy silver. Really the holdings of silver have to be jettisoned to secure funds in Europe—and that has intensified the situation in our metal market. Having paid the Orient for its wares in silver, the demand for silks, rubber, hides, tea, rice and vegetable oils being at the minimum, it follows the Orient must have emergency funds.

Silver being the medium of exchange, notwithstanding the admitted fact that production of the metal "has been coming on to the market for the last six months at less than half the pre-war amount"—and that consumption in Europe and on this Continent has increased—the break in the price was inevitable. Speaking of this, the "New York Evening Post" devoted its last weekly financial review to the discussion of the subject, and had this to say: "The present break is the more remarkable since world production of the metal now is only about 70 per cent. of prewar; since one third of this production, or the total mined in the United States, is automatically taken out of the market, so long as the price is below $1, by the provisions of the Pittman Act and since consumption in moving-picture films has increased greatly." Of course, should the Harding administration repeal the Pittman Act,—which seems improbable—silver might not recover from its fall—and that would not mend matters in the Ontario North Country. So, "marking time" may be a remedy. It is so considered by copper producers, most of whom cannot make copper for the current price—and none of whom would attempt to do it were it not for Flotation practice.

Hollinger 1920 Gross Income.

According to the Ontario Department of Mines report for the nine months ended September 30th., Hollinger Consolidated Gold Mines had then produced gold to the value of $4,620,800. Taking that as the ratio, the production for the year would be about $6,160,000—were it not for the shortage of power which has occurred. From mining and milling operations, the chances are this company, therefore, will not come within half a million dollars of the 1919 result; yet it would seem as though the income from investments, rents and the premium upon gold will more than make up the deficiency on actual operations at the properties. It has been ascertained, for example, that the Hollinger Consolidated gross income for the ten months ended November 3rd., was $5,989,313. Out of that $2,789,199 was expended, leaving $3,200,113, or 13.08 per cent. on the issued capital. Over and above that, the November and December results are a substantial addition. So the Hollinger treasury, after paying 9 per cent. in dividends, ought to reflect the prosperity of the company despite handicaps.

SILVER AND GOLD IN ONTARIO TO END 1920 VALUED AT $445,000,000.

To the end of September, it has been officially announced by the Department of Mines, Ontario had produced metallics to the spot value of $597,851,488. Of that grand aggregate, about $210,000,000 came from the remarkable silver-cobalt-nicolite Mines of Cobalt and other districts, whose twenty-eight-year record almost excuses the myriad ventures promoted in the hope and expectation that they would become part of that achievement. By the end of this year those silver mines will have yielded something like 310,000,000 ounces, besides the cobalt, nickel and arsenical contents. Out of the profits they have distributed about $80,000,000 in dividends— and several of them are still vigorously in the running. Spread over the entire period since McKinley and Darragh, and Fred. La Rose stumbled across something they knew nothing about, the Silver Industry of Ontario has provided $7,500,000 per annum to date—and "the end is not yet".

Next in the Order of Merit—even if imaginery decorations are permitted in the Dominion—is the nickel industry. As a matter of fact—and to be exact —although not in the spectacular precious-metal-class the nickel copper industry takes precedence, for the grand total value of its production at the expiry of 1920 will be about $234,000,000. Adding to this the hypothetical valuation of the rare metals accredited to this section of Ontario's mineral industries, the figures rise to between $235,000,000 and $236,000,000 —and some of the more important nickel mines seem to be perennially youthful in that ore reserves display a degree of resiliency surprising even to their directorates. Anyhow, nickel, copper, silver, cobalt, and a minor factor of rare metals, have bequeathed no less than $445,000,000 to the wealth of nations, or will have bequeathed that much on January 1st.

Yet mining industrialism is a species of "monster, of such hideous mien, that to be hated needs but to be seen!" The story of Cobalt and the Montreal River Districts is punctuated with harrowing experiences. Hardly less is this so of the earlier chapters in the history of the nickel country. As a sequel, the discovery of Porcupine and the Kirkland Lake areas will serve to demonstrate the potentialities of real mines despite paroxysms. Public incredulity, bush fires, and the Great War, attended the development of the Ontario gold industry, notwithstanding which the total gold production on January 1st. will have amounted to about $70,000,000—and at least there is as much more assured in known ore reserves —possibly the more venturesome would place the value of the gold ore reserves at around $100,000,000.

For distinguished proportions, Nipissing dividends have earned pre-eminence. That company's profit-sharing has amounted to about $23,000,000—and, with the cash on hand, the most exacting shareholders cannot groumble. Hollinger Gold Mines have yielded over $13,500,000 in dividends, have perhaps the strongest treasury position of any company operating in the precious metal districts, and have well on toward twice their capital liabilities in their proved ore reserves. They have paid over 70 per cent. of the dividends credited to all the Ontario gold mines—the Dome and McIntyre Mines coming next with about 10 per cent. of the total.

Metalliferous Production of Ontario First Nine Months of 1920

Returns received by the Ontario Department of Mines from the metalliferous mines, smelters and refining works of the Province for the nine months ending September 30th, 1920, are tabulated below, and for purposes of comparison the quantities and values are given for the corresponding period in 1919. Tons throughout are short tons of 2,000 lbs.

ONTARIO'S METALLIFEROUS PRODUCTION, FIRST NINE MONTHS — 1920.

Product.		Quantity 1920	Quantity 1919	Value $. 1920	Value $. 1919
Gold	ounces	424,297	366,288	8,735,768	7,574,586
Silver	"	7,831,143	7,475,396	8,435,088	7,898,220
Platinum metals	"	213.75	87.26	13,917	4,981
Nickel (metallic)	lbs.	7,060,078	7,820,866	2,440,303	2,732,676
Nickel oxide	"	4,886,712	5,700	1,146,768	1,607
Other Nickel compounds	"	159,725	217,135	15,362	22,279
Nickel in matte exported (*)	tons	17,446	11,301	8,723,000	5,424,552
Cobalt (metallic)	lbs.	159,151	93,227	373,168	174,782
Cobalt oxide	"	509,043	321,483	1,015,696	463,916
Other Cobalt compounds	"	1,717	29,491	1,629	18,250
Lead, pig	"	1,290,726	1,481,204	117,122	54,802
Copper (metallic and sulphate)	"	4,952,413	4,436,101	800,369	756,883
Copper in matte exported (*)	tons	9,497	6,818	2,659,160	1,908,936
Iron Ore (**)	"	5,468	5,827	47,120	44,234
Iron, pig (***)	"	49,422	30,849	1,395,948	795,009
Total		.....	.....	35,920,418	27,875,713

* Copper in matte form was valued at 14 cents and nickel at 25 cents per pound in both years. Total matte produced was 44,922 tons, of which 31,800 tons were exported. For further details see heading "Nickel-Copper."

** Shipments of iron ore totalled 89,931 short tons valued at $445,355. The figures in the table cover shipments to points other than Ontario blast furnaces.

*** Total output of pig iron from both domestic and imported ore was 512,559 tons worth $14,480,794. Figures in the table represent proportional product from Ontario ore.

GENERAL REMARKS.

Although the aggregate production of mines, smelters and refineries in the Province of Ontario for the 9 months ending September 30th, shows an increased valuation of over six million dollars as compared with the 1919 figures, developments during the past two months have been such that a proportional increase for the full year cannot be expected. Rainfall was so scanty during the late summer and fall that the power plants supplying Cobalt, Porcupine and Kirkland Lake have been unable to meet the requirements. A power shortage setting in now may be prolonged. Furthermore, the wholesale prices of commodities have declined abruptly, and industry and commerce are feeling the effects of this inevitable aftermath of the war. Labour, however, is becoming more plentiful, and the cost of production is declining, Such circumstances are specially advantageous to the gold mining industry, which has had to carry on during the war period under difficult conditions.

GOLD.

Ontario's gold output for the first three quarters of the year was 424,297 fine ounces worth $8,735,768, an increase of $1,161,182 or 15 1-3 per cent over the corresponding period in 1919. During the period 977,475 tons of ore were milled, distributed as follows: Porcupine, 903,945 tons, Kirkland Lake 69,328 tons, and Miscellaneous, 4,242 tons. As already pointed out the disabilities under which gold mining has been carried on are gradually being removed, the power situation alone excepted. Details of gold production are presented herewith :

Porcupine

Hollinger	$4,620,800
McIntyre	1,603,376
Dome Mines	1,515,086
Northcrown	70,406
Porcupine Crown	70,962
Dome Lake	46,809
Davidson	11,210
Total	$7,938,649

Kirkland Lake

Lake Shore	$ 371,359
Kirkland Lake	215,558
Teck-Hughes	182,152
Total	$ 769,069
Miscellaneous Mines	23,904
Recovery from Nickel — copper refining	4,146
Grand total	$8,735,768

Miscellaneous mines include the production by Argonaut Gold, Limited, in the township of Gauthier, Contact Bay Mines, Limited, near Dryden, and W. E. Stone of Mine Centre. In addition to gold output 71,990 ounces of silver were produced, worth $80,420. The 150-ton mill of the Wright-Hargreaves mine at Kirkland Lake is nearing completion.

SILVER COBALT.

Silver production increased from 7,475,396 to 7,831,132 ounces during the period as compared with 1919. With the exception of 32,073 ounces recovered

from nickel-copper refining and 71,990 ounces from gold refining operations, the output came from Cobalt, Gowganda and outlying areas. Power shortage and a rapid decline in the price of silver will have their effect on the output for the last quarter of the year. The average price of silver was $1.33 per fine ounce in January and 94 cents for September, with an average of $1.09 for the 9 months' period. On December 1 the price dropped to 69 3-4 cents for foreign silver on the New York market. Mines shipping over a half million ounces are given in order: Nipissing, Mining Corporation, O'Brien, Coniagas and Kerr Lake.

Refineries: During the period 426 tons of ore, 2,654 tons of concentrates and 2,117 tons of residues were treated in southern Ontario refineries for a recovery of 2,406,880 ounces of silver in addition to arsenic, nickel, cobalt and compounds of the two last mentioned metals. A small output at Welland of nickel and cobalt compounds is reported by Ontario Smelters and Refiners, Limited, successors to Metals Chemical, Limited. Copper sulphate was marketed to the extent of 98,918 lbs., the metallic equivalent being included in the total coper production. Silver producers were paid for 18,202 lbs. of copper recovered in United States refineries. A considerable increase is noted in the price of cobalt, but more recently the general slump in prices of metals has seriously affected the business of silver-cobalt refineries. The output of 203,953 lbs. of metallic nickel and 20,711 lbs. of nickel oxide from silver-cobalt ores is small as compared with the product of Canadian nickel-copper refineries.

NICKEL COPPER.

During the period 925,378 tons of ore were raised at the Creighton, Murray, Garson Levack, Bruce, Victoria No. 1 and Worthington mines. Ore smelted at Copper Cliff, Coniston and Nickelton totalled 809,022 tons, from which 44,922 tons of bessemer matte were produced. To the United States and Wales 31,800 tons of matte were exported, while 12,531 tons were treated in Canadian refineries at Port Colborne, Ontario, and Deschenes, Quebec.

At the beginning of the year smelting of nickel-copper ores was back again to a pre-war basis after the greatly curtailed production in the early part of 1919, which followed an abnormally large output in 1918. Although production has increased from 30,942 tons of bessemer matte for the first 9 months of 1919 to 44,922 tons for the corresponding period in 1920, conditions since Sept. 30th have considerably reduced this rate of production. The present market for both nickel and copper is dull and stocks have accumulated. In consequence the International Nickel Company of Canada were obliged to curtail operations both at Copper Cliff and Port Colborne on Nov. 1st to the extent of 25 per cent, which reduces the output to 3,000 tons per month of bessemer matte and 400 tons of refined nickel.

In the bulletin for the half year ending June 30th it was stated that nickel-copper matte was in process of treatment at the new refinery of the British America Nickel Corporation at Deschenes. Electrolytic nickel and copper were produced during the latter part of the nine months' period. The International company markets a considerable part of the nickel in the form of oxide.

IRON ORE AND PIG IRON

During the period 135,023 short tons of ore were mined by the Algoma Steel Corporation and Moose Mountain, Ltd. Of this total 84,463 tons (nodulized) were shipped to Ontario blast furnaces. Shipments of briquettes produced from magnetite ore were 5,468 tons worth $47,120.

The furnaces of the Standard Iron Company at Deseronto, Midland Iron and Steel Company and Parry Sound Iron Company have not been in blast since June, August and October respectively in 1919. Four stacks were operated by the Algoma Steel Corporation at Sault Ste. Marie, two by the Steel Company of Canada at Hamilton, and one by Canadian Furnace Company at Port Colborne. Of a total of 1,036,229 tons of ore smelted only 99,916 tons or 9.64 per cent was of Ontario origin. In steel making 252,797 tons of pig iron product were used. The total steel output at Sault Ste. Marie and Hamilton was 525,084 tons worth $19,253,470.

RETIREMENT OF THE DIRECTOR OF MINES AT OTTAWA.

It is announced from Ottawa that Dr. Eugene Haanel, who has been director of the Mines Branch since 1907, when that department was first constituted, has retired in compliance with the regulations of the Superannuation Act. Previous to appointment to the position of Director, Dr. Haanel was Superintendent of Mines in the Department of the Interior, from 1901 to 1907. Dr. Haanel, during his incumbency, took much interest in the application of electricity to the reduction of iron ores. Interest in electric smelting of ferrous metals in America may be said to date from the time of the Canadian Commission's tour in Europe in 1904, and the historical introduction to Rodenhauser's and vom Baur's "Electric Furnaces in the Iron & Steel Industry," the German edition of which appeared in 1911, states that when the invention of the Stassano, Heroult and Kjellin furnaces first drew the attention of the iron industry "an important contributing factor was a report by Dr. Haanel, chief of a commission of experts sent by the Canadian Government to Europe to study the electric furnace."

Dr. Haanel has also devoted much attention to the utilisation of the peat deposits of Canada, and in general has adapted his knowledge of technical progress in Northern Europe to Canadian conditions, which are in many respects strikingly similar.

U. S. BITUMINOUS COAL SHIPPED TO CANADA.

A calculation based on figures given in "Saward's Journal of New York shows that in 1919, during the first nine months of the year, there was shipped from the United States to Canada approximately 8,670,000 tons of bituminous coal at average prices ranging from $3.61 to $4.33 per ton, and averaging over the whole period $3.68 per ton.

For the corresponding period of 1920, there was shipped 9,700,000 tons, at prices ranging from $4.22 to $6.72 per ton, and averaging $5.67 per ton.

Canada's importations of bituminous coal therefore, in the period named, were greater in 1920 by one million tons, and cost two dollars per ton more. During the quarter ending September 30th, importations cost about $12,000,000 per month.

PRODUCTION OF STEEL IN CANADA DURING THE FIRST NINE MONTHS OF 1920.

The total production of steel (including ingots and direct steel castings) in Canada during the first nine months of 1920 according to statistics collected by the Mines Branch of the Department of Mines, Ottawa, was 945,282 short tons, or an average of 105,931 tons per month as compared with a total production during the corresponding period in 1919 of 770,053 tons and an average monthly production throughout the whole of 1919 of 86,157 tons.

The production of steel during the nine months included: 901,188 tons of ingots and 44,094 tons of direct castings. The production in electric furnaces was 18,323 tons and in open-hearth, converter, crucible, or other furnaces 926,959 tons.

MONTHLY PRODUCTION OF STEEL IN CANADA.
(Including Ingots and Direct Castings).
(In Short Tons).

	1916.	1917.	1918.	1919.	1920.
January	.....	130,991	145,808	120,297	102,709
February	.....	120,674	138,975	100,531	94,245
March	589,553	152,420	158,234	111,793	109,027
April	.....	139,734	166,612	83,445	103,578
May	.....	155,411	174,275	77,146	100,965
June	.....	137,161	165,973	76,185	101,935
July	100,817	139,222	165,022	73,536	105,394
August	107,273	145,934	170,495	60,226	117,460
September	113,411	149,000	166,725	66,894	110,369
October	123,469	161,297	184,115	73,716	
November	124,431	158,122	129,255	92,328	
December	116,265	155,967	117,965	97,789	
Average Monthly	106,268	145,494	156,954	86,157	105,931

PRODUCTION OF PIG IRON IN CANADA DURING THE FIRST NINE MONTHS OF 1920.

The total production of pig-iron in Canada during the first nine months of 1920, according to statistics collected by the Mines Branch of the Department of Mines, Ottawa, was 806,488 short tons (800,608 tons made in blast furnaces and 5,880 tons made in electric furnaces from scrap steel) as compared with a production during the first nine months of 1919 of 710,114 short tons. The average monthly production of pig iron during the first nine months of 1920 was 89,610 tons as compared with an average monthly production throughout 1919 of 76,482 tons.

The blast furnace plants active during the first nine months were those at Sydney and North Sydney, N.S. Hamilton, Port Colborne, and Sault Ste. Marie, Ontario.

The blast furnace plants at Midland, Parry Sound, Deseronto, and Port Arthur, Ontario were idle throughout the period.

At the end of September 10 stacks were active and 8 idle.

Pig iron was made from scrap iron and steel at four electric furnace plants located at Hull, Montreal and Shawinigan Falls, Quebec, and Orillia, Ontario.

The monthly production of pig-iron in short tons since 1916 has been as follows:—

	1916.	1917.	1918.	1919.	1920.*
January	.....	89,187	74,239	103,963	81,494
February	.....	83,801	78,507	86,840	70,864
March	562,097	103,789	96,848	91,286	77,155
April	.....	100,564	104,331	93,359	86,303
May	.....	108,891	104,867	83,059	97,593
June	.....	99,998	103,037	66,470	89,258
July	92,012	93,499	109,723	60,927	94,417
August	87,864	100,727	96,164	67,404	104,482
September	102,744	100,690	95,102	56,806	104,922
October	113,608	103,277	106,962	56,049	
November	105,496	97,905	106,585	73,092	
December	106,496	87,152	119,186	78,526	
	1,169,257	1,170,480	1,195,551	917,781	
Average Monthly	97,438	97,540	99,629	76,482	89,610

* Subject to revision.

Mineral Production of Ontario in 1919

Statistical Report of the Ontario Bureau of Mines.

Part one of Vol. 29 of the Reports of the Ontario Department of Mines contains a statistical review of the mining industry in Ontario in 1919, tabulations and dissections of mining accidents and their contributory causes, and descriptions of the operating mines in the Province.

It contains also the Second Report of the Joint Peat Committee made by the Secretary, Mr. B. F. Haanel, a Report upon a geological reconnaissance into the District of Patricia, by Mr. E. M. Burwash, a Report by Cyril W. Knight on the Windy Lake and other nickel areas, and the note upon Haileyburian intrusive rocks by Dr. Middler and Mr. Knight which appeared in this Journal in the issue of August 13th. Certain typographical changes have been made in it.

The "format" of the Report is all that could be desired, and it may be noted that the Ontario Department of Mines furnishes information on dividends and financial aspects of the mining industry, and with regard to mining incorporations and other matters connected with the business side of mining that is not given in any other annual report of the various provinces of Canada.

Part Four, of the 1919 Annual Report dealing with the Kirkland Lake gold area, by A. G. Burrows and P. E. Hopkins, which it is noted by the Deputy Minister is considered by the Department as one of the most important of its recent publications, is still to be issued. Part Six, also yet to be issued is a description of the pelecypod fossils of the Lorraine and Upper Ordivician formations in the neighborhood of Toronto.

Statistics of the Industry.

Compared with the aggregate value of mineral production in 1918, namely $80,308,872, the peak of Ontario's achievement to date, the production of 1919, which was valued at $58,883,916, represents a decrease of 26.7 per cent. The obvious explanation, as the Report states, is the stoppage of the war.

Summarised statistics are as follow for 1919:

	Metallics	Non-Metallics	Total
Value	$41,590,759	$17,293,157	$58,883,916
No. of Employees	9,254	7,974	17,228
Wages	12,798,799	7,680,036	20,478,835

Annual production for 1913, the war years and 1919, compares in value as follows:

	Metallics	Non-Metallics	Total
1913	$37,507,935	$15,724,376	$53,232,311
1914	33,345,291	12,950,668	46 295,959
1915	44,109,679	10,136,000	54,245,679
1916	55 002,918	10,300,904	65,303,822
1917	56,831,857	15,261,975	72,093,832
1919	41,590,759	17,293,157	58,883,972
1920 (Nine months).			

The value of a number of selected metals produced in Ontario from the commencement of their mining is given in the Report as follows:

	To 31st Dec. 1919
Silver	$197,931,902
Nickel	149,931,762
Gold	61,316,572
Copper	53,656,767
Iron Ore	9,350,276
Cobalt and compounds	7,205,834
Platinum	1,500,000

Gold Production.

Sixty-six per cent of the Canadian gold output in 1919 came from Ontario, and by her contribution of 505,964 ozs., worth $10,451,709 Canada takes third rank in the six leading gold-producing British Dominions, and was the only one to report an increase in production during 1919.

Silver Production.

The high average price of silver during 1919, namely $1.11 per oz. aided by the exchange premium, gave a great impetus to silver production, permitting the working of low-grade ore, the re-opening of abandoned mines and stopes and the re-treatment by flotation of tailing dumps having a silver content as low as four ounces per ton. "Despite these aids" states the Report, the silver output continued to decline with the natural waning of the camp as the deposits are being worked out."

Nickel and Copper.

The completion of the new smelter of the British America Nickel Corporation at Nickelton was the most important event in Ontario metallurgy in 1919. The following description of the plant and its operations is taken from the Report:

On January 17th, 1920, the new smelter of the British America Nickel Corporation at Nickelton was blown in, and on January 21st the first converter went into commission. Ore is being raised from the Murray mine in which diamond drill borings have disclosed over 16,000,000 tons, of smelting ore. The inclined shaft is down 1,100 feet, and eight levels have been established, on five of which electric locomotives are used.

In the Nickelton smelter, which is situated one mile from the Murray mine, there are two blast furnaces and three Pierce-Smith basic-lined converters in operation. Another blast furnace and converter have been ordered. The most noteworthy features of operation are described in a letter dated June 24th, 1920, by W. A. Carlyle, Managing Director, as follows:

In the blower room are four turbo-blowers, each driven by steam turbines, 3,600 r.p.m., Rateau-Battu-Smoot design, made by the Dominion Bridge Co. Limited, Montreal.* There are two blowers of 30,000 cu. ft. free air each at 36 oz. for blast furnaces and two of 36,000 cu. ft. each, 12 pound pressure, for supplying air to converters, the steam turbines for the latter being 2,200 h.p. The air stabilizers and governors first supplied were not successful, but new ones just installed, using monel metal in certain parts are operating well and this unique blower plant now promises to be most satisfactory. Each turbine has its surface condenser complete in every detail. A 300 k.w. motor-generator set supplies D.C. power to the locomotives, cranes and converters in the smelter building and a duplicate will soon be placed.

The ore consists of eruptive rock (norite), impregnated with pyrrhotite and some chalcopyrite, containing about 25 per cent. SiO_2, 35 per cent. Fe., and 18 per cent. S., etc., and the metallurgical process is to smelt this ore direct without roasting and to convert the low-grade matte containing 10 to 12 per cent. copper and nickel to the usual 80 per cent. matte, which is granulated and sent to the refinery. Converter slag, averaging about 16 per cent. SiO_2, is the only flux used in the blast furnace, which easily smelts 1,000 tons of ore and flux per day and has done 1,148, taking about 10 per cent. coke in the charge. At each end of each furnace is a 20' by 30' settler having at one end two tapholes and two syphon exists for matte, the latter a new device, permitting most successfully the drawing off of matte from near the top of settler, thus avoiding breakaways.

In the converters low-grade matte is fluxed with fine ore

and some blast furnace molten slag, gravel or sand being used for end fluxing when a completed charge of 60 to 110 tons of 80 per cent. matte is poured and granulated. The converter slag is partly poured into the settlers and partly into beds, where after being broken up by hand or explosives it is loaded by steam loco-cranes and sent to the smelter bins. There is no trouble in producing slag containing only 14 to 15.5 per cent. SiO_2, making a good iron flux for the blast furnace. The Garr gun is used for charging the fine ore or gravel. There are large dust flues and chambers, with a brick stack 300 feet high and 25 feet internal diameter.

The electrolytic refinery is situated on the Ottawa river, at Deschenes, Quebec, where cheap electric power is available. Mr. Carlyle's description follows:

The matte passes through two Wedge roasters with 8 hearths, thence to leaching department where part of the copper is leached out and sent to the copper electrolytic depositing house.

The leached matte is then smelted with fluxes in a specially designed electric furnace using 24" carbon electrodes, and nickel-copper anodes, weighing 200 pounds, are cast in moulds on a revolving table. This furnace has proved a signal success. These anodes go to nickel house where the nickel is electrically plated out by the Hybinette process, to cathodes being then either cut up or remelted in a Rennerfelt electric furnace and poured into ingots or granulated to shot. The slimes containing platinum, palladium, gold, iridium, etc., will be refined in the precious metals department. The capacity of the present plant is 15,000,000 pounds nickel and 9,000,000 pounds copper per annum, but at comparatively small expenditure can be greatly increased.

A report for the half year ending June 30th, 1920, showed that 1,185 tons of Bessemer matte had been produced at the smelter. All this matte had been shipped to the refinery and was in process of treatment.

Iron Ore. — Beneficiation.

Reference is made to the proved value of blast- furnace slag as a road material, and the use of basic slag as a fertilizer, and attention is drawn to the slight recognition so far accorded to these by-products of the iron plants of the Province.

Attention is also drawn to the growing use of beneficiated ores in 15 states, and the subjection of 8,000,000 tons of ore annually to some form of concentration. The work of Mr. James W. Moffatt of Toronto,** and of Dr. Stansfield of McGill University is referred to, and it is pointed out that Ontario only requires the evolution of a commercially practical process to make large tonnages of low-grade iron ores available for use in domestic furnaces.

By-Product Coke.

Reference is made to the modern by-product ovens used by the Ontario steel companys, and to the new benzol plant of the Steel Company of Canada, now in operation, and designed to produce 100,000 gallons of motor-fuel per month.

The Semet-Solvat Company has leased a property from the Toronto Harbor Commission with the intention of erecting by-product ovens so soon as the cost of building will permit, and it is stated that the British Foundation Ovens, Ltd. proposes the erection of retort ovens in the neighborhood of Hamilton and Toronto, presumably for preparation of coke for domestic uses, in substitution for anthracite.

Structural Materials.

The increase in production of non-metallics in the Province is largely attributable to the partial recovery of building, although, as the Report points out, after allowing for increased costs of materials, the 1919 expenditures for building did not represent in the Province more than one-half the figures of 1912 and 1913.

Reference is made to the "Super Cement" being made at St. Mary's, a product that is receiving much advertising in England, and is stated to be stronger than Portland cement and possessing waterproof and oilproof characteristics.

The following reference is made to the Port Colborne plant of the Canada Cement Company, where the recovery of potash from flue-dust is to be undertaken.

During the year a potash recovery plant was under construction at the Port Colborne works of this company for the purpose of extracting or washing out flue-dust containing potash salts from gases passing through the kiln stacks. Volatilized potash in the gases is dissolved by passing through spray chambers. The resulting sludge is put through thickeners and filters, and the brine evaporated in condensers. The quantity of potash (K_2O) recoverable is about 1 ton per 1,000 tons of cement manufactured. In design the new plant contains many desirable features found in installations in the United States, and it is expected to be in operation by July, 1920. From the 12 potash recovery installations operated in the United States in 1918, there was a production of 1,549 short tons of potash (K_2O), valued at $603,617.

The production of felspar, fluorspar, graphite, talc, actinolite, gypsum, iron pyrites, mica, natural gas, peat, apatite (for phosphate), quartz (silica), salt, and other minerals is fully dealt with, but the diverse particulars will not permit of useful summarisation.

Mineral Revenues.

Sales of mining lands, lease rentals, royalties on sand and gravel, miners' licenses, natural gas tax and assay charges brought in a revenue of $137,541, and the Mining Tax Act yielded $624,951, made up as follows.

Acreage tax	$33,126.34
Natural Gas tax	38,797.71
Profits Tax	533,027.15

The Profits Tax was made of contributions from the mines derived as follows:

Gold Mines	$ 59,257.28
Silver Mines	143,292.58
Nickel-Copper	346,521.31
Miscellaneous	3,955.48

The large proportion of the tax contributed by the nickel-copper companies is noticeable, the amount paid by the International Nickel Company being $300,923.51, or 54 per cent of the total amount collected.

Mining Accidents.

Fatalities were 39 in 1919, compared with 32 in 1918. Although the fullest particulars are given of the accidents, the inclusion of metallurgical operations and the very diversified character of the industry, does not allow the drawing of deductions, except that the rate of accidents appears to be greater in the Winter than in the Summer, and that fatalities appear to be more numerous in the metallurgical operations than in mining work proper. The number of shaft accidents seems large. The rate of fatalities per thousand employees was 3.00 in 1919, comparing with 2.10 in 1918 and 2.02 in 1917, a rate that compares very favorably with the record of other mining provinces and countries.

*See page 796, issue of 1st Oct. 1920. "Utilization of Ontario Iron Ores", by R. E. Hore..

Northern Ontario Letter

THE SILVER MINES.

The Cobalt Field.

The end of the second week of December finds the mining companies in the Cobalt district growing uneasy over the steady recession in quotations for commercial bar silver. The price which the metal now commands is very little above the average cost of producing, and in the case of some of the smaller mines, the balance is on the wrong side.

A factor of outstanding importance, of course, is the steady decline in commodity prices. This is bound to reduce the cost of mining. So far, however, no cut has been made in the rate of pay to the mine workers, and up to the present these men have not volunteered any suggestion that they would prefer to work at lower pay rather than have the mines close.

Although the situation is disquieting, yet the fact remains that the mines of the Cobalt field contain many millions of ounces of silver in ore reserves, the ore is sufficiently high grade to compare with the richest in the world, and sooner or later the silver mining industry of Cobalt is bound to settle down into a steady stride and on a basis of profitable operation.

After having been closed for a short time due to shortage of hydro-electric power as well as desiring to make certain repairs to the mill, the Beaver Consolidated is again in operation. This is interpreted as an expression of confidence in regard to the future, relative to both power supply and the price of silver.

The McKinley-Darragh has issued a financial statement, summarised as follows:

Cash on hand	$ 69,070.80
Bullion on hand at smelters and ore at mine	244,307.75
	$313,378.55
Less Bills payable	$ 65,000.00
Cash assets	$248,378.55

These cash assets are equal to more than 11 cents on each of the company's issued shares. Factors of outstanding importance, and of special significance to the stability of the mining industry of Northern Ontario are found in the report just issued by the Ontario Department of Mines showing the metal output of these mines during the first nine months of 1920. The report is such as should cause a general wave of optimisim as not only does it show the North's gold output to be the heaviest in the history of the Province, but it also shows that the silver output for the nine months under review actually increased 355,747 ounces over the first nine months of 1919 and the value of the production for this year so far recorded shows an increase of $536,868.

Not only this, but the cobalt oxide produced in Cobalt more than doubled during the period as compared with last year, and altogether the report of metal output shows a total increase of more than eight million dollars.

This achievement is regarded as extremely remarkable owing to such having been accomplished at a time when the economic conditions were so adverse to silver, gold and nickel mining.

Coming just now when a good deal of pessimism seems to be abroad, the official figures should have a stabilizing influence and bring the public to realize that the physical condition of the leading mines and the general outlook for the mining industry of Northern Ontario was never better and the mines were never before confronted with prospects of such magnitude as that found now on every hand.

Labor shortage during the past summer, followed by shortage of electric power late in the fall gave rise to pessimism entirely out of proportion to all reason. The labor supply is now abundant and the power shortage at worst is entirely temporary. Bearing these facts in mind the opinion seems now to be likely to take quick form that in regard to the mining industry there is now greater occasion for optimism than ever before in the history of the North.

The re-treatment of sand tailings from Cobalt Lake has been discontinued in the Buffalo mill of the Mining Corporation. This has reduced hydro-electro power consumption to the extent of between 400 and 500 h. p. In the meantime, part of the plant is working on fines from the main plant of the Mining Corporation. This reduction in work has released about thirty men.

In all parts of the mining districts a surplus of labor is reported, and the suggestion is being made in circles in close touch with the situation that the workmen should consider some plan to encourage as little curtailment of work as possible. To do this, it would be necessary to volunteer a reduction in wages.

The Kerr Lake Mining Company is stated to be making good progress in the development of its property in the state of Utah. About 100 tons of silver-lead ore is being treated daily, and the company is stated to have paid about $50,000 in royalties, this amount applying on the ultimate purchase price of $250,000. The company's silver production at Cobalt has been reduced due to power shortage and is now about 40,000 ounces monthly.

Voting has been completed at the Cobalt mines on the question of adopting a scheme to establish an Employes' Sick Benefit Fund. The last two mines to be heard from were the McKinley-Darragh and the Peterson Lake. The former voted 65 for and only 3 against. The Peterson Lake voted 14 for and 11 against. This makes the total vote 871 of which 737 were in favor of the scheme and with only 134 opposed to it. Accordingly, arrangements will be made to carry the scheme into operation as quickly as possible.

A small shipment of ore has been made from the property of the Regent Mines, near Elk Lake, for testing purposes. The shaft has been put down about thirty feet, and encouraging results obtain to that depth.

Concerning silver mining in general, the present quotations necessitate a general reduction in operating costs. The price of the metal has now declined to almost pre-war levels and suggests no other remedy than a general cut in expenditure.

THE GOLD MINES.

The Porcupine Field.

In the gold mining districts, power shortage is preventing the full benefit which might otherwise result from the present abundant supply of workmen. Restricted operations on this account preclude the possibility of reducing operating costs for the time being. In spite of this, however, a very satisfactory showing is being made, and the margin of net profit is quite satisfactory.

Up to the beginning of December, the Dome Mines had produced over $1,800,000 and the indications appear to be that an output of close to $2,000,000 will

be made for the full year. As regards the future, the power shortage threatens to cause a reduction in milling operations, although it is stated the development of the mine will not be interrupted. The slack period in the mill at worst will be completely relieved in the spring when the break-up of ice takes place in the lakes and rivers.

Production from the Hollinger Consolidated Mines will approximate $6,000,000 for the current calendar year, according to official figures now available. This has been accomplished when able to operate at not more than two-thirds capacity. The causes contributing to the reduced scope of work was made up of a shortage of workmen during the first nine months, and by a serious power shortage during the last quarter. In spite of this, the company has just declared its ninth dividend of 1 p.c. payable December 31st to shareholders of record December 15th. This will call for the disbursement of $246,000 and makes a total of $2,214,000 paid this year. It seems to reflect the confidence with which the directors of the company view the future. Just now, the Hollinger is rushing large quantities of coal in full trainloads to the mine, so as to use its auxiliary plant to fullest capacity throughout the period of power shortage, and added assurance is thus provided that dividends during the coming year promise to even exceed the magnificent record of 1920.

Gold production from the north for the first nine months of 1920 increased fifteen p.c. over the corresponding period of 1919. The output came from twelve mines, seven of which are in the Porcupine field, three in Kirkland Lake, one in Gauthier townships near Larder Lake and one in the Rainy River district.

During the coming year, at least three more important producers should be added to the list, namely, the Wright-Hargreaves, Tough-Oakes and Ontario-Kirkland, all three of which are situated in the Kirkland Lake district.

Kirkland Lake Area.

Unofficial reports tend to indicate a movement intended to merge the Teck-Hughes with the Orr Gold Mines. Officials of these companies have been in conference, but have not made any public announcement as regards progress made. It is learned, however, that promising headway toward this end has been made. A merger between the Teck-Hughes and Orr would be beneficial to both companies, as it would increase the tonnage of ore available for treatment in the mill already operating on the Teck-Hughes. In regard to the latter property, it is stated the current year's operations have resulted in a substantial profit, and the outlook for the future is brighter than ever before.

For the current calendar year, the production of gold from the lake shore mine will approximate half a million dollars. In addition to this, considerable development work has been done, including sinking the main shaft from the 400-ft. level to a depth of 600 feet. The Company will enter the new year with extensive plans in view, among which will be continuing the shaft to a depth of 800 feet, as well as driving crosscuts at the 600 and 800-ft. levels for the purpose of determining the extent of the ore deposits at these horizons. Following this work, the question of enlarging the mill will be taken under consideration. For these reasons the year 1921 promises to be one of probable big expansion of this rich mine.

Output from the Kirkland Lake Mine of the Beaver Company will exceed $300,000 for the current year. This company is in excellent shape and can now proceed with the return of capital advanced by the parent company, the Beaver Consolidated.

Altogether, the Teck-Hughes, Kirkland Lake and Lake Shore mines will produce approximately $1,060,-068 for the current year, and with promise of the production being doubled during the coming year, owing to the present producers adding to the scope of their operations as well as the addition of the Wright-Hargreaves, Tough-Oakes and Ontario-Kirkland to the producing list.

Larder Lake.

The Goldfields, Ltd., of Larder Lake, one of the companies understood to be controlled by the Associated Goldfields, concerning which considerable newspaper criticism has been heard recently, will hold a meeting on December 15th to consider the special interests of the shareholders of Goldfields Ltd. Associated Goldfields is said to be proceeding with a reorganization intending to increase its authorized capital from 5,000,000 to 30,000,000 shares. The plan is to issue four shares of the new for one of the old, and thus leave an extra 10,000,000 shares in the treasury. The suggestion has been made in the press that it is understood the Ontario Government would be willing to appoint engineers to make a report on the property provided they are urged to do so by the stockholders. The Government, however, presumably would hesitate to take such action without first being urged by those financially interested.

Ore and Bullion Shipments.

During the week ending December 10th, four shipments of ore were made from the Cobalt district, aggregating 219,056 pounds.

Following is a summary :

Company	Cars	Pds.
La Rose	1	86,793
Dominion Reduction	1	63,000
Kerr Lake	1	59,715
H. F. Strong	Odd lot	9,548
Total		219,056

During the corresponding period, the Nipissing mine was a heavy shipper of bullion, sending out 76 bars containing 100,068 ounces. This makes a total of 360,933 ounces shipped from the Nipissing so far this month.

PERSONALS.

Mr. John T. Stirling, Chief Inspector of Mines of Alberta, is in Toronto on his way back to Edmonton. He has been overseas for some months on account of ill health.

Mr. Chas. Camsell, Deputy Minister of Mines, was in Toronto Saturday and addressed the Toronto branch of the Canadian Institute of Mining and Metallurgy.

Mr. Geo. Guess, professor of metallurgy at the University of Toronto has been chosen chairman of the Toronto branch of the C. I. M. M., for the coming year. Mr. J. P. MacGregor has been reelected as Secretary of the Branch.

TORONTO MINING QUOTATIONS.

Following are the average quotations for active gold, silver and oil stocks on the Standard Mining Exchange, for week ending 11 Dec. 1920.

SILVER	High	Low	Last
Adanac Silver Mines, Ltd....	1⅞	1¾	1⅞
Bailey	4	3½	3½
Beaver Consolidated	29	25¾	26½
Chambers-Ferland	5½	5	5½
Cobalt Provincial	46	40	40
Coniagas	2.00	2.00	2.00
Crown Reserve	20	15	16
Gifford	1⅜	1	1
Hargraves	1¼	1¼	1¼
La Rose	23	22	22
McKin.-Dar.-Savage	22¾	20	22¾
Mining Corp. of Can.	1.10	85	1.00
Nipissing	9.24	8.10	8.40
Ophir	2¼	1¼	1¾
Peterson Lake	10	8½	9½
Temiskaming	26	24	26
Trethewey	17¼	12½	14½
GOLD.			
Apex	1¾	1½	1½
Atlas	16½	15½	15½
Boston Creek Mines	10	8	10
Dome Extension	43½	42	42
Dome Lake	2½	2	2½
Dome Mines	13.00	12.20	12.40
Gold Reef	3	2½	2½
Hollinger Cons.	5.65	5.50	5.50
Keora	15	11	12
Kirkland Lake	39½	37	39
Lake Shore M. Ltd.	1.02	1.00	1.02
McIntyre	1.88	1.81	1.81
Moneta	9½	9	9
Newray Mines, Ltd.	3¾	3¾	3¾
Porcupine Crown	17½	15	15
Porcupine Tisdale	1	1	1
Porcupine V.N.T.	19	17½	17¾
Preston East Dome	2⅞	2⅝	2⅝
Schumacher	19	16½	18
Teck-Hughes	10	9	10
Thompson Krist	5	5	5
West Dome	5½	4¾	4⅞
West Tree Mines Ltd.	5½	5	5⅜
OILS.			
Ajax Oil	21	20	21
Eureka	31	30	30
Petrol Oil, New	34	30	30
Petrol Oil, Old	80	80	80
Rockwood Oil, Gas	3	3	3
Vacuum G.	20	10	12

METAL QUOTATIONS.

Fair prices for Ingot Metals in Montreal Dec. 14th, 1920. (In less than carload lots).

	Cents per lb.
Copper, electro	19
Copper casting	18¾
Tin	43
Lead	6¾
Zinc	7¾
Aluminum	35
Antimony	8

SILVER MINE TO RE-OPEN NEAR PORT ARTHUR

J. J. O'CONNOR.

Another of the old time silver properties of the Port Arthur district is about to be developed. Mr. J. G. Spears, of Toronto, owner of the "3A", situated twelve miles east of Port Arthur, and one mile north of the Canadian National Railway, at Silver Harbour, has optioned this property to Pennsylvania interests. Work will be undertaken in the early Spring of 1921, when systematic development will be carried on to depth, and the formation thoroughly proven.

This property was discovered by two miners employed at the Silver Harbour mine, which adjoins it on the south, in the fall of 1870. During the winter of 1871-72, these men worked on the lode, carrying the ore taken out in the day, to their boarding house at Silver Harbour every night. They sunk a pit 18 feet deep from which they took during the Winter, 22 barrels of ore, which was declared to be as rich as anything the Silver Islet Mine was then producing. This ore was sold to Mr. J. S. Lyon, of Buffalo, N.Y. where he had it reduced by Kayser, James & Co. The bars were sent to the United States Assay Office, in New York, where according to the official report of the chief clerk, Mr. J. M. Floyd, yielded $17.80 of gold, and $301.45 of silver to the ton, with some nickel and cobalt.

Soon after this event Captain Slawson took over the management of the "3A". He sank three shafts on the lode 310 feet apart, from which considerable very rich ore was taken. According to J. M. Courtice, and the assayer J. B. Cleveland, the assays showed a yield of 2,465 ozs. of silver to the ton of 2,000 pounds, and one and four-tenths per cent of cobalt, with a good percentage of nickel.

The vein strikes nearly east and west, parallel with, and about a mile to the north of Silver Harbour. It occurs in the Huronian series, which in the vicinity consists of thick beds of diorite and fine grained greenish-grey slates, some of which are chloritic, talcose and ferruginous, with some serpentine alongside and in the vein. This formation, with which the vein appears to conform, dips at an angle approaching the perpendicular. It is much more ancient than that in which other silver mines in the Port Arthur district have been found. The discovery of silver in these older rocks, which are known to underlie the horizontal silver-bearing slates of the Thunder Bay silver area, should be good evidence to show that the silver does carry down, and is not carried only in the surface bed.

The outcome of the forthcoming development will be watched with great interest, as it is expected to demonstrate the occurence of silver in paying quantities, in a formation known to have great depth.

The Dominion Coal Company has acquired the steamers "Kamouraska" and "Rosecastle" by purchase. Both these steamers were built for long-term charter to the Dominion Coal Company, and were for a long time under Admiralty requisition during the war period. A controlling interest has also been obtained in the S. S. "Daghilda" which was constructed under a similar arrangement for the coal and ore service of the Dominion Steel Corporation.

British Columbia Letter

Stewart, B.C.

Now that the winter has settled down on the north country, word may be expected soon of considerable shipments of high grade ore from the Premier Mine, Salmon River, Portland Canal. Preparations were made during the Summer to transport quantities of such material over the snow trail as soon as the latter had hardened. The Premier, however, is not depending on this ore for its future but on its reserves of lower grade which have been under development and for the treatment of which the necessary plant is under construction.

There is no doubt that the closing down of development on the Big Missouri had a dampening effect, but those who have been through the district and who are competent to talk, assert that the Portland Canal Mining Division has but started along the road of mineral production, that the Premier mill be one mine among many, and that last season there were a number of prospects staked on both the British Columbia and the Alaska sides of the boundary sufficiently promising to warrant extreme optimism.

The Spider Group of Mineral Claims, which is being opened up by the Algunican Development Company, is a property of which much is predicted. Work is being continued throughout the winter. Commodious quarters have been provided for the men, who are being well taken care of in every respect and it is planned to commence shipment of ore over the snow early in the New Year.

Kaslo, B. C.

There is a revival of mining in the Slocan, the richest silver-lead camp of British Columbia. For months all the large producers have been closed down, with the exception of the Silversmith Mines Ltd. (old Slocan Star), because of the refusal of the operators to meet the demands of the men with respect to wages, accommodation, etc. They regarded the requirements of their employees, as expressed through an organization known as the One Big Union, as extravagant and refused to take them seriously. A strike was called. There is no doubt that it was effective for the mines were forced to inactivity. Ever since midsummer the mine managements have held to their guns and now it appears that they have been successful. When the strike was first declared work was plentiful as the lumber camps were able to absorb practically all able-bodied men who wanted employment. These camps now, in many instances, are closed down. There also is an influx of labor from the prairies province. The mines, therefore, are well provided with men and the old-established properties again are being put on a producing basis. The Noble Five Mine at Cody has taken on a crew of between 65 and 70 men; the McAllister has obtained all the men required to carry on work planned; the Rambler-Cariboo has a full crew; the Rosebery-Surprise Mining Co. has re-opened the Surprise Mine at Sandon as well as the Bosun Mine at New Denver. The concentrators of the Rambler-Cariboo and the Noble Five are in operation. It seems, therefore, that the strike is definitely broken and that the output of this section of the Province from this date on will begin to climb. There is no hope, however, that the loss of time experienced can be made up this year, and it would appear certain that the silver production of the Province, as a result, will show a decline as compared with the previous year when the official statistics are compiled.

Nelson, B. C.

At the International Mining Convention held at Nelson, B.C., during the Summer it was resolved that the Dominion Government should be asked to make provision for the prospecting and mining of base minerals on Indian reservations in this Province. As a result of the joint action of the Federal and the Provincial Governments it is permissible at present to mine the precious metals on such reservations. This privilege is considered of little value in British Columbia, because gold and silver are seldom found entirely apart from other minerals. Delegates to the Convention, consequently, decided to ask the Ottawa authorities to broaden the regulations to such an extent that they might be of value to the mining industry. Judging, however, from the reply received from Ottawa the prospectors and miners of the Province are as far as ever away from their object. In the first place it is pointed out that the Dominion Department of Mines has no control over the minerals found within Indian reservations, but that they come under the jurisdiction of the Superintendent General of Indian Affairs. And, secondly, it is set out that "under the provisions of the Indian Act the baser metals can only be disposed of by this department upon a surrender being obtained from the Indians, and where the base metals are found in conjunction with gold and silver authorized to be mined by the regulations....this department cannot dispose of the same until surrendered by the Indians."

Taxation on mining companies was a subject dealt with by Hon. Wm. Sloan, Minister of Mines, in a recent address delivered at Nelson, B.C. He made the important announcement that the justice and equity of representations made by mining men had been recognized and that "it would be recommended for favorable consideration that the depletion of mines be allowed as a deduction from revenue in ascertaining the taxable income."

Continuing he said:

"Our policy in all branches of Provincial endeavor is to increase production. While there must be income to meet obligations and to provide for the development of natural resources and the opening up of the country, the Government's course is so shaped that no industry will be overburdened, but that all enterprise that gives employment and increases our wealth and stability will be encouraged and stimulated."

Ainsworth, B. C.

No. 1 Mine, Ainsworth Group, owned by the Consolidated Mining and Smelting Co., has been leased by a number of competent mining men who propose mining and shipping ore without loss of time. This mine formerly was an important producer. Some great stopes have been chambered out. The property is situated high up the mountain back of Ainsworth. Both tramway and compressor are included in the lease. Last year No. 1 shipped 235 tons to the smelter and this year it has contributed 336 tons to the Train plant.

The Florence Mining Co., is pursuing an aggressive policy in the development of its property situated on Princess Creek, a few hundred feet from Kootenay Lake. This mine has been operating steadily during the past two years and is one of the few silver-lead producers of the Province with such a record. R. H. Hewer, general superintendent, believes that it is to prove one of the deep mines of the Kootenay. While ore has been extracted constantly since the opening of the property, being shipped by tram to the hopper of the concentrating mill whence the concentrates are transported to the loading trestle at the lake edge, the proving of ore reserves and general exploration has been systematically carried out with good results, according to Mr. Hewer. He states that the Florence has been found to possess one of the big vein systems of the district, including seven large veins, three being parallel fissure-veins and four cross-fissure veins. These veins are in limestone formation and are of a very friable rock. The Company has acquired permission to utilize the natural power of Woodberry Creek and it is planned to construct a plant on this Creek in the Spring, thus obviating the possibility of being inconvenienced through shortage of water for the generation of power. It also is proposed driving a new main tunnel from a point near the lake some 500 feet below the present No. 5 Level. Assuming that the theory that the ore is to be found at depth proves correct this work will open up an extensive new stoping area.

Trail, B. C.

Ore receipts in gross tons received at the Trail Smelter of the Consolidated Mining & Smelting Co., during the week ending November 30th last were 12,561, bringing the total for the year to 239,183 tons. Of the former the Company's mines aggregated 11,150 tons, while the Canada Copper Co., Allenby, which recently commenced operations, contributed 362 tons. The Josie Mine, Rossland, shipped 531 tons and the North Star, Kimberley, 250 tons.

Grand Forks.

The Copper Mountain Mine of the Canada Copper Company now is on a permanent shipping basis. The new mill has been in operation for some weeks and is reported to be giving satisfaction. Some minor adjustments had to be made after the test runs but these have been effected and now the ore is coming from the mine daily in carloads, is being concentrated at Allenby, and thence shipped to the Trail Smelter. The last reports were that 50 carloads of concentrates were being shipped from Allenby every day which means that approximately 800 tons of ore is going through the Mill in the same period.

It is announced that a Dominion charter has been granted the Canada Copper Co. and that the Company's head-office will be situated at Toronto. The capitalization is $10,000,000 and authorization is given to take over the Canadian Copper Corporation Ltd. carrying on business in British Columbia.

Vancouver, B. C.

Those in charge of development on the Emancipation Mine are very sanguine in their references to the outlook. Dr. E. T. Hodge, who recently returned from the property, declares that some of the richest gold-bearing quartz of British Columbia has been uncovered, assay returns having been obtained which are rivalled only by the Engineer Mine of the Atlin District.

Reference has been made to the incorporation of the Coast Range Steel Ltd., an organization said to be backed by British capital to the extent of $15,000,000, and whose plans are to establish in British Columbia an iron and steel industry capable of taking care of all the requirements of north western America and as well of securing a large share of the foreign trans-Pacific trade. It was said, too, that another British syndicate has had its engineers in the field in this Province investigating its natural resources with a view to starting a similar enterprise. A third announcement has been made in this connection which is of interest. It is that the Industrial Department of the Provincial Government has undertaken to loan $250,000 to finance the amalgamation of the Port Moody, Eburne, and Tudhope Electric Plants, the new company to be known as the B. C. Steel Works Ltd. No official confirmation, however, is available of the assistance said to be promised by the B. C. Government.

Victoria, B. C.

Because of the weakness of the copper market the Britannia Mining & Smelting Co., has materially reduced its staff both at the mine and smelter. It is stated that the shipment of concentrates will cease until conditions improve and that in the meantime the development of the property will be proceeded with. The Granby Mining, Smelting & Power Co., has been similarly affected. The output is being substantially reduced, a large number of the employees having been discharged.

The prospectors of British Columbia now are strongly organized and they are moving towards the establishment of closer relations with the Provincial Department of Mines. They are anxious to obtain action on a number of matters of concern to them, chief among which is cheap powder. It is contended that the miners should obtain explosives on the same basis as it is supplied to the farmers for stumping purposes. The farmers get it through the Government and the Farmers' Institutes at cost plus transportation charges. The Prospectors' Association believe that a similar arrangement is feasible in connection with the mining industry. They also desire some uniform policy in respect of mine-road construction in the various districts, in regard to Winter lectures by resident mining engineers for the benefit of prospectors, and relative to the establishment of exhibits of minerals in the various provincial centres. There is a probability that a conference will take place before the next session of the Provincial Legislature between authorized delegates from the Prospectors' Associations and the Minister of Mines for a discussion of these questions and with a view to reaching a basis for close co-operation in the formulation of advanced and generally beneficial legislation.

GOLD-BEARING ROCKS IN THE WESTERN AUSTRALIAN DESERT.

Valuable Report issued by the Geological Survey, Perth, W. A.

Notable among the publications of the geological surveys of the British Dominions are those of Australasia, and in particular those of New Zealand. These publications, which rival in excellence of contents and format those of our own Survey, apart from their scientific value are interesting because of the vivid contrasts they reveal between the necessary outfits and the surroundings of geological survey parties in Canada and in the Antipodes.

An exceptionally interesting report to hand is one issued by the Geological Survey of Western Australia describing a geological reconnaissance of the country between Laverton and the South Australian Border, including part of the Mount Margaret Goldfield, near south latitude 26 degrees. In this instance the word reconnaissance is used with exactitude, as a great part of the territory traversed was waterless desert, with occasional "soaks" and desert vegetation consisting largely of spinifex. The country contains roving black fellows, and some delay was occasioned to the expedition by an attack of the aborigines in which one of the party was seriously injured. The pack animals were camels. The location of water-holes was carefully observed by the party and a chapter is devoted to notes on this all-important matter in desert travel.

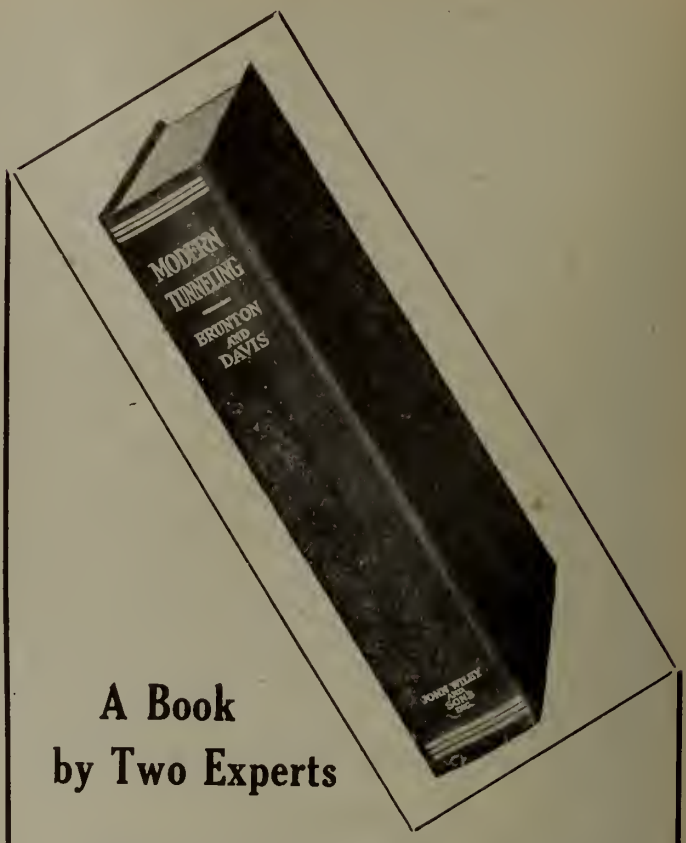
A characteristic topographical feature of the West Australian desert is the "breakaway", and much space is devoted to explanation of the probable origin of these raised "table-tops". The feature is due to an indurated surface capping over unconsolidated material. When through animal agencies, or wind and water, the indurated capping is broken through, the unconsolidated strata below is, after undergoing breaking down by weather agencies, finally "exported" by the wind, and eventually rolled into great ridges, leaving the insolated "breakaway" ranges like coastal cliffs in appearance.

The area of possibly auriferous rock discovered appears to be small, but it is stated there are good grounds for believing that it extends further than it was possible for the exploring party to penetrate. The rock samples brought back were found to be only slightly gold-bearing.

At one point the expedition noted an extensive and definite boulder bed about fifteen feet in thickness, of glacial origin. Mr. A. Gibb Maitland considers this important discovery to be of more than local significance. The precise position in the geological time-scale of this deposit cannot be fixed definitely, but Mr. Maitland suggests it may be of late Mesozoic or Tertiary age.

The petrology of the rocks observed is very carefully worked out, and numerous microphotos of specimens are included in the Report. A correlation of the specimens brought back by the expedition is given with those from other localities in Central Australia, and from the Western Australian Goldfields. The rocks brought back by the survey party include acid porphyries, granites, granulites and gneisses, greenstones, basic plutonic and dyke rocks, and rocks of clastic and sedimentary origin. About half the volume is occupied by the petrological matter.

The Report is issued by Minister of Mines, Perth, West Australia.



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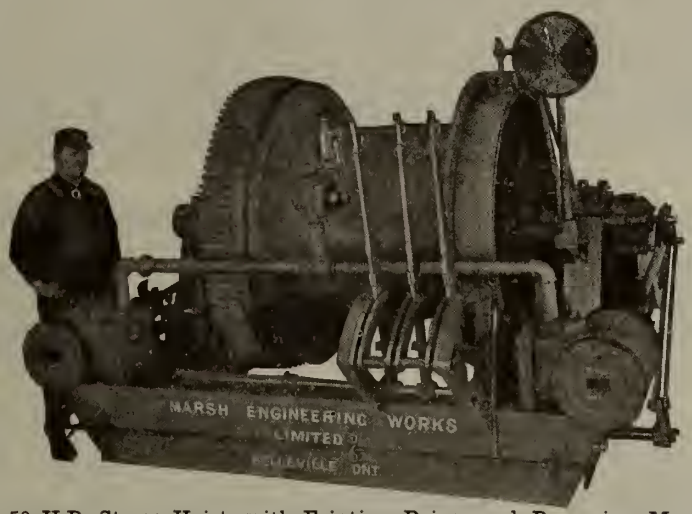

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NOTES FROM THE NOVA SCOTIA COLLIERIES.

Labor and Wages.

The vote of the union members taken on the question of the acceptance of the Montreal agreement approves of its acceptance. The matter has been one of very hot debate, and the advice of the leaders to accept the terms agreed upon at Montreal met with severe criticism, especially from the mainland collieries. The alternative of a strike met with no sincere advocacy, because the inopportuneness of a strike for higher wages under conditions of widespread unemployment and tumbling values of commodities and securities was too plainly evident.

Lifting of the Export Embargo.

The Board of Railway Commissioners has ordered a conditional lifting of the export embargo, and it is unlikely that such a measure will again be invoked. The ideas of Government with regard to the coal industry seem to be limited to the imposition of control of prices and limitation of distribution. It never seems to have occurred to anyone at Ottawa that what the coal industry needs is financial aid, more skilled miners and governmental solicitude for extension of coal markets. Up till now the Nova Scotia coal mines have been utterly neglected when coal could be cheaply imported from the United States, and treated as the reserved property of the national railways when coal was scarce and dear across the line. No consistent policy of guaranteeing government purchase of domestic-mined coal, or of preference for Canadian coal in governmental uses has ever been adopted. If the policy of the government is to buy coal in the cheapest market, regardless of its origin, it can not grumble if the public do likewise, and if such a policy is persisted in, it makes the variest buncombe of all arguments for a policy of national protection. The imposition of an embargo on exports in times when export trade is profitable carries with it an obligation to guarantee a domestic market when export is unprofitable, and when the pressure of foreign importation is great. Coal production is as truly a crop as wheat. Unless the seed of preparation, development, expenditure and human energy is sown, and due allowance made for the factor of growth and the lapse of time, no production can be looked for. The popular idea that a coal mine resembles a reservoir which can be tapped at need is all wrong. The production of coal five years from now will depend upon the work done in 1920, and not all the King's horses or all the King's men can produce coal in times of scarcity if the plans were neglected, or prevented, in the years that preceded scarcity.

WATER-WHEELS IN B. C. MINES.

The Improved Kincaid Water-Wheels and Governors are the latest in water-power machinery. This equipment is of Canadian manufacture, being manufactured in Vancouver, British Columbia by the Canadian Water Wheel Company, Limited. Mr. John Kincaid, the designer of this water-wheel, is in charge of the factory, and every machine passes under his personal supervision. Several of these wheels have been in use at the Premier Mine, and just recently orders for two more wheels have been received from the same people, which speaks well for the results obtained from these machines.

COAL MINING IN SPITSBERGEN.

The Scottish Spitsbergen Syndicate sent two expeditions to Spitsbergen, the second of which recently returned and reported. The expedition, including distinguished geologists, miners, borers and assistants numbered about fifty persons.

Coal seams are noted, containing coking coal of good quality. The seams are not thick, varying from 2 ft. 3 ins. to 4 ft. One proved area in the Ebba Valley is estimated to contain up to 16½ million tons of accessible coal, and another area is estimated to contain 90 million tons. There is said to be an absence of folding and faulting.

There are now stated to be ten working coal mines in Spitsbergen, and over one thousand miners and mine officials and their wives are wintering in Spitsbergen this season.

Some idea of the necessity for coal in Europe may be gleaned from the statement that Spitsbergen coal is finding a ready sale at from fifty to sixty dollars a ton. The community has postal service, a newspaper, hospital and other conveniences, and is connected by wireless stations with various points on the European mainland.

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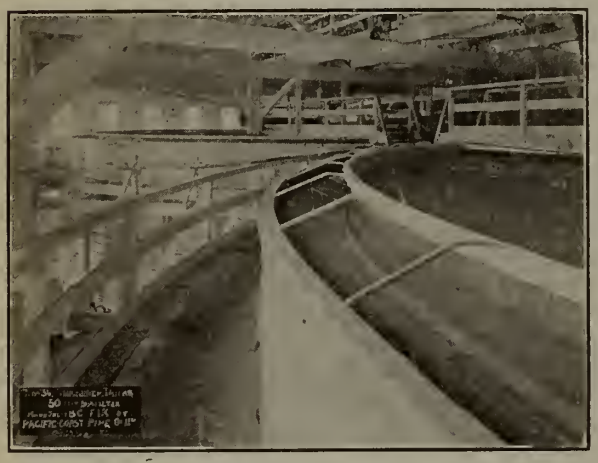

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EDITORIAL

British Empire Steel Corporation Ltd.

The formation of British Empire Steel Corporation, Ltd., will not, it is understood, now proceed to final consummation as originally projected. The most important clause in the agreement for consolidation which was approved by the directorates and shareholders of the Dominion Steel Corporation and the Nova Scotia Steel and Coal Company, was the provision, in Canadian funds, of twenty-five million dollars of new working capital. It was also part of the agreement that twenty million dollars of the new money was to be devoted to the development of the coal, iron-ore and limestone mines and quarries, and the steel-making and transportation operations of the two companies named in Nova Scotia.

The raising of the required sum, and its transference to Canada, has proved too difficult except at a ruinous discount in underwriting costs and exchange, and, also, the complexion of business has so changed since the project was mooted in the Spring as to make the flotation of stock issues in Britain more difficult than previously.

The attitude of the Street towards the securities of the constituent companies of the proposed consolidation has been as paradoxical and as little related to facts as that attitude usually is. When the idea was first mooted is was used to "bear" the securities, and when it was evident that the project was about to fail of fulfillment, it was again regarded as a reason for selling the securities affected. It is difficult to see how both views can be accurate. One thing which is quite certain at this time is that the securities of the coal and steel companies concerned, both senior and junior securities, are selling far below their intrinsic value when the physical assets are reckoned up.

The proximate reason for the consolidation which was projected was the necessity, arising from technical reasons, for the operation of the coal and iron-ore areas of the Dominion Steel Corporation and the Nova Scotia Steel and Coal Company under single management. This primary and compelling reason still exists, but it has been much emphasized in the meantime by the advantages that have actually been experienced from close co-operation of the managements of the Dominion and Scotia companies, and reciprocal agreements with regard to the mining of abutting and intervening areas that have already led to increased production, lessened expenditures and the testing of areas that had been held out of operation by the exigencies of lease interference. The chief reason why the coal and iron-ore properties of the Dominion and Scotia companies can be best worked under single management is that their division was an initial error. The system under which the coal areas of these two companies have been divided up has had the effect of sundering that which nature intended should remain one. The separation of the coal areas has lessened their value, and consolidation would increase their value. What is true of the coal areas in Cape Breton is equally true of the iron-ore areas at Wabana. The merged value of the properties of the Dominion and Scotia companies—to their shareholders and to the public and the Province of Nova Scotia—is greater than their sum when separately calculated.

The "Canadian Mining Journal" has taken the view from the first mention of the consolidation of the Dominion and Scotia properties; held the view before consolidation was mooted, and still maintains, that the proposal was above everything a measure of necessity and self-defence.

We objected to unrestrained statements which intimated that the British Empire Steel Corporation would become a serious rival to the United States Steel Corporation, and would be able to compete with the world in sales of coal and steel products. The actual sentiment which probably inspired the glowing cables that came to this side from London, respecting the prospects of the proposed amalgamation, was a feeling that only through consolidation of conflicting interests and consequent economies could the coal of Nova Scotia, and the steel products made with the help of that coal, hope to enter the markets of the world.

No matter what the course of the consolidation pro-

posals may be, the fact remains, and will always remain, that the fullest and most profitable results from the properties and plants of the Dominion and Scotia companies will be missed and will remain unattainable until they are operated under single management.

So far as the interest of the Province of Nova Scotia is concerned, its Legislatures have already made it clear that no diminution of the productivity and profitableness of the coal areas owned by the Province will be allowed to occur through existing lease divisions, and power has been taken to make such corrections in lease allotments as may be found necessary to bring about thoroughly workmanlike and technically correct exploitation of the remaining unworked portion of the coal fields.

Our comment has touched only one side of the proposed merger, namely the consolidation of the Dominion and Scotia companies, because it is the essential aspect. The larger proposals, which included transportation and shipbuilding interests, were made possible only by the basis provided by the coal and steel companies in Nova Scotia. The advisability of extending the scope of the consolidation involves a matter of opinion, and this journal will not venture an opinion thereon as it is outside the scope of mining activities. and essentially a financial consideration. The considerations however that counsel consolidation of the coal and steel operations are not matters of opinion, but questions of fact. That this is so evident from the co-operation between the directorates and management of the Dominion and Scotia companies now existent. We would assume therefore that a consolidation of the two companies is a certainty of the future. There are other considerations, irrelevant to the main issue in the eyes of the mining engineer, but considered important in other respects, which may delay the actual event, but it must ultimately take place.

If the modified project, which is intimated may result from the abandonment of the original proposals, should include such users of steel products as the Halifax Shipyards and the nail factories in the Maritime Provinces, it would be a logical proceeding, and in line with a number of similar combinations that have taken place in Great Britain since the Armistice. All these projects have been the result of attempts to utilize the heat of coal fuel, and its by-products, by disposition of major operations of steel manufacture so that coke-oven gases, blast-furnace gases, producer gases and every other product of the combustion of coal shall be utilized to the last pound of recoverable chemical compounds, and the last heat unit.

At this time, with the steel market depressed and demand suppressed, the excellence of coal as an asset, and as a backlog to associated steel enterprises is manifest.

CHANGED CONDITIONS FAVOR GOLD MINING.

The tide has turned strongly in favor of gold mining and we may confidently look forward now to the expansion of the industry. Northern Ontario has, during a very unfavorable period of high prices, given substantial evidence of its coming greatness as a source of gold. The war and the conditions that it brought would have killed any but a well-founded gold industry. In spite of high costs much progress has been made and now under more favorable circumstances exploration and development should soon begin again. It will be some time before the work is well under way; but the improvement is already noticeable.

One factor which will obscure for the immediate future the great change in conditions is the shortage of power at the producing gold mines. An unusually dry fall has left the mines short of water for their power plants and it is impossible just now to take full advantage of the situation. Labor is plentiful and increased efficiency is to be expected; but the lack of water will seriously interfere with production and will prevent the operators from laying aside their troubles for a few months yet.

During the past week there has been some rain in the basins drained by the rivers that furnish power for the mines. This has given some additional water and is welcomed; but is regarded merely as a temporary relief. A real January thaw that will turn the quiet streams into torrents is much to be desired. It may come when there is abundance of snow; but until it does the production of gold will not increase with the speed that it otherwise would.—R. E. H.

CHRISTMAS, 1920.

The Editor takes a second opportunity to wish the readers of the "Canadian Mining Journal" a very Happy Christmas.

In our issue of a year ago it was observed that Canada was a good land and a vast one, well-known to the Canadian miner, who usually has seen it first. The goodness of the land is even more apparent than it was last Christmas. Within the year that has passed Canada's known possessions in gold, silver, petroleum, zinc and coal have been notably enlarged. New processes have added to the value of our minerals.

Compared with Europe and Asia our country is indeed a happy one. Neither civic disturbance or physical calamity has visited us. Our statesmen have upheld Canada's place among the nations of the world, and, because of paradoxical happenings and the unintentional functioning of the dead hand of precedent, Canada has been required to represent and interpret North America to a badly wounded civilization across the seas.

There are some drawbacks to national complacency, that need not be catalogued at this time, but, on the whole, there is no country in the world where the Christmas season brings more real basis for happiness than in Canada.

The "Journal" extends to its readers its heartiest seasonable greetings.

PLATINUM METALS IN CANADA.

This issue contains a description of the occurrence of platinum metals in Canada, being a chapter devoted to Canada in a recently published monograph of the platinum metals of the British Empire, the latest of a series of monographs prepared under the direction of the Mineral Resources Committee of the Imperial Institute. The platinum monograph is the work of Prof. A. D. Lumb, and is published by John Murray, London.

The monograph is interesting at this time in view of the larger quantity of platinum metals extracted in Canadian refineries revealed by the latest figures issued by the Ontario Bureau of Mines, and as containing some information — which we do not remember having seen previously published — of the platinum metals recovered from the matte of the Mond Nickel Company treated in Britain during the years 1915 to 1918.

THE ANTHRACITIC COALS OF THE WEST.

The Secretary of the Admiralty has stated in the British House of Commons that the Admiralty has not purchased a large anthracite property in British Columbia, and had no intention of doing so. There are some difficulties in the way, even if the Admiralty did intend a purchase, chief among which is that there is no anthracite in British Columbia. There are in the western coalfield, within the vicinity of the Rocky Mountains, a number of deposits of metamorphosed bituminous coal seams, having anthracitic characteristics, but the existence of the true anthracite has not been yet reported in Canada. The Groundhog Mountain field, which is the one referred to by the Secretary of the Admiralty, is described by Mr. D. B. Dowling as an important area situated on the headwaters of the Skeena, Naas and Stikine Rivers. The sediments which contain the coal seams rest on volcanic rocks, of probable Jurassic age. The coal-bearing rocks are much faulted, and by subsequent erosion the field has possibly been divided into a number of small separate blocks. The original area outlined by prospectors, and included in surveyed lines, is nearly 170 square miles. The coal, states Mr. Dowling, is all semi-anthracite, and "in some instances is classed as anthracite". The anthracitic qualities, like all the gradations in the quality of the coals of the great western fields, are presumably the result of heat and pressure upon the original coal material. The mother material was probably the same in the case of the sub-bituminous, bituminous and steam coals of the west, and the characteristics of the mineral as mined today are the result of different degrees of heat and pressure. In the case of true anthracite there is good reason to believe that the original material differed from the material from which bituminous coal was formed.

The University of Alberta proposes to undertake misroscopic examination of the western coals, and if this investigation is carried out upon a scale that will include all the coals of the west, it should throw much light upon the original substance of the coal seams and the forces which have given them their characteristics.

THE PELYCYPODA OF THE STRATA AROUND TORONTO.

Part Six of the 29th Annual Report of the Ontario Department of Mines contains a description of the pelycypod fauna found in great abundance in strata near Toronto, and particularly in the brick shales. The Report, which contains fine plates illustrating some 54 fossil shells, and technical descriptions of a much larger number, is the work of Beatrice Helen Stewart, and a prefatory note is made by Dr. W. A. Parks, whose assistance in the carrying on of the work and the preparation of the final text is acknowledged by the author. The present volume arose out of investigations commenced with the hope of more definitely fixing the stratigraphical relationship of the paleozoic rocks in the vicinity of Toronto, but the abundance of pelycypods observed was so marked that it was thought well to present first an account of this preponderating group, and to leave the question of correlation until more extensive data had been obtained.

While no definite attempt is made at correlation, the author suggests that the Toronto pelycypod fauna represent in general a horizon comparable with the Pulaski fauna of New York State, (of general Cincinnatian age) on the one hand, and the Maysville of the Ohio Valley on the other, but with a stronger commingling of Maysville forms.

The Ontario Department of Mines is to be congratulated on undertaking investigations of what may at this time be regarded as purely scientific interest, but may at any time be found to have economic value.

NEW TYPE OF IRON DEPOSIT IN ALBERTA.

A despatch from Edmonton states that in the Peace River country, where there is much iron "a solid bed of pig-iron, the depth of which is not known" has been discovered. Possibly this is the stock-yard of Gehenna, the product of Beelzebub's own private blast-furnace? The depth of the deposit is not known, but perhaps, like some fabled veins of precious metals it goes down to the original tap-hole. Dr. Allan mentioned the iron deposits of the Peace River Country at the Winnipeg Meeting of the Institute, but he omitted to mention this interesting and novel type of a differentiated magma.

PERSONALS.

Mr. H. H. Claudet who for some years has been in charge of the Ottawa Branch of the General Engineering Co. of New York, will, on the 1st of January, take over the office and laboratory at Ottawa and carry on the business independently.

Mr. R. M. Wolvin, President of the Dominion Steel Corporation will sail for England on the 23rd December in connection with the affairs of the British Empire Steel Corporation. Mr. D. H. McDougall, the President of the Nova Scotia Steel & Coal Company will leave for England on the 28th December in connection with the same matter.

The Platinum Metals in Canada

By A. D. Lumb.

(Abstracted from a Monograph of the Mineral Resources Committee of the Imperial, Institute, London).

The occurrence of platinum in Canada was first observed in 1862, in the course of gold-mining operations on the Rivière-du-Loup and the Rivière-des-Plantes in the province of Quebec.

Since that time platinum has been found in a number of localities associated with auriferous gravels, but the crude metal has only been obtained commercially from the Similkameen district in British Columbia. These deposits first attracted attention in 1885. All the workings are alluvial, although the platinum has in several cases been traced to its parent source.

Alberta.—Platinum and gold in minute grains, closely intermixed, are found in the North Saskatchewan River, near Edmonton. In 1918 certain platinum occurrences were examined by the Munitions Resources Commission, visits being paid to Fort Saskatchewan and the Peace River district, in Alberta. These deposits, however, proved to be disappointing. In the former locality, which was carefully tested by drilling, the values of the samples obtained averaged less than 10 cents in gold and platinum per c. yd. of gravel.

British Columbia.—Platinum, associated with gold, which is the dominant metal, occurs in the Tulameen River and its tributaries, the principal of which is Slate Creek, others being Cedar Eagle, Bear and Granite Creeks. The metal is present in small rounded grains, or pellets. Chromite is often found intergrown with the platinum, olivine and pyroxene usually occurring in association. The heavy minerals remaining with platinum in the concentrate are titaniferous magnetite, chromite and native copper. The platinum is sometimes magnetic, probably due to the covering of the grains by small particles of magnetite.

The following analysis, according to G. C. Hoffmann is representative of an average sample of crude platinum from the Tulameen River:

	Per cent.
Platinum	72.07
Palladium	0.19
Rhodium	2.57
Iridium	1.14
Osmiridium	10.51
Copper	3.39
Iron	8.59
Gangue (Chromite)	1.69

Owing to the presence of osmiridium in considerable proportion, the ore is classed as "hard metal," and on that account fetches a high price. Many of the richer placers have become exhausted, and work is now carried on by a few individuals, principally Chinese, who work during the summer months only. In some cases high benches, 50 to 100 ft. above the creek bottom, are being worked. Much of the platinum and gold is of a coarse texture, with a rough surface, and the latter is sometimes found imbedded in quartz. Nuggets are sometimes found encrusted with chromite, and are thus liable to be overlooked. The deposits are therefore not of great age, and the metals have not been transported long distances from their sources.

Kemp is of opinion that the platinum is derived from pyroxenite dykes cutting through peridotites, which outcrop on Olivene and Grasshopper Mountains.

It is of interest to note that some diamonds and rubies have been discovered with the platinum in the Tulameen deposits. They are of good quality, but of small size, and occur in a matrix of dunite. American capital dominates the platinum industry in the district. In 1918, at the request of the Imperial Munitons Board, special investigations in this area were undertaken by members of the Geological Survey, and several prospecting bores were put down to bedrock. Full reports of the work done are not yet available, but it is understood that the results are considered to be promising, and to warrant further examination of the district.

Platinum was in 1918 discovered at Franklin Camp, near Grand Forks, B. C., in the "Black Lead," so-called, which is a mixture of augite, 75.13 per cent.; orthoclase and microcline, 17.06 per cent.; hornblende, 1.47 per cent.; and magnetite, 6.06 per cent., as determined by microscopic measurements on a typical specimen, with accessory minerals, chalcopyrite, bornite and apatite. A sample of chalcopyrite assayed 0.38 oz. crude platinum per ton. Samples of the "Black Lead" assayed from 0.02 to 0.17 oz. per ton.

At Burnt Basin, on the Mother Lode claim, an auriferous quartz vein carries platinum, in amounts varying from a trace to 0.25 oz. per ton. The quartz also contains chalcopyrite, pyrite, galena, sphalerite and molybdenite. Native platinum in small quantities has been found associated with gold in the following localities: Tranquille River, Fraser River, Rock Creek, Yale District, North Thompson and Clearwater Rivers. It has also been reported to occur in a dyke across the Kootenay River upon the Granite Poorman Mining Company's property a few miles from Nelson. At Siwash Creek, in the Tulameen district, small flakes of platinum, associated with chromite, often occur in shear zones in granite. Dredging for gold and platinum is being carried on, on the Peace River, North British Columbia.

According to J. B. Hobson the heavy concentrate produced on the Consolidated Caribo hydraulic mine at Quesnel, contains, besides gold and silver, platinum, palladium and osmiridium, one analysis giving a total value of $3,873 per ton. The gold and silver being non-amalgamable are probably included in particles of pyrite and galena, whilst the platinum metals are found as minute grains or are enclosed in particles of chromite and magnetite. A system of "undercurrents" is being installed to properly dress this concentrate.

In 1917 the recorded output of crude platinum from the placer gravels of the Tulameen district in British Columbia was 57 oz., that for 1918 being 39 oz. For the five years preceding 1892, this district produced on an average of over 1,500 oz. per year.

Manitoba.—Samples of gold ore containing platinum have been obtained in the Star Lake district of southeastern Manitoba. Analyses of the samples from dif-

ferent auriferous reefs were made by the Department of Mines in 1917, and yielded platinum varying in amount from a trace to 0.1 oz. per ton. In addition to gold and platinum, the veins carry small quantities of galena, zinc blende, pyrite, chalcopyrite and arsenopyrite in a gangue consisting mainly of quartz.

Platinum is reported to occur in auriferous quartz veins in several mines and prospects in Le Pas district; a picked sample of ore from the mine of the Northern Manitoba and Development Company, assayed $49 gold and $17 platinum per ton. McCafferty's Prospect, about 5 miles away, contains platiniferous quartz.

Nova Scotia.—According to E. R. Faribault in *Summary Report*, 1918, Part F, of the Canadian Department of Mines, platinum has been found, mostly in traces, in some of the old gold districts of Halifax county and, lately, in the tungsten concentrates of the Moose River mines. So far, all occurrences are in quartz veins in the lower quartzite and slate formation of the gold-bearing series of the Atlantic coast. The platiniferous mineral is supposed to be sperrylite, with which is associated arsenopyrite.

Ontario.—Sudbury is one of the few places where platinum is profitably extracted from deposits *in situ*. The metal, which was first discovered in this region in 1889, is found mostly in combination with arsenic, as sperrylite associated mainly with chalcopyrite in the well-known copper and nickel-bearing deposits of the district.

The origin of the ore-bodies has not yet been settled. They are either marginal deposits in, or off-shoot deposits to, a norite laccolith, which has intruded sedimentary rocks, the ores consisting principally of chalcopyrite, pyrrhotite, and pentlandite. Metallic platinum, gold, silver and palladium occur in the ore, the last also, probably, as an arsenide. The highest platinum content is associated with the highest copper content; the highest palladium with the highest nickel. According to Roberts and Longyear the mean analysis of rocks of from sixteen drill holes gave an average ore content of: copper, 1.11 per cent.; nickel, 1.95 per cent.; silver, 0.223 oz.; gold, 0.022 oz.; and metallic platinum, 0.0068 oz. per ton. The ore is principally worked for its nickel and copper content and yields a large proportion of the world's supply of nickel. The ore is first smelted at the mines, and a portion of the low-grade matte so produced is then shipped to South Wales for final treatment, the remainder being sent to the recently-constructed refinery of the International Nickel Company, at Port Colborne, Ontario, and to the United States. It was stated in 1903 that this matte contained on the average 1.25 oz. of the platinum metals per ton of nickel content of the matte, of which about 80 per cent. was extracted. The Victoria Mine, owned by the Mond Nickel Co., is stated to carry a high percentage of the precious metals, as is also the Vermilion Mine, although in the latter case the ore body is very small. In 1917 the total output of copper-nickel ore from these deposits amounted to 1,506,828 tons, of which the Canadian Copper Co. raised 1,139,629 tons, the Mond Nickel Co. 361,335 tons, and the Alexo Mining Co. 5,864 tons. The nickel content of the ore of the Canadian Copper Co. was about 2.5 times that of the copper, whilst the ore mined by the other two companies contained the two metals in approximately equal proportions. The matte produced by the Alexo Mining Co. is smelted by the Mond Nickel Co. According to the report of the Royal Ontario Nickel Commission, the matte produced by the Canadian Copper Co. in 1916 was estimated to contain 4,640 oz. platinum and 8.460 oz. palladium, corresponding to 0.10 oz. platinum and 0.15 oz. palladium per ton of matte, the International Nickel Co. recovering in that year 1,093 oz. platinum and 257 oz. allied metals. This company is now reported to have improved its methods of recovery. In 1918 the total matte shipment by the Canadian Copper Co. is stated to have contained, among other precious metals, 8,677 oz. platinum and 13,016 oz. palladium.

According to information supplied by the Mond Nickel Co., their nickel residues derived from the refining of the matte are taken over by Johnson, Matthey and Co., Ltd. During the years 1915-18 the residues disposed of were estimated to contain the following amounts of platinum metals:

	(In oz. troy).			
	1915	1916	1917	1918
Platinum	3,078	3,782	4,913	4,465
Palladium	5,474	——	——	——
Iridium and Rhodium	973	——	——	——

Messrs. Johnson, Matthey and Co., Ltd., have kindly supplied the following figures of platinum-extraction from these residues:

	Oz. troy.
1916	3,722
1917	4,719
1918	4,958

The British America Nickel Corporation, who are developing some large deposits in the same district, are also erecting a refinery near Hull on the Ottawa River. It is stated that they will employ the Hybinette process of electrolytic refining, and expect to obtain a high recovery of the precious metals.

With gradual improvements in the refining process, and with the refining of the whole of the matte produced, instead of a portion only, as at present, it seems probable that the production of platinum metals by the three nickel companies may in time exceed 10.000 oz. per annum.

The 1919 report of the Ontario Bureau of Mines shows that in 1918 the International Nickel Co. treated 62.250 tons of matte for 650 fine oz. of platinum. 787 oz. of platinum, and 473 oz. of metals of the rhodium group. This cannot be used as a basis of calculation, as the proportions are not constant.

On the Quinn claims, near the Croesus Mine, Munro Township, is auriferous quartz containing platinum. Five assays gave a platinum content of value ranging from $180 to 1,800 per ton (with platinum at from $40 to $50 per oz.). The Abro Mine in the Timiskaming district in 1915 shipped between 5,000 and 6,000 tons of ore, containing 0.03 oz. of palladium and platinum per ton. The ore consists of pyrrhotite, chalcopyrite and pentlandite, in a gangue of altered peridotite and serpentine.

Yukon Territory.—Platinum occurs associated with gold in small quantities in most of the tributaries of the Yukon River, notably at the mouth of the Hootalinqua River, and in the River Lewis.

Newfoundland.

Chromite derived from the serpentinized area in the region of Mount Cormack, situated in the central part of the island, has been found to contain small quantities of platinum.

The Kirkland Lake Gold Area

"Interesting and Important Description."

Part Four of the 29th Annual Report of the Ontario Department of Mines for 1919, just issued, is a report on the Kirkland Lake Gold Area, by A. G. Burrows and P. E. Hopkins, being a second report by these officers of the Bureau of Mines and supplementary to one published in 1914.

The Report is summarised in a preface by Dr. W. S. Miller, who names the work as being "One of the most interesting and important descriptions of a Canadian mining area that has been published for some years, at least." Dr. Miller's preface is as follows:

"The authors, A. G. Burrows and P. E. Hopkins, of the Geological Staff of the Ontario Department of Mines, have had wide experience in the pre-Cambrian gold and silver areas of the Province.

"The Kirkland Lake Area can be classed as Ontario's fourth most important metal-producing area, being preceded, in order of seniority, by Sudbury, Cobalt and Porcupine. The development of the area was retarded during the period of the war, systematic work having been begun only about a year previous to the outbreak of the great conflict. To the end of the year 1919 the output of gold, with some silver, had a value of nearly $3,000,000.

"Exploration in the Kirkland Lake Area has shown that there are three principal zones of mineralization, or, to use a more definite term, of metallization. The main or central zone extends in a northeast-southwest direction along the southern expansion of Kirkland lake for a distance of over two and a quarter miles. The southern zone is distant about three-quarters of a mile from the main zone and the northern about two miles. The gold production up to the present has come from the central zone.

"According to the authors, the central zone shows a major fracturing along which are situated the principal mines. This fracturing crosses all the rocks in the zone, including feldspar-porphyry, syenite, lamprophyre and conglomerate. In addition to the major fracture there are branch or minor fractures now represented by branch veins or lodes.

"The fracture zone, where examined, usually contains several fault planes which often form the boundaries of ore bodies. The fault planes along which the ore deposits have been formed dip to the south, generally at angles of 80 deg. to 85 deg. At several mines development has been carried on with regard to two prominent fault planes, called footwall and hanging-wall planes. These planes are from a few feet to 40 feet or more apart, ore occurring sometimes over the whole width, or, as is more common, near one wall or the other, depending on subsidiary slip or fault planes. Ore has also been found beyond the recognizable fault planes or so-called vein boundaries. Mineral-bearing solutions with accompanying vapours have filled fissures and more or less replaced the rock in the fracture zone. The quantity of vein quartz in the ore deposits is relatively small as compared with the mineralized porphyry or other rocks that make up the ore bodies.

"The minerals in the ore bodies, other than the primary constituents of the rocks, are quartz, of two or more ages, calcite, ankerite, sericite, chlorite, iron pyrites, copper pyrites, small quantities of galena and zinc blende, molybdenite, graphite and barite. The ore minerals are native gold with the tellurides, calaverite, kalgoorlite and hessite. Other tellurides are altaite, coloradoite and tetradymite.

"The authors say that the gold deposits at Kirkland lake in their mineral constituents resemble those of the Sierra Nevada, Cal., and that it is probable that they were not formed at as high temperatures as those of Porcupine, Ont. Granite, syenite and porphyry in the Kirkland Lake Area are believed to represent different facies of one magma. While the gold-bearing deposits were formed subsequent to the intrusion of the porphyry, they are believed to be genetically connected with this rock."

The map which accompanies the Report, in addition to a number of maps and sections that are bound in the volume, is on a scale of 600 ft. to the inch. and is almost two feet square. The mapping has been very carefully done, and Dr. Miller's characterisation of the Report is not overdrawn.

A natural-size colored reproduction of high-grade gold ore in red porphyry and syenite, typical of the Kirkland Lake area, adds to the general typographical excellence of the Report, and is as fine an example of color printing as one could desire to see.

The authors state that Kirkland Lake is second among Ontario's gold camps in importance, and rapidly developing. "It is characterised by the richness of its ore." It is part of a large mineralized region that extends roughly from Matachewan in the southwest to Larder Lake and beyond into Quebec Province in the east. In places the older gold-bearing rocks are covered by deposits of newer formations, conglomerate, greywacke, and slate of the Cobalt series that have not been removed by erosion, and "consequently cover possible gold deposits."

In regard to the main mineralized belt which runs through Kirkland Lake, the significant statement is made that operations at the Kirkland Lake mine in October 1920 have indicated promising ore at a depth of 900 ft., where the same general mineralization has been encountered.

The operating properties are each described in detail, and flow-sheets are given, with much information on capitalization, ore yields, distances driven underground, etc. This detailed and interesting information is very full. The illustrations are well chosen and of much interest to the student of geology, apart from local significance.

The Report shows evidence of much conscientious and thorough work, and has been well edited and printed. It will doubtless be very welcome to those who are engaged in mining in the district.

Notes on Steel Plate Picking Belts

By JOHN S. WATTS, New Glasgow, N.S.

The following are a few random notes, on the designing, and operation of steel plate picking belts, and contain pointers, derived from a fairly long experience with these machines, which should be useful to the designer and operator.

In designing the floor, the weight of the picking belt, in the absence of more precise information, may be taken as 350 pounds per foot of length, plus 150 pounds per lineal for the weight of the coal, or a total of 500 pounds, per foot of length, for a belt five feet wide.

Good average practise is to run these belts at forty-five feet per minute, and, at this speed, the delivery of coal, with a steady continuous feet to the belt, would be 170 tons per hour, allowing that the stream of coal will average six inches thick. The actual delivery attained will, however, be usually rather less than this, as it is scarcely possible to attain a steady feed to the belt.

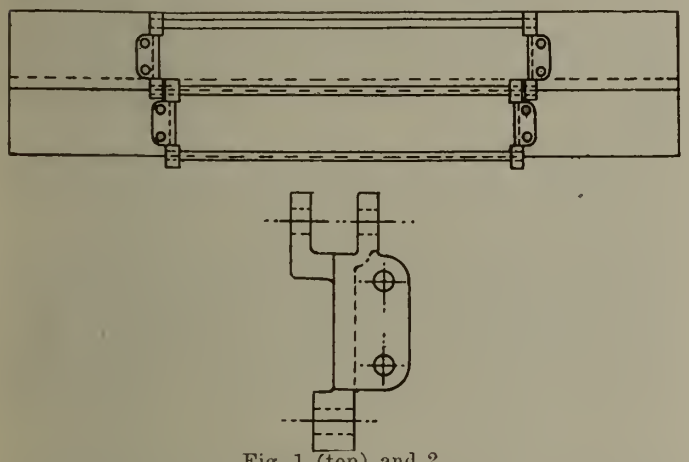

Fig. 1 (top) and 2.

A higher delivery can be got by allowing the stream to run thicker, but anything over six inches will prevent proper picking out of the refuse from the coal.

Frequently the belts are fitted with a hinged loading jib, which can be raised or lowered, to deliver the coal into cars below, or into a hopper above, the picking belt floor level. The maximum inclination up which the coal can be conveyed, may be taken as eighteen degrees, but depends largely upon the class of coal being handled. If necessary the angle may be increased by rivetting angles to the plates of the belt, about every four feet, to prevent the coal sliding backward.

A common but unsatisfactory way to fit the links, is to have them all made with single eyes at both ends, and spaced alternately out and in, with long pins passing thro both links, as indicated in figure I.

This method is unsatisfactory, for the following reasons, first, when it becomes necessary to take out a plate to tighten up the belt, two plates must be removed. Second, the long pins are apt to bend under the pull of the sprockets; are difficult to assemble, as the four holes are never exactly in line; and are so much additional weight to be hauled without any corresponding gain in carrying capacity. The sprocket can only mesh with every alternate link, making the wear on the teeth twice as rapid as it would be if every link meshed with a tooth.

The better method, is to make the links with a double eye at one end and a single eye at the other end, as indicated in figure 2. In this design the pins need only be long enough to pass thro the double eye, are light, easily assembled, and dismantled, and all the plates are alike. As the links are all on the same center lines, the sprocket can have teeth to mesh with every link.

The fit of the chain on the sprocket, with the single eye link, is much inferior to that of the double eye link, and in actual operation the belt fitted with single eye links, has to be kept very tight to prevent the links from jumping the sprocket teeth. A study of figure 3, will show the advantage of this latter type is that the teeth of the sprocket being central, permits the sprocket being reversed when the teeth are worn, thus doubling the useful life of the sprocket.

For handling iron ore or similar material in large heavy lumps, the plates should be reinforced, and a handy way to do this, is to use two plates with a 2'' strip of hardwood between them.

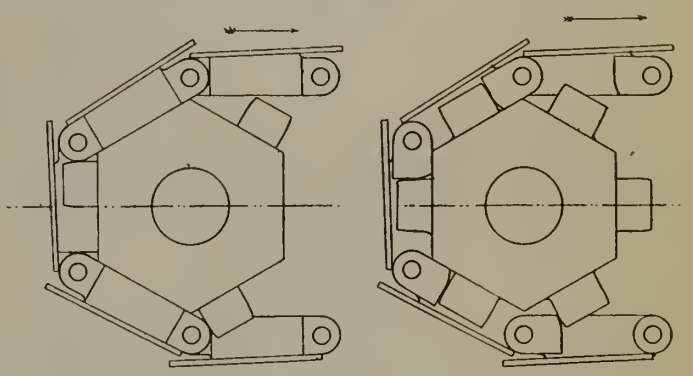

FIGURE 3

When handling very heavy material, it will pay to have belt run entirely on rollers, both on the conveying and return sides. The rollers should be kept inside of the width of the plates, so as not to increase the distance which the pickers have to reach over to pick out the refuse.

Horse Power Required for Steel Plate Picking Belts.

There has been, so far as I know, no data published, either in the technical journals, or in the catalogs of the makers, upon which to base an estimate of the horse power required for driving the machinery in a colliery bankhead, and I am therefore giving the following figures, based on actual experience, which will serve to give as close an approximation, as the varying conditions will permit, to the actual power required to drive a steel plate picking belt, the error being, if anything, more likely to be over than under the actual amount.

Taking as our basis, the following dimensions, which are in this district, (Nova Scotia) at any rate, practically standard, that is, a width of plate of five feet, and a pitch of links of six inches, the weight per foot of the moving parts, will be about 160 pounds, that is the weight of the plates, links and pins, per lineal foot of

belt. One half of this is on the upper or conveying side, and the other eighty pounds is in the return side. Allowing that the coal on the belt will average about six inches deep, and allowing for voids will weigh forty pounds per cubic foot, we will have per lineal foot of belt, a weight of coal equal to 5 x 1 ½ x 40 = 100 pounds.

The upper or conveying side of the belt is usually supported on rollers spaced about two feet centers, the plates between the rollers dragging on the flanges of the guard angles, and the pull required to move this upper side is made up as to one half sliding friction between the plates and guard angles and the other half the friction of the roller spindles in their bearings.

The co-efficient of sliding friction for steel on steel, un-lubricating, being .4, and that of the roller spindle bearings .2, the co-efficient of friction for the upper side as a whole may be taken as .3.

The return side of the belt is usually entirely supported by the rollers spaced about four feet apart, and the friction is that due to the load on the roller spindles, the co-efficient of friction being about .2.

The pull required for the loaded side will be .. .. (100+80) x .3 = 54

The pull required for the return side will be .. .. 80 x .2 = 16

Total pull required will be 70

The usual speed of the belt is 45 feet per minute, and the horse power required at the sprockets, per lineal foot of length of the belt, will be

$$H.P. = \frac{70 \times 45}{33000} = .096$$

Multiplying this figure by the length of the belt, center to center of sprocket shafts, will give the power required at the sprockets, and this amount must be added about 5 p.c., to overcome the friction of the driving gears, bearings, etcetra. For a picking belt of average length (about fifty feet), the total horse power may be taken as about 1 HP per foot of length.

The method of arriving at this figure has been given to enable the reader to make any required modifications made necessary by variations from the standard practise, as given above.

The co-efficients of friction used, are those incurred in starting up the machine from rest, loaded, and may be taken as the maximum under normal conditions. But in wet exposed places, where the bearings may become frozen in extreme cold weather, it is desirable to provide for a momentary over-load of one hundred per cent to start the belt.

When the picking belt is fitted with hinge loading jib, and this is used to load the coal into a storage hopper, above the level of the belt, the extra horse power required when the loading jib is inclined upwards, will be,

$$HP = \frac{w \times h}{33000}$$

Where w= weight of coal delivered in pounds per minute and h= height to which coal is raised in feet.

As the weight of coal delivered, is usually specified in tons per hour, it may be preferable to have the formulae to use this latter figure and calling W=weight of coal delivered in tons per hour, the formula becomes

$$\frac{W \times h \times 200}{33000 \times 60} = \frac{W \times h}{990}$$

or, approximately, one-thousandth of a horse power for each ton per hour, raised one foot.

DEPUTY MINISTER OF MINES ADDRESSES TORONTO BRANCH, C. I. M. & M.

Oil discovery is one of great importance.

Mr. Chas. Camsell, Deputy Minister of Mines, in addressing a meeting of the Toronto branch of the Canadian Institute of Mining and Metallurgy on Saturday last, said that he regarded the discovery of oil at Fort Norman this fall as the most important mineral discovery made in Canada in recent years. Mr. Camsell speaks not only with the authority of Deputy Minister of Mines, but as a geologist who worked many months in the Mackenzie River basin. He knows that there are evidences of oil in many parts of that area, and is confident that further exploration will prove the existence of important oil fields. The well at Fort Norman has been so successful that there is sure now to be vigorous exploration of the promising fields.

The Fort Norman well is reported to have been flowing when capped at the rate of 1,200 to 1,500 barrels per day. It is oil of superior grade.

The oil was found in the Upper Devonian formation. As the Devonian formations are of great extent in the area the territory to be explored is very large. There is every chance that large numbers of wells as good as that at Fort Norman will soon be drilled. The success of the pioneers will attract attention of oil men from all parts of the world.

The Mackenzie oil field is too far away to be a factor in production for some years at least. If exploration proves the presence of large quantities of oil, however, methods will be devised for bringing the oil to market.

Fort Norman is near the Arctic circle, nine hundred miles beyond the end of steel. It is known, however, that the Mackenzie river is navigable for several hundred miles. An extension of the railroad to Slave Lake would made Fort Norman easy of access. The shipping of oil is a problem that is already arousing comment, and feasible routes for pipe lines are being compared.

Three sea planes for Mackenzie exploration.

Mr. Chas. Camsell confirms the report that arrangements are being made to use airplanes to convey geologists to their distant fields of work next summer. It has been in some cases possible to do only about six weeks work in distant territories in a summer, the greater part of the field season being taken up in reaching and reurning from the far northern areas being explored. It is hoped that by utilizing airplanes of the type used in the trans-continent flight, the geologists will this summer be able to use their time to great advantage.

The planes used will be of the boat type, and of a size to permit the carrying of five men. It should be possible with these sea planes to made Fort Norman easily in a day from the rail end.—R. E. H.

Northern Ontario Letter

THE SILVER MINES.

The Cobalt Field.

A strengthening in the demand for silver during the third week of December has given rise to a more optimistic view of the mining industry in the Cobalt district. An improved power supply as a result of half an inch of rain falling at the beginning of the week has also improved the power situation. Added to this, is an abundant supply of labor for all branches of work.

Wages continue at the highest level in the history of these mines, and up to the present no reductions have taken place. It is learned, however, from the Central Council of Workmen that in order to keep all the mines in operation the men are favorably disposed to negotiate with a view to meeting the operators on reasonable grounds. On this matter, the mine workers have appeared to adopt a most sensible view and it is felt that accordingly as the cost of living recedes the men will be generally agreeable to also accept a reduction in wages.

In connection with the silver situation, one of the most interesting developments is an announcement from Mexico City declaring about one-third of the silver and copper mines of Mexico have been closed down owing to the low price of the metal. It is announced that the cost of mining silver in that country is close to 80 cents an ounce, and the government is taking steps to do what it can to relieve the situation. It is said that about 500,000 workers are threatened with being thrown out of employment, according to a statement issued by the Treasury Department. It is announced relief may be given in the form of presidential decree reducing freight rates and federal taxes and annulling laws restricting the importation of material such as steel, powder, acids and tools.

As compared with the situation in Mexico, the mines of the Cobalt district are about on an equal basis insofar as operating costs are concerned. The leading mines of Cobalt are able to produce their silver at under 60 cents an ounce, but a number of the smaller properties, like many of the Mexican mines, find costs up around 80 cents per ounce. By narrowing down operations and selecting the richer part of their ore, these small mines have continued to operate.

Official announcement is made to the Journal that the Kerr Lake mine will curtail production for the time being. Development work, however, will be continued, and employment thereby provided for as many of the company's employees as possible. The development work will include further work to determine the extent of the three veins of high grade ore opened up at surface last fall and which have not yet been developed underground. Recent reports indicated a general closing down at the Kerr Lake, but manager H. A. Kee, who has just returned from a trip to the head office in New York, corrected the wrong impression.

Announcement is made that the Dominion Reduction plant will curtail operations this week. The plant has been operated chiefly on ore coming from the Kerr Lake mine, and the discontinuance of production from the latter property renders it necessary for the Dominion Reduction to curtail.

A winze is being put down on the Chambers-Ferland property on the vein recently encountered in the crosscut at the 385-ft. level. The work is several feet below the floor of the cross-cut and is expected to reach the conglomerate formation this week. The silver so far discovered is continued in small veinlets which extend up into the layer of slate formation in which the crosscut was passing. These veinlets are believed to be offshoots of a high-grade deposit lying in the conglomerate, and for that reason the present work is considered to be important.

Work has just been commenced on the Haileybury Frontier property in South Lorrain where an effort is to be made to mine the cobalt metal which occurs in large veins. The enterprise has been undertaken by Horace F. Strong, of Haileybury, together with associates of Buffalo. The property lies in the vicinity of the Keeley Silver Mines and it is believed more or less silver may be recovered as a by-product during the course of producing the cobalt metal.

Production of silver from the Nipissing mine for the month of November showed a substantial increase over the October output. This achievement is all the more significant in view of the low price of silver which prevailed, it being kept in mind that the increase for November is shown in dollars and not in the number of ounces produced, the comparison being $184,578 produced in October and $190,219 in November.

Hugh Park, manager, makes the following statement to the President and Directors of the Nipissing Company:—

"During the month of November the company mined ore of an estimated value of $190,219 and shipped bullion and residue from Nipissing and customs ore of an estimated net value of $232,526. The silver value of the month's production was estimated at 69 cents per ounce as compared with 82 cents in October.

"No new veins of importance were found during the month. Production was obtained from the older stopes, assisted to some extent by development work being done on several small veins on both sides of the Lake.

"The low grade mill treated 6,000 tons. The high grade plant treated 192 tons. The refinery shipped 250,067 fine ounces of bullion. The following is an estimate of production for the month:—

Washing plant	$ 64,130
Low grade mill	91,749
Residue	34,340
Total	$190,219

As regard the present situation at the Nipissing, the company has shipped 360,933 ounces of bullion already in December. Also, a dividend of five per cent plus a bonus of equal amount has been declared payable January 20th to shareholders of record Dec. 31st. This double disbursement will call for the distribution of $600,000.

Ore and Bullion Shipments.

During the week ended Dec. 17th, two Cobalt companies shipped three cars containing approximately 217,666 pounds of ore. The Coniagas was the heaviest shipper, as shown in the following summary:—

Shipper	Cars	Pds.
Coniagas	2	141,393
Bailey	1	76,273
Totals	3	217,666

During the corresponding period, and including Saturday the 18th, the Nipissing and Mining Corporation were again very heavy shippers of bullion, sending out an aggregate of 252 bars containing 299,852 ounces of silver and divided as follows:—

Shipper	Bars	Ounces
Nipissing	153.	200,283
Mining Corporation	98	99,569
Totals	252	299,852

THE GOLD MINES.

The Porcupine District.

Gold miners in the Porcupine field are finding no difficulty in getting all the workmen they require. It is now possible to retain the services of efficient men, and in this way a favorable reflection on mining costs is indicated for the early future.

It is clear, however, that throughout the present winter, costs may not decline to any important extent, the reason being that the operating companies are obliged to go to much added expense in providing auxiliary power. Coal is pouring in and general activity is assured throughout the winter in spite of the hydro-electric shortage.

Preliminary estimates indicate a production of more than 10 million dollars from the three leading Porcupine mines during the year just drawing to a close. This is made up approximately as follows $6,000,000 from the Hollinger, $2,050,000 from the McIntyre and about $2,000,00 from the Dome. In addition to this production, the companies have received upwards of $1,000,000 in premium on United States funds for which they sold their gold.

Development work on the new orebody on the McIntyre which is believed to be the eastward continuation of the No. 84 vein of the Hollinger is steadily adding to the proven worth of the McIntyre mine. This orebody has a higher average gold content than vein No. 5 which has formerly been the chief source of production from this property. These favorable results are accepted as indicating new possibilities on the Plenaurum property which adjoins the McIntyre on the east, and which is under option to the McIntyre company. In the meantime, the mill on the McIntyre is treating an average of about 500 tons of ore daily and producing about $170,000 a month. A feature in connection with the company's plans to utilize auxiliary power as much as possible during the winter is a report this week that coal is to be secured from the Blue Diamond coal property at Brule, Alberta, which property is owned jointly by the McIntyre and the Temiskaming Mining Co.

In a statement just sent out by the Clifton-Porcupine Mines, the shareholders are informed as follows:—

"Under the financial conditions which have prevailed during the last few months, it has been found impossible to dispose of treasury stock in sufficient quantity to provide the funds to carry on development on an adequate basis. The underwriters of our stocks have carried on an extensive advertising and selling campaign at a considerable loss to themselves in an endeavor to market the stock and provide adequate funds for our treasury. The result, however, has been disappointing.

"Your directors have accordingly deemed it advisable to suspend all operations at the mine for the present, conserving the funds still in the treasury until such time as it is found expedient to resume work. The adverse operating conditions with which gold mines have had to contend during recent years are rapidly being overcome. The labor shortage, which was the biggest handicap, no longer exists. Costs of material are declining. We are accordingly encouraged to believe that the time is not far distant when money will be more easily obtained for the development of gold mining properties. The results of work so far done give us reason to believe that the Clifton property can be made a profitable gold produced with the expenditure of a further reasonable amount of time and money. It is the intention of the Directors to seize on the first favorable opportunity to complete the financing of the company and proceed with the development of the property."

Employment of hand steel at the Dome Mines has proved to be exceptionally costly and has been discontinued to a large extent. Some of the imported Cornish miners have been engaged on machines and their work is said to be less efficient than the experienced drill runners in this country.

The Kirkland Lake District.

Production from the three producing mines of the Kirkland Lake district will exceed $1,000,000 for the year just drawing to a close. Of this the Lake Shore will account for about $500,000; the Kirkland Lake for about $300,000 and the Teck-Hughes about $260,000. Added to this is the big new mill of the Wright-Hargreaves which will be ready to open early in the new year, and with the Tough-Oakes likely to open in the spring. By late summer the Ontario-Kirkland mill will also be ready for operation, and the coming year promises to see the production from this field almost doubled.

Concerning the Boston Creek district, the following summarizes work being done at the leading property:—

An interesting find of almost pure chalcopyrite has just been made in the West cross-cut at the 500-ft. level of the main shaft of the Miller Independence mine. The mineral occurs in the form of a small solid vein lying alongside a vein of calcite. Assays in bulk show 32.48 p.c. copper together with $2.80 in gold and 1.3 ounces of silver per ton of ore.

This discovery is of particular interest not only because of the comparatively high copper content as well as gold and silver value (pure chalcopyrite assaying 34.6 p.c. copper), but also because it co-relates operation underground to the west at the 500-ft. level with the presence of a copper-bearing vein at the surface in the western party of the property. This vein on surface can be traced in a north-westerly direction through the neighboring properties as far west as the old Patricia mine. Assays on surface, however, have seldom exceeded 3 and 4 p.c. and it is thereby evident the mineralization is increasing with depth.

Work has been resumed on what was the first inclined shaft started, and which is located almost in the middle of the property. This shaft was originally thought to be following the dip of the vein on which it was started, but was subsequently found to flatten to such an extent as to give the impression that it almost followed the strike, and further work here was abandoned. The ore here is rich in both free gold and tellurides and the intention is to clean out the accumulation of rock originally broken and lying in place, then to do some further exploratory work and, with the information thus gained, to follow the ore to depth in the direction of the greatest "dip." A small hoist has already been installed and the work is progressing well.

During the holiday season a small laboratory crushing and testing plant will be installed which will consist of a Sturtevant Crusher, a set of rolls and a small concentrating table. The function of this plant will be to deal with samples of larger bulk than those merely intended for assay.

British Columbia Letter

The standardization of equipment used in coal mines for rescue purposes, which was proposed by Hon. Wm. Sloan, Minister of Mines for British Columbia, in correspondence with the United States Bureau of Mines, probably will be discussed at a conference held next Summer during the Annual International Mine Rescue and First Aid Meet.

There has been no decision as yet regarding the date or the place at which this Meet will take place, but it is expected to be arranged for the early part of September somewhere in the Middle States. The suggested Conference will be attended by representatives both of the operators and the miners associated with the coal mining industry. They will come from the United States and Canada. Mr. Sloan, who stands as sponsor of the idea, is likely to be present with one or more officials of his department.

Discussion will centre, not so much on the possibility of fixing on a single type of Mine Rescue Apparatus, as on the possibility of establishing a standard, acceptable internationally, for the training of men in the use of such Apparatus. That it is out of the question to take any instrument and arbitrarily say it is the last word and must be used to the exclusion of all other types is admitted. Action of that kind would mean the throttling of competition and the strifling of the ambitions of those who are constantly striving to improve the protective machines used by miners who venture into deadly underground air to rescue their fellowmen. It is not that end that the Conference has in view, but the exchanging of ideas in the hope that it may be possible to adopt in America a simple formula, recognized in collieries wherever situated on the continent, for the training of men in mine rescue work.

Mr. Sloan feels that an improvement along these lines can be arrived at. He does not presume to say definitely what, in his opinion, should be done but, broadly, his views are those outlined. He is confident, as also are the officials of the United States Bureau of Mines, that much good will come from the contemplated informal round-table discussion.

David Brown has resigned his position as Manager of the Reserve Mine of the Canadian Western Fuel Co. in order to accept a leading and active part in the development of new coal fields situated north of the City of Kamloops.

Recent oil discoveries in the Mackenzie River basin, Northwestern Canada, have caused considerable stir throughout the Dominion. The first party of what is likely to develop into a rush of oil prospectors into this region, has been passed through the hands of the Royal Northwest Mounted Police. The northern patrols of this organization has been charged with seeing that no one goes through their lines who is not experienced in northern travel and who lacks the equipment necessary to life during the winter. The attention of frontiersmen at present is centred on the Great Slave Lake and Fort Norman section where oil has actually, according to authentic reports, been found in commercial quantities.

But this part of the Canadian Northwest is not the only district attractive to oil hunters. There is a report that a representative of the Imperial Oil Co. has made application for the lease of approximately 10,000 acres of land situated near the confluence of the Pouce Coupé and Peace Rivers, where indications are impressive. Development is planned for next season in this locality and, as a result, others are looking to the same region.

The Dominion Government has passed an order-in-council limiting the amount of oil land that may be held by lease to 640 acres. Whether this was passed before or after the Imperial Oil Co's application already referred to is not known. If the regulation became law before the Company's action the alienation of 10,000 acres in one swoop is out of the question and the chances of the individual prospector are improved.

That the incorporation of the Mackenzie River Petroleum Co. Ltd., has been decided upon is announced. This concern will ask for power for the production and storage of oil and natural gas and for authority to transport and market the same. It also will require of the Dominion Government the power required to construct a pipe line from a point near the mouth of Rat River near its junction with the Peel, a tributary of the Mackenzie River. The project, it is understood, contemplates the carrying of the pipe line through Alaska to tidewater at St. Michel, or somewhere in that vicinity.

A Montreal Letter

By ALEXANDER GRAY

Flotation Recovery of Coal Fines.

How flotation has progressed since physicists, chemists—and lawyers—busied themselves with the "phenomena of froths!"

Less than twenty years ago economists began to think about the wastage of minerals. Prior to that sapient mining men waived whatever was problematical, accepted losses in recovery, preferred the "simple life."

About the time John Ballot, a through-going, courteous Cape Colonial, was in continuous session with Henry Livingstone. Sulman, in London not Germany, when flotation was deemed too nebulous for financiers to consider. I have vivid recollection of an effort to induce Old Country coal owners to adopt modern practice in the cleaning and classification of their coals.

A plain-spoken Pennsylvanian, whose jigs and washing apparatus were in use at 1,100 plants in the "Keystone," "Buckeye," and adjoining States, thought he could learn something by visiting English, Scottish and Welsh collieries. He told me what his mechanism had accomplished. I told him to "pick out the dirtiest coal country" in the United Kingdom.

When he returned to London, after being to Scotland, Staffordshire, and elsewhere, his report was: "I've seen more of waste and of slavery than I thought would ever be permitted — women and children in the mines and on picking belts — coal that can be saved going to waste heaps, and obsolete machinery we began to discard in the States a quarter of a century ago."

To the best of my recollection, one washer of German origin, had been installed in Staffordshire! The response of several coal owners to the suggestion that too much coal was going to waste, was "We've got all the coal business we can handle, and we don't have to clean our coal." When we gave the Manager of the "dirtiest" colliery a demonstration, and presented him with a coking product from what was going to his heaps, in reality, 25 per cent of the total tonnage raised was going to those heaps. He was incredulous, but he also declined to pay us a shilling a ton for all we saved

of what was then being wasted. He was ca'canny, very much so, and rather than supplicate Mr. Lloyd George, then in the Home Office, to take up the matter of "slavery" and waste as a national economy, the Pennsylvanian practical genius betook himself to Tamaqua.

Ludierous hardly expresses our feelings when the Seot saw the 4 and 6 per cent. ash classifications we handed to him as examples of what he was putting to waste and he dubiously declared he had his "doots."

In the meanwhile, altered conditions have arisen in every "black country" — coal has become a neeessitous luxury — and flotation, the "visionary" ideal of the earlier years of this country, promises to effect a more radical departure than the Pennsylvanian proposed. If scrap heaps and garbage piles are no longer despicable, why not the millions of tons of "waste," discarded as such by coal operators? The Mineral Separation Scientists having effected notable savings with sulphide ores, evidently sought new mining "worlds to eonquer"; for the latest technical journals from London eontain the following account of the company meeting held there on November 24. the remarks being those of Chairman Francis L. Gibbs:

"We have come to an agreement with the Powell Duffryn Company, of South Wales, under which they have granted to us an option over all the waste heaps and current waste belonging to them in the Aberdare Valley, and the option provides that this material may be treated on a large scale under a half joint aeeount arrangement between the Powell Duffryn Company and ourselves. A pilot plant on a commercial scale has been erected at Aberaman for carrying out exhaustive tests on this material. The cost of this plant and the testing work are being equally borne by the Powell Duffryn Company and ourselves. The quantity of material under option to us under this arrangement is very large, and we antieipate that this enterprise will eventually become a very important one.

Plants are in the course of ereetion nnder agreement with the Ashington Coal Company in Durham, and at the Kirkby works of the Midland Coal Products, Ltd., and a plant of considerable size will also in the near future be erected at the East Bristol Collieries. In addition to these, numerous other collieries are in negotiation with us for the erection of plants. One of the most important agreements which we have completed is with the Skinningrove Iron Company for the treatment of their eoking coal. The decision to pnt in this plant was arrived at by that company after extensive experiments had been carried out in our London laboratory and at their works in the North of England.

Options on Millions of Tons.

We are also engaged in the examination of many large waste heaps in various parts of the country, and some of these show promise of a large business on sound eommercial lines being developed. The waste coal heaps over which we have acquired options amount to several millions of tons, and negotiations are now being conducted for further quantities of this material. Systematic and thorough sampling of the heaps is essential in every case, and our engineers are already engaged upon this important work. We anticipate that it will not be long now before we shall be in a position to form an estimate of the commercial value of what we have under examination, and although, of course, we must expect that some of this raw material will not contain sufficient coal to treat profitably, we have good reason to suppose that many of these heaps will prove to be very profitable.

"Our coal business is also gaining ground abroad. In France a pilot plant with a capacity of 100 tons in 24 hours, is almost completed at the Noeux property of Vicoigne and Noeux, the great French colliery owners. This agreement was made by Minerals et Metaux, our agents in France. In Spain a new company in whieh we hold a large interest has been formed, and, as is subsequently meutioned in my speech, is making very satisfactory progress. In China the Chinese Engineering and Mining Company is about to instal a plant of 250 tons daily capacity, and one of our engineers is now on his way to China in order to take charge of the ereetion and subseqnent operations of this plant. All these plant at home and abroad which I have referred to will at a later date, it is anticipated, be replaced by plants having a very much larger capacity.

The foregoing represents a short summary of our coal business to date, and I may add that we have been, and are being, approached by very many of the large colliery owners in Great Britain, and that we have important proposals for the adoption of our coal-washing methods before us from the Brazilian Government and from collieries in South Africa, India, Japan and elsewhere. Our coal business may therefore, even at this early stage, be safely said to have become established."

In the Sump.

"The Canada Copper plant at Allenby, B.C., has shut down." Metal markets have collapsed.

Casualty stations are being crowded.

The "Bannister" route-gravity incline or whatever those who are heading for the sump may choose to term it, is expeditions, if nndignified.

Those who craved deflation are getting it with variations. No stabilizer having been invented to keep prices in the npper air when those who went on strike against the high cost of everything declined to "pay, pay, pay," only associated Bankers complacently affirm that "the earth and the fullness thereof" are here in form and substance.

Part of which is sedative, but most of which is otherwise.

The process has all the attributes of the "refinement of cruelty." With rare exceptions metals cannot be produced for enrrent market prices. Inventories will not be carried by banking accommodations. With the holiday season over, surplus stocks it is thought, will have to be jettisoned. There is more emergent selling —and only emergent buying—yet the farmers will have it that speculators have forced down staples nntil it is nnprofitable to raise them.

"Vengeance is mine," says the Liquidator. The era of inflation has been rudely ended. Even creditor nations tobogganed things, the "bannister" being inadequate for what was toppling.

"Wages will be the last to fall," was the forecast of Judge Gary. That was some time ago. Unemployment has intervened. "Take it or leave it," wage is being proferred those who do not wish to remain idle.

There is one certain element: The bargain hunter is alert. He seeks plums and usually takes the ripe ones. Canada, however, distrait in some respects, has the greatest nickel and asbestos mines; the largest gold mine; the biggest lead-zinc mine, and one or two more coming along; an abundance of iron and coal on our eastern shore and more coal than can be availed of in the West,—to say nothing of its silver mines,—so, with solvent banks and the sinews of industrial warfare, "we should worry!"

SAFETY MINE CAGES MADE TO FIT YOUR SHAFT

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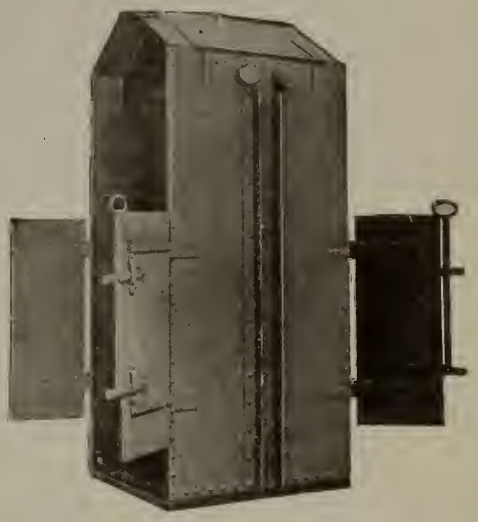
CONFORMING TO ALL GOVERNMENTAL RULES AND REGULATIONS

Showing Cage with One Set of Doors only. Note the door fastening — absolutely safe. and strong enough for hard usage. Note also the hand holds for the passengers, to steady them in the swift descent.

Showing Cage with Two Sets of doors, and rails in floor for Ore Car. Note the Safety Device—simple, effective, strong and dependable. It works every time, protecting lives and property in case of accident.



Cage with Two Sets of Doors, opened to show the door latches, etc. Note also the top doors—useful for carrying long timbers, or for escape of the passengers in case the cable breaks

The Dogs cannot fail to grip the timbers and hold the cage.

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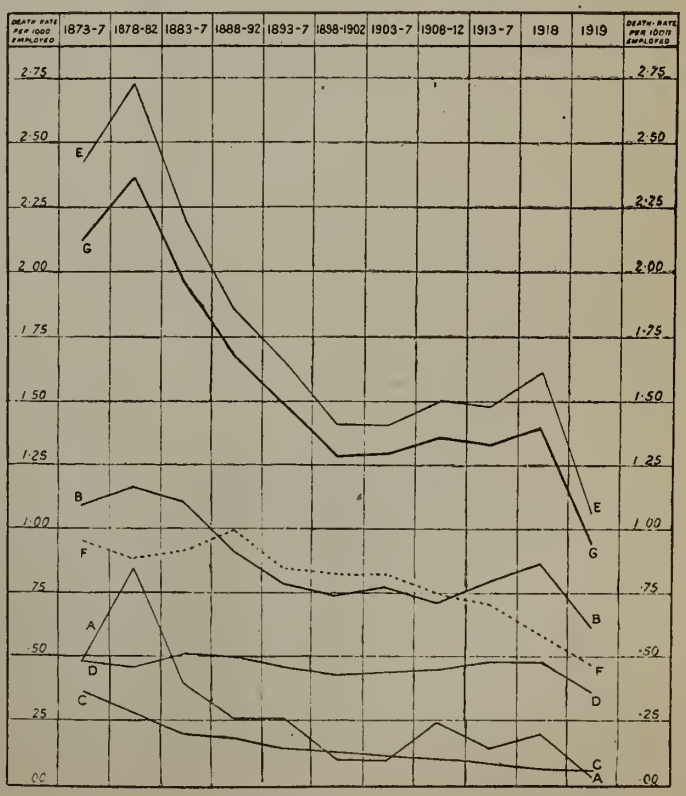
DECLINE OF FATALITY RATE IN BRITISH COAL MINES.

The following diagram is reproduced from Part II of the Annual Mines and Quarries Report of the Home Office in Great Britain.

It shows the average quinquennial death-rates from various causes of accident in and about the mines, regulated under the Coal Mines Act, from 1873 to 1917, and the annual death-rate for the years 1918 and 1919.

The curves provide a first-class argument for stringent regulation and inspection of coal mines, and are moreover a tribute to the management of the coal mines. They provide also an excellent refutation of the charges made against colliery management before the Sankey Commission. In considering this record, it should be remembered that a modern colliery, having large air-courses, extensive workings, high-velocity ventilation currents, great depth and intensified underground traffic, and containing large numbers of workers, provides a much greater scope for disastrous explosion than the mines of the period from 1873 to the beginning of the Twentieth Century, which were relatively small, unpopulated, shallow, and in many cases provided with an atmosphere sluggish and barely able to support combustion. The curves on the diagram relate to the following:—A = explosions of firedamp and coal dust; B = falls of ground; C = shaft accidents; D = miscellaneous underground; E = accidents from all causes underground; F = surface accidents; G = general death-rate under- and above-ground.



TORONTO MINING QUOTATIONS.

Silver.

The following are the closing quotations for active gold, silver and oil stocks on the Standard Mining Exchange on December 21st, 1920.

	Ask	Bid
Adanac Silver Mines, Ltd.		1¾
Bailey	4	3¼
Beaver Consolidated		27
Chambers-Ferland	6½	5½
Cobalt Provincial	37	
Coniagas	2.00	
Crown Reserve	18	
Gifford	1¼	1
Hargraves	1⅞	1¼
La Rose	25	20
McKin.-Dar.-Savage	25	22
Mining Corp. of Can.	1.00	96
Nipissing	8.60	8.40
Ophir	2	1½
Peterson Lake	10¼	9½
Temiskaming	26	25
Trethewey	17	16

Gold.

Apex	2	1¼
Atlas	15	14
Dome Extension	45	
Dome Lake		2
Dome Mines	12.00	11.50
Gold Reef	3½	2¼
Hollinger Cons.	5.55	5.51
Keora	14¼	14
Kirkland Lake	39½	35
Lake Shore M. Ltd.		1.03
McIntyre	1.85	1.81
Moneta	9½	9
Newray Mines, Ltd.	5	3½
Porcupine Imp.	½	
Porcupine V.N.T.	18	17½
Preston East Dome	3	2
Schumacher	17¾	16½
Teck-Hughes	15	11
Thompson Krist	6½	5¼
West Dome	6	5
West Tree Mines Ltd.		5½

Oils.

Ajax Oil	30	23
Eureka	30	
Petrol Oil, Old		30
Rockwood Oil, Gas	3	2
Vacuum G.	15	13½

METAL QUOTATIONS.

Fair prices for Ingot Metals in Montreal, Dec. 21 1920. (In less than carload lots).

	Cent per lb.
Copper, electro	18¾
Copper casting	18½
Tin	41
Lead	6¾
Zinc	7¾
Aluminum	34
Antimony	7¾

COAL PRICES.

Toronto.—Demand is slack and little business is being done. Following prices are representative, smokeless $9.50 to $10.00; slack, $8.50 to $8.75; lump, $9.00 to $10.00. Anthracite is $8 to $12 at the mines.

Montreal.—Bituminous is offered at $14.50 at the coal yards, to which carting costs are to be added. Anthracite is selling at $18.75 delivered to customers. Bituminous prices are likely to decline, and some deliveries are being obtained on contracts made last Spring, but which have remained unfulfilled owing to the preference of the mines to do business at higher prices obtainable. The treatment of Canadian buyers by the mines in the United States indicates that these so-called "contracts" have little real binding power. Pool prices at the mines range from as low as $3.00 to $5.00, the average being around $3.75. Saward's Journal, of New York, states that some operators are closing down rather than sell coal at the prices it will command at present, and that "operators have been able to keep going by shipping heavily on contracts when "spot" orders were not forthcoming." Truly the conception of what constitutes a contract must differ across the line from the Canadian idea.

COPPER DEPOSITS IN WESTERN IDAHO.

We are in receipt of a copy of a Report of the "Copper Deposits of the Seven Devils and Adjacent Districts," published by the Bureau of Mines & Geology of Idaho in co-operation with the U. S. Geological Survey. Prof. Francis A. Thomson, of the University of Idaho at Moscow, is Secretary of the Bureau, and the Report in question is Bulletin No. 1.

The Seven Devils Quadrangle in the Snake River Copper Belt was examined in the Summer of 1919, up to which date no topographic mapping had been undertaken in the quadrangle by the U. S. Geological Survey. The work is stated to have been unique in that triangulation and level control, topographic and geological mapping were all done for the first time in the district, and in one season.

The country examined is said to possess the most rugged relief in the United States, a fall of 7,500 feet in less than six miles, the last 2,000 feet of the fall almost vertical, being mentioned as typical of the district, of which the Snake River Canyon is a prominent and most scenic feature.

The ore deposits are classifiable under four heads, namely, mineralized shear zones, fissure veins, disseminated deposits of large size, and contact metamorphic deposits, from which last-named type the copper so far produced by the district has come.

The origin of the ores and their petrological characteristics are fully described and illustrated by microphotographs. Gold and silver are associated with the copper ores.

One of the deposits, the Red Ledge occurrence, described as a typical disseminated sulphide ore-body, of low-grade but very large dimensions, is remotely and difficultly situated. The genesis of this ore-body is given much consideration, and to those who are interested in ore bodies in Canada, of similar nature, this first Bulletin of the Idaho Bureau of Mines, apart from its definite economic importance to Idaho, appears to have importance of a wider character; and, with the courtesy that is a pleasant characteristic of the professional relations of mining scientists in North America, will doubtless be forwarded to any reader in Canada who desires to peruse it.

EDITORIAL

Coal Production During 1920 Highest in Canadian History

While the statistics of coal output in Canada during 1920 are only available in very approximate form, they indicate a production of between 14 and 14½ million long tons. This is a million tons larger than the record production of 1913 and the only slightly smaller production of 1918.

A recovery of almost two million tons from the disappointingly small production of 1919, and a betterment of the best previous years by a million tons, is the most unreservedly satisfactory feature of mining in Canada during 1920. Canada's coal supply has been the weakest part of her economic structure, and the most malignant menace to her national independence.

The improvement in coal production is more interesting as a psychological reflex than as an achievement in production. In the last-named regard it is indeed nothing to crack about, the actual production being disproportionately small compared with the country's ability to produce coal. As an index to the general attitude of Canada towards coal supply it has much interest because it indicates the inculcation of a coal conscience in our population.

Canada has had some broad hints in regard to her coal insufficiency. Periodic panics reflected in coal selling prices, fuel controllerships, rationing of coal, official appeals to Washington, cavillings and heartburnings, ill-considered restrictions on coal exports may be mentioned, but probably the broadest hint is a nineteen percent discount on the Canadian dollar in New York, to which our importations—quite unnecessary importations—of coal are a major contributory cause.

In the period from 1914 to 1920, seven years, Canada produced from her own mines twenty million tons less than their capacity, and by doing so increased her adverse trade balance by two hundred million dollars, and greatly increased the price of coal to the consumer in the Dominion.

The war and its aftermath has had a revealing effect upon the regional use and distribution of Canadian coals. When Sir George Foster called his first coal conference in 1917 it was amusingly plain that the use of western coal was regarded by western people as a temerarious experiment, and it was a little difficult for the men who came from the bituminous coalfields of British Columbia and Nova Scotia to understand the trepidation with which the use of bituminous coal for domestic purposes was regarded by those who had learned to depend utterly upon anthracite as a domestic fuel. The recent meeting of the Canadian Institute of Mining and Metallurgy disclosed the gratifying fact that in Winnipeg and district in 1920 no less than eighty percent of the fuel requirements were being supplied from the western mines. The extension of the radius of consumption of western coal during 1920 was so great, and so contradictory of some previously held opinions that it is fair to assume the ultimate radius of distribution and use of western coal has not been reached.

In reviewing the outputs of the three main coal districts of Canada, namely, British Columbia, the Prairie Provinces and the Maritime Provinces, it is evident that Alberta's contribution is chiefly to be thanked for the good showing of 1920, and it is further evident that Alberta has now definitely assumed the lead in coal production among the provinces.

There is one serious drawback to Alberta coal mining, as now practised, namely, a too great preponderance of small mines. The waste of capital, the overextension of supervision and corporate organizations, the spoiling of the coal areas by letting in water and making many holes in the cover, and the general uneconomy of such methods is strikingly reminiscent of Nova Scotia before the formation of the Dominion Coal Company. It is evident that Alberta is passing through a formative period in regard to its coal trade, and that before really important progress can be made it will be necessary for the coal areas to get into the hands of large companies.

We believe the record of the western coal trade in 1920 is definite confirmation of a statement tentatively

put forward by the Editor at the Toronto Meeting of the Institute in the Spring, namely, that West of Fort William, Canada can be self-supplying in coal fuel.

In Nova Scotia, production, while notably improved, still lags some two million tons below the output capacity of 1913, and as yet the St. Lawrence markets are being supplied from the United States. It seems a reasonable ambition for the coal trade in Nova Scotia to supply all the coal required by the Maritime Provinces, Quebec, and a portion of Eastern Ontario.

The cost of living in Canada, the success of manufactures, the movement of crops and the markets of the farmers, the rate of exchange and the general freedom of our national functions depend more upon the tonnage of bituminous coal available and its selling price than upon any other economic fact. If the large users of coal, and the government of Canada, ever undertook to study the prime importance of coal, solicitude and fostering care would supersede the traditional neglect that has been the fate of the coal industry in Canada since its dawnings in the early years of last century. We have a coal industry in Canada that antedates the discovery that anthracite would burn. Canada exported coal when Chicago was a swamp, and before the Mississippi had been mapped. During all that period we have looked to the United States for coal supply first, and to Canadian coal mines have given secondary and contemptuous consideration.

If the 1920 figures indicate a new attitude towards coal mining in the Dominion it will also indicate that Canada intends to write a new and better industrial record than that of the past.

DEPRESSION IN THE CANADIAN STEEL TRADE.

The Steel trade in Canada is badly depressed as the year closes. This is particularly so in regard to pig-iron and steel ingot production. In the fabrication trades, such as the car-works, structural steel mills, foundries, etc., the depression is not so marked. The lowering of steel prices in the United States, and the better transportation service now being given by the railways, has rather tended to assist the secondary iron and steel industries in Canada, but it is having a very different effect on primary steel and iron producers in the Dominion.

The blast-furnace and open-hearths of the Nova Scotia Steel and Coal Company at Sydney Mines are closed down. At Sydney, only one blast furnace is operating, and while some hindrance to operations proceeds from the strike of the railwaymen on the Steel Plant, the lack of orders is actually the major cause of the slackness of work. The Plate Mill is working to finish up some orders of small dimensions, and there is a prospect of rail orders, but the outlook for business is not good.

The Welland Works of the Electric Steel & Metals Company has definitely ceased operations. The Steel Company of Canada, and the Algoma Steel Company have both found it necessary to curtail producing operations drastically.

The shipbuilding companies, with one or two exceptions, have no business in prospect when present orders are filled, and those shipbuilding yards that possessed least of the elements of permanence have already closed down or gone into liquidation.

The condition of affairs is very similar to that which existed in the coal trade in the Spring of 1919. At that time there was an apparent lack of demand, but actually there was a world shortage of coal. The lack of demand for steel today dose not arise from over-production, but from purchasing inability, and also, to a very large extent, is attributable to an abstention from buying by large users of steel on this continent in expectation of lower prices. In Europe two factors are working together to present an appearance of over-production which is essentially misleading. These are the recovery of the steel producing capacity of Germany and Belgium, and the poverty of Europe generally. Actually, we believe, the world is very very short of steel of all descriptions, and is especially short of steel railway rails.

So far as America is concerned, the long-continued cessation of immigration, and the measures now being taken to restrict immigration — which we believe will be later regarded as ill-advised and the result of immature consideration — are likely to act as restraints on production, which, added to the losses in population which the world has suffered in recent years, by war, famine, pestilence and the decrease of the birth-rate, will before long manifest itself in unmistakable fashion. The fact that there has been a large drop in the prices, and in the demand for such things as wheat, sugar, steel and cotton, does not do away with the fact that the world is lacking a full supply of these commodities, and that the hands to produce these supplies in the near future are lacking, because some are dead and others will not be born.

When the steel market revives, it will do so with over-night suddenness, and the demand will be found to be insistent and large and requiring a long period of time to satisfy.

THE COMING ACTIVITIES OF THE CANADIAN INSTITUTE OF MINING & METALLURGY.

During the next few months the Canadian Institute of Mining and Metallurgy has a programme of great activity. When the meetings in prospect are over, and the meeting of October 25th in Winnipeg is included, it will be apparent that the Institute can justly claim to cover Canada thoroughly and representatively. At Winnipeg, the Institute was officially welcomed by the Attorney-General on behalf of the Premier of Manitoba, and in the deliberations of the Meeting, it was found that the Institute provided an influential and respected medium through which the needs of the

newly-born mining industry of Manitoba could put its needs before the Federal Government—and, what is more to the point—get them attended to.

The Annual General Meeting of the Institute is to be held in Ottawa, and, has been usual in former meetings in the Dominion Capital, the presence of the members of the Institute there will doubtless receive official cognisance. While no programme of the Ottawa meeting is yet available, the efficiency of the Ottawa Branch is traditional, and with the presence of loyal and long-tried supporters of the Institute in high places there, the members will look forward to the Ottawa gathering with pleasurable anticipation.

The Mining Society of Nova Scotia intends to hold its Annual Meeting in Halifax, probably in April, and it is the desire of the members of the Mining Society, who are also members of the Institute, to have the Halifax Meeting looked upon as the Eastern Meeting of the Institute; as the Vancouver Meeting was regarded as the Western Meeting, and as the Winnipeg Meeting served to display the banner of the Institute in the midst of the embattled farmers in the Middle West—first cousins of the miner and sons of the soil like the miner, with some of the miner's little peculiarities of clannishness.

Halifax is the seat of government in Nova Scotia, one of the oldest Capitals of the Dominion, and since the Canadian Mining Institute—as it was then—held a memorable and festive function in that City, much has happened. Halifax is no longer somnolent, and should it ever occur to anyone to write a true account of Halifax's wartime experiences, there would be in that volume much to astonish and much to enthuse the people of Canada. The Mining Society of Nova Scotia was moved from Halifax in 1914, and no meeting has since been held in that City. The interval has been longer than was intended, but this has partly been due to the war. It is quite certain that Halifax will welcome the idea of holding an Eastern Meeting of the Institute in Canada, and that the Local Government will join in that welcome.

The last annual meeting of the Mining Society of Nova Scotia, held in Glace Bay, was marked by technical papers of unusual excellence, papers that were re-produced in the mining journals of the whole world, and added not only to the excellence of the Annual Transactions of the Institute, but gave it wide advertisement. Papers of equal excellence may be looked for at the next meeting, and it is hoped by the Council of the Mining Society of Nova Scotia that a large attendance of Institute members and officers will be present from Montreal, Ottawa and Toronto.

An Institute that can within half a year compass successful meetings attended by representative mining men in the Far West, the Middle West, Ottawa and the Far East of Canada, and hope to receive the official welcome of the government at each centre, is justified in its existence, in pride in its achievements and in desire to still further extend its influence and widen its membership.

This statement perhaps may be objected to as slightly previous and as assuming that the Ottawa and Halifax Meetings of the Institute will be entirely successful. We will, however, persist in venturing the assumption.

SCIENTIFIC HONORS.

It is traditional in learned and technical societies of national repute and long standing to award medals and other insignia of honor to members who have distinguished themselves in professional duties or have added some notable contribution to technical literature. The Canadian Mining Institute has not as yet considered itself in a position to make such awards, but possibly the time has arrived when their institution should be considered. The members of the Institute include some wealthy men, and include also men of sufficient technical distinction to enable discriminating adjudication of such awards were they available. We commend this suggestion to the consideration of those members of the Institute who have found mining lucrative and wish to leave a permanent memorial of their membership.

When titular honors are denied to scientific achievment by our legislators, who apparently are unable to distinguish between achievment and notoriety, some mark of appreciation should be available by which scientists and technologists in Canada can be honored at home. There are men living and moving amongst us today whose names will be spoken by our children as we speak of Logan and Dawson, of Van Horne and Strathcona, but the country that bore them does not know their fame.

NEW SECRETARY FOR THE INSTITUTE.

The "Journal" learns unofficially that Mr. Geo. C. Mackenzie, formerly Secretary of the Munitions Resources Commission at Ottawa, and up till recently President of the Electric Steel & Metals Company of Welland, Ont., has been appointed Secretary of the Canadian Institute of Mining & Metallurgy, and will commence his duties at headquarters in Montreal with the week beginning the 3rd January.

The "Journal" believes Mr. Mackenzie to be admirably fitted for the position he has taken. His task is not an easy one, but it will have the inspiration of being one of over-growing importance and prestige. It will not be possible to suit everybody in the Institute. That would test the capacity of a sublimated archangel, but the members individually and as a whole are loyal hard-working men who have traditionally supported the Secretary, their differences of opinion arising from a common desire to make the Institute larger in numbers and more successful in its policies.

We tender our good wishes to the new Secretary,

and shall be happy to assist the progress of the Institute by every means that is open to us. Mr. Mackenzie is just in time to engage in a very busy six months, as we have elsewhere noted.

PROTECTIVE TARIFF AND THE COST OF LIVING.

The Freetrader affirms that tariffs on imported manufactured goods restrict the growth of primary industries by raising the costs of livelihood of the workers.

Put in another way, the argument is that the whole evil of import tariffs resides in the high rate of wages necessitated by the tariff impost, which forbids the full use of labor in the production of basic raw materials. This is to predicate that the first desideratum for the production of such commodities as wheat, potatoes, coal and iron-ore is cheap labor.

Actually, however, it is not the cheapness of labor, but its abundance and its quality that determines the cost of producing primary materials. Relative to the United States, we have always had cheap labor in Canada, but the condition has not been one that advanced our productivity as a nation, but the reverse, for the higher wages paid in the United States have for generations drained Canada of its young people, and have diverted year after year the tide of European emigration to the country of our neighbors. Now whether the high wages paid in the United States were and are a result of protective tariffs there may be much debate, but high wages and protection have endured so long together in the United States that they are inseparable in the public mind. So ingrained is this sentiment that any proposal to reduce import tariffs on manufactured goods is regarded as a threat against wages and employment—and, apart from effect of specific action to reduce import tariff—the psychological effect on a working population is to induce alarm and a desire to leave a threatened territory. In some respects it may even be that this state of mind brings about the very effects that are dreaded but, whether this be so or not, tariff charges are unsettling, and not lightly to be courted.

While the effect of high wages may be negatived by high living costs, there is nevertheless a decided satisfaction in the receipt of a high wage, for its usual accompaniment is a more luxurious standard of living. This is a feature that should not be overlooked by a country that is in the market for labor.

In Canada, at any time when protective tariffs have been at their highest, they never reached the point of effectiveness in raising living costs, and thereby necessitating high remuneration of labor, that the causes arising out of the war have done. If import tariffs have had any real effect on living costs and wages during the past few years, that effect has been in the direction of lowering prices by American importers in an attempt to offset the influence of the heavy discount on Canadian funds in New York. The discount on our dollar has been a much more potent deterrent to imports into Canada from the United States than any item on our tariff schedule. Similarly no import tariff of any outside country has been such a deterrent to Canadian exports as the existing discount of all other currencies in favor of Canada—with the sole exception of the United States. There is no doubt about the demand for Canadian goods, but the drawback is the price that we ask for exported goods. Are we to lower our import tariffs with the expectation that by reason of consequent lowered living costs we shall be able to compete in European markets?

Such a course might be suggested, were it not that the economic weight of the United States would find no barrier against it in Canada, and—except in those few instances where a superior combination of location and materials in Canada dictated an opposite course, manufacturing in North America would concentrate around the great central coalfield of the United States.

The policy of protective tariffs in Canada has been adopted to help out our national deficiencies. As a nation Canadians have been the victims of hypnotism arising from constant iteration of the vastness of our natural resources, but, compared with the country of the United States, Canada presents vast extents which are chiefly remarkable for the paucity of their natural resources. Canada's problem consists in the intensification of the utilisation of domestic resources of inferior grade and difficult location, in competition with resources of the United States which are ideally located and of excellent grade, and the chief compulsion to adopt protective tariffs in Canada comes from the necessity to offset the economic deficiencies under which we labor in the attempt to perpetuate and consolidate our political independence in North America.

To be quite frank about this matter, is it not fairly evident that Canada can only avoid political absorption by the United States by achieving economic independence? There is no question of annexation sentiment, emanating from one side or the other, implied in this statement. It is a statement of the inexorable trend of economic conditions, which always gives political power to those nations that possess (or utilise, which is an equivalent thing) essential raw materials.

Our problem, therefore, is to maintain high wages in Canada, a high standard of living, and that extent of tariff protection that shall put us in the best bargaining position, and shall best avail to protect Canadian nationality and Canadian political independence. If tariffs should cause high living costs and high wages is that—for Canada—essentially an evil thing?

From "Iron & Steel of Canada".

Coal Mining in Nova Scotia During 1920

(By the Editor)

Last year's review of the coal trade of Nova Scotia (issue Jan. 7th 1920), forecasted that with uninterrupted work and no major accidents or delays, the output of coal in 1920 might reach 5,750,000 or even 6,000,000 tons. The year has seen no material interruptions to steady work, and has fortunately been free from disasters, yet the output will probably not be found to exceed 5,600,000 tons. The reason why production has not been greater is to be found in the still continuing shortage—or lessened number—of men employed in cutting coal at the working face. The number of men employed in the non-productive and auxiliary operations of handling the coal to pit-mouth and preparing it for market, and on the surface, is in excess of the number required to give an economical balancing of the working forces as a whole.

A calculation of the number of men employed in 1916 at the coal face, and the number now so employed, would disclose that the percentage of reduction in output is identical with the percentage of reduction in the number of faceworkers. Until the number of faceworkers is restored to the figures of 1916 it will be found impossible to restore production to the previous maximum. The questions of the provision of equipment, or of the condition of the existing equipment, does not bear on production in Nova Scotia, as in all cases the equipment is greater and better than it has ever been, and at no time during the year has any difficulty ever been experienced in taking away all the coal that could be produced by the workers at the coal face.

The question of pit-room is probably not quite so satisfactory, as the continued and unrelieved shortage of face-workers since 1916 has restricted the amount of development work. It is an axiom in coal-mining that arrears of development work can only be overtaken with great difficulty, if at all.

The year 1920, has however been quite remarkable for the amount of underground development, and for the work done in testing virgin seams, both by drilling and by surface openings and prospect pits. The knowledge of the coal operators of their areas is probably wider and more accurate at the end of 1920 than at any previous time, particularly in regard to submarine workings. The course of certain undersea disturbances, and the "lay" of the submarine coal seams is more accurately known now than ever before. It is understood that the Geological Survey has detailed a paeleontologist to study the fossils of the Sydney district, and that some microscopic examination of the coal seams is contemplated. Some work on topography is also likely to be undertaken, supplementing that done by Dr. A. O. Hayes before he left the service of the Survey. There is probably not in all Canada an industrial area of such importance as the Sydney coalfield that has received less attention in recent years from the Geological Survey. A thorough topographical survey, accompanied by much-needed revision of the geological sheets, on a scale as elaborate as that of the Nanaimo, Vancouver Island, sheets, would be of much assistance to the mining engineers in Nova Scotia, and is years overdue. A new topographical sheet of the Pictou district was issued by the Geological Survey during the year, and has proved very welcome.

The Government of Alberta, through the staff of the University of Edmonton, is undertaking a comprehensive study of the origin and occurrence of the Alberta coals and of their combustion qualities. Some of the best equipped scientists in Canada have been retained by Alberta for this work, and it is not without interest to Nova Scotia to know that one or two of these gentlemen obtained their initial coal experience there.

Trend of Production.

The trend of production is shown by the table following :

	Output (Long tons)	Percentage of decline from 1913	Percentage of Cape Breton Production
1913	7,263,485	.....	81½%
1914	6,650,031	8½%	81½%
1915	6,709,951	7½%	82½%
1916	6,171,434	15%	81½
1917	5,665,477	22%	77%
1918	5,211,000	28%	77%
1919	5,160,000	29%	75%
1920	5,600,000 est.	23%	75%

This table discloses that a definite upturn in production is under way, and that the shortage of skilled miners, so often referred to, in this and previous annual reviews, has chiefly affected Cape Breton Island.

The production of the leading operators, with a rough approximation of the aggregate output of the smaller companies which probably errs on the conservative side, compares with 1919 as under:

	1919 (Long Tons)	1920 (Long Tons)
Dominion Coal Company		
Cape Breton Collieries. . .	3,087,638	3,250,000
Springhill Mines	393,441	420,000
Nova Scotia Steel & Coal Co.	552,044	625,000
Acadia Coal Company	407,326	502,000
Intercolonial Coal Mining Co.	184,417	160,000
Inverness Railway & Collieries	138,388	186,000
Other Operators	395,749	457,000
	5,160,000	5,600,000

Dominion Coal Company.

As was pointed out in the 1919 Review, the Dominion Coal Company's Cape Breton production has suffered not only from a greater disturbance of the balance of the working force than any other company experienced —arising from the large number of men that enlisted from Cape Breton Island—but the shortage of miners has coincided with an impairment of the capacity of the mines for output that was known to be impending in 1913, but which the conditions of the war period did not permit to be offset by the necessary new undertakings. When men were available in 1914 and 1915, expenditures could not be undertaken because of trade depression; and later, when money was available, men were not, and deliveries of machinery and construction materials had to defer to munitions priorities.

During the past two years, however, the Dominion Coal Company has accomplished many improvements, some of which are as follows. The underground haulage and pumping systems of No. 2 and 9 collieries have

been remodelled, electrically operated endless haulages having been substituted for a rather clumsy combination of compressed-air locomotives and several auxiliary haulages that necessitated many shifts of the load. Concentration and electrification of the pumping arrangements has also been completed.

A new shaft is being sunk between Nos. 1 and 2 collieries, close to the shore, which will serve as an intermediary shaft for the winning of the Phalen Seam in this vicinity and seawards, and will also materially shorten the distances that the workmen have to walk to work. Centralized pumping operations are also projected in this area.

A new colliery on the Emery Seam, No. 24, has been developed during the year and is now producing between 300 and 400 tons daily. No 17 Colliery has also become a producer during 1920, although partially developed and equipped in 1914.

Additional openings are understood to be projected upon the lower seams in the land area of the Glace Bay district during 1921.

The Morien shafts were unwatered, and some machinery installed there, but intensive development of this property which has large tributary sea areas—has been deferred. Production from the Cape Breton collieries is now close upon 300,000 tons monthly, and it is probable that the output in 1921 may reach 3,750,000 tons.

Nova Scotia Steel & Coal Company.

A satisfactory recovery in outputs was made by the Scotia collieries in 1920, and production is now at the rate of 60,000 tons monthly. A new colliery is being opened in the Bonar Point district that is expected to be a substantial producer in the Spring of 1921. Very satisfactory results are understood to have been obtained from the testing operations on the Stubbert Seam in the Point Aconi district.

It is possible that this Company may increase its production in 1921 almost to the pre-war figure of 750,000 tons.

Other Cape Breton Companies.

The Hiawatha Mine, in the Morien District, at False Bay Beach is a new producer, under the direction of Messrs. V. McFadden and Cavvichi. It is understand this property may put out up to 300 tons a day by the Spring.

The Indian Cove Coal Co. (which is the successor of the Sydney Coal Co. has developed an output which will exceed 57,000 tons in 1920, comparing with an average for many previous years of about 5,000 tons annually.

The Inverness Railway & Collieries Ltd., shows a marked improvement over the figures of 1919. A new seam overlying the Seven Foot seam that has been very extensively worked seawards, has been proven, and should trade conditions be favorable, a still further increase in outputs may be looked for in 1920.

Other small companies operating include the Anglo Company at New Campbellton, the Bras d'Or Coal Co. near North Sydney, and a small mine operated by Glace Bay interests in the same neighborhood, all of which show larger production than in 1919.

Mainland Collieries.

The Acadia Coal Company has achieved, relatively to its position, the most substantial increase in coal output of any Nova Scotia Company. This Company, which is now controlled by the Scotia Company, is mining coal from ten separate mines. Technically, its management is of unusual excellence, and the property, which is potentially one of the best in Nova Scotia, is doing very well, and should do better, with fair luck. The writer forcasted a year ago that Acadia might reach the output of 1913, namely, 539,000 tons, and it has not fallen far short of this estimate.

The Acadia Coal has acquired the mine of the Milford Mining Company at Thorburn, near New Glasgow.

As was also noted last year, the Springhill Mines in 1919 had the unique distinction of producing more than they did in 1913, but 1920 figures have bettered by 30,000 tons. A possible production of 450,000 tons in 1920 was forecasted, but production suffered from some heavy roof-falls in the main slope of the most important mine at Springhill. Even with this drawback the 1920 output at Springhill is the best since 1908.

The Export Embargo.

A reminder of the supreme importance of the coal mines of Nova Scotia to eastern Canada was given during the Summer by the unwelcome imposition of an embargo on coal export from Nova Scotia, other than to Newfoundland and the United States. It appears to occur to Ottawa every little while that the coal mines of Nova Scotia are the only ones between the Atlantic and the Middle West, a distance of 1,900 miles, constituting Canada's sole source of coal supply in six provinces, but so far governmental solicitude for the coal production of Nova Scotia has been expressed in terms of price restriction and control of distribution.

The embargo on export coal was not well conceived, and particularly in the case of the small operators, it deterred them from undertaking expenditures to develop output. What the coal industry of Nova Scotia needs is definite encouragement, and guarantees from government-directed enterprises that a policy of using Canadian coal, to the point of maximum avoidance of the use of imported coal, will be followed. If such guarantees are not now given, the rectitude of government interference in times of scarcity can not be upheld, and, so long as government and public utilities in Canada do not use Canadian coal when it is available, no platform of national protection can be anything but a hollow sham. The government can not with propriety advise the public to buy and produce at home should it continue to buy—as was done in the past—United States coal because it was cheaper than Canadian. The world has lately learned that "cheapness" is not a condition that can be expressed in currency values. There are very few things that are "cheap" if bought abroad, when home production is possible, and coal is most assuredly one of those commodities that is dear at any price if brought from the outside, and cheap at any price, if produced in preference at home.

St. Lawrence Market.

The resumption of St. Lawrence shipments that was anticipated in last year's review did not materialise, and, despite the export embargo only a negligible quantity of Nova Scotia coal was shipped to Montreal and St. Lawrence ports. In 1921, it is quite probable that a substantial beginning towards a restoration of this temporarily lost market will be attempted. The former customers of Nova Scotia coal companies are anxiously awaiting the re-appearance of Nova Scotia coal on the Montreal market. It should receive a sympathetic consideration if the public realise that

Nova Scotia's five years exclusion from Montreal market was entirely a war casualty, occasioned by heavy enlistments of miners, and by the taking of the coal-freighting fleet for munitions transportation by the Admiralty. For years, the ships that should have carried Nova Scotia coal to Montreal were carrying munitions to East Africa, Salonica and the Admiralty alone knows where else.

Consolidations of Mining Properties.

The much to be desired consolidation of the mining companies, which this journal has urged for many years, came nearer consummation in 1920 than at any time since the formation of the Dominion Coal Company. The reconstruction of the original structure of the General Mining Association only now requires a union of the mining operations of the Dominion Steel Corporation and the Nova Scotia Steel Company. This is a foreordained inevitable event of the future, and the sooner it takes place the better for Nova Scotia. In the 1919 Review, we ventured to assert that "only by consolidation of interests can the scattered, and in many instances financially weak coal companies of Nova Scotia hope to weather the future." The patent advantages that have already followed co-operation between the two large coal companies provide the strongest argument for their actual union. The general favor which consolidation of coal-mining interests has received from the public in Nova Scotia during the past two years is the most hopeful sign of the times to the provincial coal trade.

Output Prospects for 1921.

A study of the position of the several companies indicates an output capacity in 1921 of 6½ million tons, but a forecast of the actual production is more difficult to make than has been the case since 1914, because there is not the same assurance of insistent demand and uninterrupted outlet for the coal that has existed for the past six years.

Labor and Wages.

The year has seen almost continuous negotiations between the United Mine Workers and the coal companies for increased wages. The agreement of January last, which gave the miners a substantial increase in wages, was barely signed when a new demand was made for a further increase, accompanied by request for alterations in working conditions, which, had they been granted, would have been found to be far more onerous than the wage increased asked, their general tendency being to restrict production and to attempt to fix as a permanent feature the very uneconomical arrangement of the working forces and certain conditions which had resulted from war exigencies.

A Royal Commission was appointed to consider the whole question of wages and working conditions at the mines in Nova Scotia and New Brunswick. No person with first hand acquaintance with coal mining was appointed on this Commission, and its recommendations were of an impracticable character. The Union summarily rejected the Commission's recommendations, and after protracted negotiations — which have been fully reported in the "Journal" — an agreement was come to between the Executive of the United Mine Workers in Nova Scotia and representative operators which has since been ratified by the individual vote of the union members. This agreement grants an increase in wages, effective 1st November, of 55 cents per day to day-paid workmen, and a ten per cent increase on contract tonnage rates. There was very determined opposition to the ratification of this agreement from the Mainland and Inverness Districts, but the Sydney District gave a large vote in its favor which carried the Province. There is reason to hope a settlement of the wages question has been obtained that will last for at least a year, if it should turn out that the coal operators can pay the high rate of wages the agreement calls for. There is every likelihood that the Nova Scotia collieries will have to mine coal in 1921, not to satisfy an insistent demand for coal more or less regardless of price, but on a strictly competitive basis, and, so far as the consumption of coal for steel-making purposes is concerned, there are good grounds for belief that present wages costs are higher than will permit the coal to be used in steel processes with any substantial hope of successful competition with steel and steel products made in competitive countries. It may be that the demand and price of coal for export business will enable the coal companies that are associated with steel enterprises to concentrate upon coal production for commercial sale rather than for consumption in steel manufacture, but there are many considerations that make this undesirable, and, as we have stated previously, it is to be doubted whether the higher wages which the miners have gained, accompanied by the unemployment that will result from them, will be found to be better than more steady work at lower rates of remuneration.

ADVANCE FIGURES OF CANADIAN COAL PRODUCTION DURING 1920.

The very approximate figures of 1920 coal production available at the time of writing show a comparison with 1918 and 1919 as follows:

	LONG TONS.		
	1918	1919	1920
Nova Scotia & New Brunswick . . .	5,450,000	5,330,000	5,650,000
Alberta & Saskatchewan.	5,650,000	4,800,000	6,100,000
British Columbia .	2,290,000	2,170,000	2.700,000
	13,390,000	12,300,000	14,450,000

A comparison with production in 1913 and since is as under:

	Long Tons
1913	13,400,000
1914	12,200,000
1915	11,850,000
1916	12,930,000
1917	12,550,000
1918	13,360,000
1919	12,590,000
1920 . . . . . (est.)	14,450,000

The foregoing figures are transposed, in round numbers, from the short ton statistics of the Mines Branch, Ottawa. Strict accuracy is difficult, as some of the provinces have fiscal years that do not coincide with the calendar year, and there is a difference between output and production (very marked in British Columbia because of the large reject in the coal as mined in some districts). Also, while the provinces generally use the long ton in statistics, and the coal operators almost invariably do so, the Ottawa figures are given in short tons.

Coal Production in British Columbia During 1919

ROBERT DUNN, Victoria, B.C.

An increase in coal production will be shown by the collieries of all the coal fields of British Columbia for 1920 in comparison with the previous year. A conservative estimate places the output at 2,787,384 tons the figures for 1919 being 2,267,541 tons, an improvement of 518,843 tons.

On Vancouver Island there has been a notable advance. The big producers, viz., Canadian Western Fuel Co. and the Canadian Collieries (D) Ltd., have more than maintained the pace set in 1919. While the Island Field has lost the "Jingle Pot" Mine, which ceased operation early in the year, the adverse effect of this has been fully taken care of by the speeding up of the regular producers and by the marked development of the production of the Granby Mining & Smelting Co's Collieries at Cassidy. The output of the Island will aggregate approximately 1,783,800 tons as compared with about 1,700,000 tons in 1919.

There also will be an improvement in the Nicola-Princeton Field where the production of 1920 is expected to total 151,584 tons as compared with 150,705 tons in the previous year.

The outstanding advance, however, is in the Crow's Nest Pass District, Eastern British Columbia. The aggregate for 1920 is placed at 852,000 tons in round figures as compared with 562,000 tons in 1919. The explanation, of course, is that in 1919 there was a three month strike at Fernie, materially reducing the output of the principal colliery of the District, the Crow's Nest Pass Coal Co.

It must not be assumed that the past year has been altogether free of labour trouble in the Crow's Nest Pass District. There have been disputes; in fact for some months there has been more or less open warfare between two labor organizations, namely the United Mine Workers of America and the so-called One Big Union. In this section the authority of the Dominion Government exercised for the purpose of preserving industrial peace in order that production might be maintained during and immediately after the war, still exists. W. H. Armstrong, as Director of Coal Operations, still is in control and it has been possible by virtue of the mediatory service of his department, to keep the mines, fairly consistently, on a producing basis throughout the year. This, therefore, accounts for the fact that the mines of Coal Creek and Michel will show an output for 1920 of about 686,000 as against 480,000 tons last year while the Corbin Coal & Coke Co. will have a production of something like 166,00 tons as against 82,000 tons last year.

To revert to the conditions on Vancouver Island it is interesting to note that the Canadian Collieries (D) Ltd. has conclusively demonstrated its ascendency with a total (estimated) of 746,000 tons. The nearest to this production is that of the Canadian Western Fuel Co. Ltd., the long established collieries of Nanaimo, B.C., with about 459,000 tons. Reference has been made to the showing of the Cassidy Collieries of the Granby Company. This industry was in its infancy in 1919 and it is only necessary to state that its product for 1920 will aggregate something like 210,000 tons to indicate that it has grown into a business of importance in the course of the past twelve months. The Pacific Coast Coal Mines Ltd., with 99,800 tons, also has commenced to climb while the Nanoose-Wellington Collieries Ltd., Nanoose Bay, has done well with 45,000 tons approximately to its credit.

With regard to the Nicola-Princeton District the chief producer is the Middlesboro Collieries with a total of about 95,000 tons. Then comes the Fleming Coal Co. with 30,000 tons, the Princeton Coal & Land Co. with 19,000 tons, and the Coalmont Coal Co. with some 7,584 tons. The latter Company was re-organized recently and is developing its holdings so that it may be expected to take a more important part in the colliery activities of the section from this date forth. Several million tons of coal are being developed. An aerial tramway is being installed between the Mine and Coalmont on the Kettle Valley Ry. A screening plant is being installed and a tipple constructed at the railway.

A new field is being opened up by the Chu Chua Coal Mining Syndicate. It is situated on the Indian reserve a short distance south of Chu Chua Station, and not far from the City of Kamloops. This coal is of excellent quality and, although the seam, now under development is somewhat narrow, some three feet in width, this is expected to improve as the work continues. The Kamloops Natural Gas, Oil and Coal Co. Ltd. also is doing some diamond drilling in the coal measures at Coal Hill, situated a short distance from Kamloops.

The Tolkwa Collieries, located near the Grand Trunk Pacific Ry. in northern British Columbia, has not done much this year, its production, as far as can be judged at present, being about 1,300 tons. A short distance from this property a new seam is being opened up which contains high grade coal, some of which soon will be marketed. It seems probable that the immediate future will see extended development of the coal areas of this District. The ever-increasing price of fuel oil and its scarcity in the world's markets is causing renewed interest in all the promising coal fields of the north. The Telkwa, Morice River, Peace River and Groundhog fields have attracted interest this year and large scale development may be expected before long. Undoubtedly those areas contain large quantities of good grade coal and but for the admitted transportation difficulties they now would be in the productive class.

JOHN L. LEWIS RE-ELECTED PRESIDENT OF UNITED MINE WORKERS.

The recent elections for office in the United Mine Workers of America are regarded as a decided victory for the conservatives among the members of that union. John L. Lewis was re-elected President, defeating Robert H. Harlan by the largest majority ever received by a candidate for the presidency. The Vice-President, Phillip Murray, was also re-elected, defeating Alexander Howat. The Secretary, William Green was re-elected by acclamation. Harlan and Howat were understood to represent the radical portion of the membership. Harlan represented the international officers of the U. M. W. of America in Montreal at the meetings in January 1918 when the coal operators of Nova Scotia agreed to recognise the U. M. W in Nova Scotia.

Northern Ontario Letter

THE GOLD MINES.

The Porcupine District.

The silver and gold of Northern Ontario, in receiving around 18 p.c. premium on United States funds during the fourth week of December, are realizing at the rate of about $4,140,000 a year on the aggregate output of something like $23,000,000. This premium is "net" to the producing companies and amounts to more than fifty per eent as much as the average yearly dividend disbursements.

During 1920, the net revenue in premium to the precious metal mines of the Temiskaming district has exceeded $2,250,000, the average premium having been well above 10 p.c. This alone constitutes a fair rate of interest on the capital involved. In the case of the Hollinger it has amonnted to nearly 3 p.c. on the Company's total issued eapital, and at the present high point is at the rate of between 5 and 6 p.c. This amount added to comparatively large earnings has appeared to place the Hollinger in a position where dividends are expected at the rate of 1 p.c. every four weeks, beginning with the first of the New Year. At worst, it is believed, this rate will not be delayed longer than spring.

Shortage of hydro-electric power in the Porcupine district is serious. The condition, however, is entirely temporary. Careful investors are taking advantage of the present temporary depression to accumulate a large amount of the share capital of the produeing companies. These interests are found to be disregarding the present power shortage, and are basing their analysis on conditions under which the mines will operate at full capacity. To figure what may be expected at the Hollinger, Dome, McIntyre-Porcupine, Northcrown, Porcupine V. N. T., Schumaeher, and so on, with the return to a full power supply and with operations at full blast, the present quotations which are based on present curtailed earnings show clearly the inducement to invest. The mines have large ore reserves. They are equipped with most modern mining and milling plants, and the supply of labor is now abundant. It seems reasonable, therefore, to estimate the earning power of these mines by the end of 1921 at an average of at least fifty per cent higher than at the present time.

Further reports are current with regard to a possible consolidation of the Northcrown mines with the Porcupine V. N. T. This report received support this month when a brief examination of the holdings of the Northcrown was made by Major J. McIntosh Bell for the Porcupine V. N. T. Company.

In the meantime, the Northcrown continues aggressive operations. Twe new veins have been cut at the 500-ft. level on the Thompson-Krist side of the property. The veins lie within about twenty feet of each other. One is about five feet in width and the other about ten feet. No official announcement has so far been made relative to the gold content of the veins, although it is understood to be fairly low. Plans have been arranged to carry on considerable exploration work on the new veins.

A narrowing down in milling operations is expected to mark the first quarter of 1921 at the Dome Mines, and perhaps also at the McIntyre. Power shortage conveys at least a threat of this. Any hardship experienced will not extend beyond May 1st, at the longest, and the mines appear to be confronted with exceptionally favorable conditions after that date.

One feature of the change to more favorable economic conditions is expected to consist of quite general activity on many of the outlying gold prospects. Although the producing mines of the Porcupine district are located in a comparatively small area, yet interesting deposits have been found over an extensive stretch of country and gives rise to the belief that further exploration work might lead to a broadening out of the producing zone.

Recently, the Hollinger Consolidated has been able to produce about $20,000 daily. The tonnage going to the mill has reached as high as 2,400 tons daily. It has not been stated whether or not the management hopes to maintain this record throughout the winter, but it is regarded as reasonably eertain that the coming summer will witness this mine operating at full capacity of not far under 3,500 tons daily for the first time in its history.

Kirkland Lake Field

During the month of November the Lake Shore mine again increased its output, the report just submitted to the president and directors by Manager R. C. Coffey, showing 1,810 tons of ore treated and resulting in a recovery of $49,340, the average production amounting to $27.25 per ton and the mill working at full capacity of 60 1-3 tons every twenty-four hours.

The November produetion compares with $47,078 in October, $40,151 in September, and $35,261 in August. The total production from this mine since starting up its mill in March, 1918, has reached an aggregate of $1,148,148.

A feature of the official statement just issued is that although the mill has generally been rated a capaeity of 60 tons daily, and has usually averaged between 50 and 55 tons per month, yet the November operations exceeded the 60-ton mark, and with the mill operating only 94.44 per cent of the possible running time.

The work of sinking the main shaft to deeper levels is proceeding satisfactorily, a depth of 564 feet having been reached at the end of November, indicating the likelihood of the 600-ft. level being established by the end of December.

Larder Lake Area

Application was made for letters patent to incorporate the Canadian Associated Gold Fields, Ltd., with an authorized capital of $30,000,000, made up of 30,000,000 shares of the par value of $1 eaeh. This concern proposes to take over the Associated Goldfields, of Larder Lake, the plan being to pay the Associated 20,000,000 shares, with about 2,000,000 shares to satisfy the Goldfields, Ltd., and the balance of around 8,000,000 shares to be retained in the treasury, to be sold to the public.

The Northern Ontario correspondent of the Journal referred in the past to this concern, and received quite pointed criticism for doing so. However, the information submitted in the Journal was entirely correct, the only unfortunate phase being that it was interpreted as reflecting adversely upon the reputation of a mining engineer who recently made an independent examination. Such reflection was not intended. As regards the enterprise the opinion is being freely expressed in mining circles that it is quite unfortunate that such a promotion (having a larger authorized capital than any precious-metal mining company in the Dominion) should not be supported by reports on

its property by mining engineers who are known to the mining profession of this country.

THE SILVER MINES.

Operators in the Cobalt field are confident of being able to compete with other silver producing mines and survive the adverse influence of the return to low quotations for the metal. With copper mining which supplies a large part of the world's silver output as a by-product almost at a stand-still in the United States and with further information coming from Mexico indicative of additional curtailment in that country, the downward tendency in silver quotations is believed to have run its full course.

Workmen in the Cobalt district appear to take a very reasonable attitude and it seems likely to expect a gradual reduction in wages, at least in proportion to the decline in the cost of living. Mine workers generally express the belief that it would be better to accept a little lower pay and keep the mines all operating, rather than to endeavor to demand the present high rate with the threat of curtailment of work.

The Nipissing Company is in a strong position, its latest financial statement having shown more than $4,600,000. In this respect, the Nipissing is the leader in this part of Northern Ontario, even leading the Hollinger Consolidated. Current premium on United States funds is adding at the rate of around $500,000 a year to the company's net income. Recent bullion shipments from this property have been exceptionally heavy, the total for the first half of December amounting to 561,216 ozs. It is learned, also, that representatives of the Nipissing are making an examination of the old Norwalk property in the Michipicoten district. The underground workings are now being de-watered.

A new company, known as the Ruby Co-operative Cobalt Mines, has been incorporated for the purpose of taking over and operating the old Ruby Silver Mines, situated in the south-eastern part of the township of Bucke, in the Cobalt district. The company has an authorized capitalization of $1,500,000, made up of 1,500,000 shares of the par value of $1 each. Of this, 750,000 will be distributed among the members of the original syndicate, and the balance of 750,000 shares left in the treasury to finance subsequent work. Clifford H. Moore, of Cobalt, is president of the Company, with the following directors: Dr. E. W. Mitchell, Dr. E. F. Armstrong, of Cobalt; Kenneth McDonald and B. Hartly, of Haileybury.

The annual report of the Coniagas mine will be placed in the mail this week, and shows a very successful period for the fiscal year ended August 31st. During the period the Company paid $500,000 in dividends.

Elk Lake and Gowganda Area

The idea to provide railway facilities for the Gowganda silver area is being rejuvenated by the promoters who planned the construction of a light narrow-gauge line last year. The present plan differs from that of last year, in that a standard-gauge road is now favored, with 56 lb. rails. Mining interests do not appear to be very enthusiastic about the project, after having been disappointed last year. The fear is expressed that the scheme may only serve to discourage the Government from building a macadam road, and perhaps in the end fail to succeed in providing rail transportation.

Information coming to Elk Lake conveys the report that power shortage is being experienced at the plant of the Miller Lake-O'Brien mine, and the indications point toward closing the mill early in the New Year. The mine has considerable auxiliary equipment, however, and the development of the mine will continue throughout the winter. With the advent of power in the spring, everything will be in readiness to proceed with production at full blast.

TORONTO MINING QUOTATIONS.

The following are the closing quotations for active gold, silver and oil stocks on the Standard Mining Exchange on December 27th 1920.

Silver.	Ask.	Bid.
Adanac Silver Mines, Ltd.	2⅛	2
Bailey	4¼	3½
Beaver Consolidated	27	26
Chambers-Ferland		6½
Cobalt Provincial	25½	
Coniagas	2.00	
Crown Reserve	17	15
Gifford	1¼	1
Hargraves	1⅝	1¼
La Rose	25	23
McKin.-Dar.-Savage	25	23
Mining Corp. of Can.	99	90
Nipissing	9.00	8.60
Ophir	1⅞	1
Peterson Lake	10½	9½
Temiskaming	26	25
Trethewey	16	15
Gold		
Apex	2	1¼
Atlas	16	14
Dome Lake	2	1½
Dome Mines	12.00	11.00
Gold Reef	2¾	2¼
Hollinger Cons.	5.55	5.49
Keora	15.½	15.
Kirkland Lake	38	35½
Lake Shore M. Ltd.	1.06	1.04
McIntyre	1.80	1.79
Moneta	10¼	
Newray Mines, Ltd.	5	3½
Porcupine Imp.	½	
Porcupine V. N. T.	16	17¼
Preston East Dome	2½	2¼
Schumacher	17	16½
Teck-Hughes	11	9
Thompson Krist	6½	6¼
West Dome	7	6½
West Tree Mines Ltd.	5½	5
Oils.		
Ajax Oil	28	
Eureka	26½	
Petrol Oil, Old	35	
Rockwood Oil, Gas	3	2½
Vacuum G.	16	11½

METAL QUOTATIONS.

Fair prices for Ingot Metals in Montreal, Dec. 29th, 1920. (In less than carload lots).

	Cent per lb.
Copper, electro	18¾
Copper casting	18½
Tin	41
Lead	6½
Zinc	7¼
Aluminum	35
Antimony	7¾

British Columbia Letter

Stewart, B.C.

At the Premier Mine, Salmon River, Portland Canal, the winter's work is in progress. Supplies for the mill are being taken in over the snow, sixty-five horses being used. Ore is being taken by the same means to tidewater for shipment to the smelter. The mill is about three-quarters complete. The force of workmen numbers approximately 200. Two five-ton Holt tractors now are being used over part of the trail. The installation of the hydro-electric power plant is finished.

Anyox, B.C.

There has been some uncertainty of late as to the permanence of work at the Anyox Camp, Granby Mining & Smelting & Power Co. Following the laying off of some 400 men and the announcement by the management that, unless the employees were prepared to accept a reduction in wages of about 75 cents a day, it would be necessary to practically cease operations, news has been awaited as to the attitude of labor. Nothing has developed, work is continuing, and the assumption is that the men have recognized the force of the Company's position and have acquiesced in the "cut" proposed.

Alice Arm, B.C.

The Dolly Varden Mine Railway, connecting the Company's wharves with the mine property, has closed down for the winter. This was rendered necessary because of recent heavy snowfalls. A. J. T. Taylor, president of the company, is satisfied with the season's operations. The production of over one million ounces of silver since September, 1919, is not a bad showing in his opinion. Besides development work has given, he says, gratifying results. Work is being continued at the mine, during the winter, between 65 and 100 men being employed, and Mr. Taylor hopes that it will be possible to maintain production at a high level next year. High grade ore has been sacked and shipped to the Tacoma (Wn)Smelter and the lower grade has been going to the Granby Company's Smelter, Anyox, for treatment.

Trail, B.C.

For the first week in December the ore receipts at the Trail Smelter of the Consolidated Mining & Smelting Co. totalled 12,502 tons. During the week ending December 14 the smelter receipts were 9,093 tons, bringing the total for the year up to 360,778 tons. Recent new shippers are the Silver Cup, of the Lardeau, and the Society Girl, at Moyie.

A considerable number of men employed in and around the Trail Smelter have been discharged and S. G. Blaylock, manager for the Canadian Consolidated Mining & Smelting Co., states that only necessary construction will be continued. The operation of the smelter will not be affected. This means that the proposed new mill for the handling of the ores of the Rossland Camp will not be commenced this winter and that other contemplated works will be deferred.

Cranbrook, B.C.

That over 30 uncommon minerals have been sampled and forwarded to the Department of Mines, at Ottawa, for analysis and intensive study within the last few months, from Eastern British Columbia, as one result of his collecting tours, is the statement of W. D. Thomlinson, the New Denver mineralogist.

Mr. Thomlinson commenced his work of field research for the laboratories of the Department of Mines just before the war, and during the war the work was suspended. It was resumed in the past summer.

One of the minerals forwarded Mr. Thomlinson believes to be stream tin—he did not himself have the opportunity to test it. If this belief proves to be well founded, a tin area has been discovered.

Barium sulphate or heavy spar, which has an important commercial use, is another of these undeveloped resources. It is being found in association with lead and zinc ores, but is usually mistaken for a form of limestone. Some considerable deposits of this have been brought to light.

One of the most important finds is of a rare clay, adapted to a very exclusive use, of which previously only one deposit has been worked commercially on this continent. Indications point to a deposit of commercial dimensions near Merritt, and two such deposits near Princeton.

In the Lardeau a curious alloy has been found, its elements being gold, silver and mercury. The latter may have possibly escaped from early milling operations, but if not, the alloy is a natural product not previously known to science, and Mr. Thomlinson will, in that case, endow it with the name of "Lardeauite." Native quicksilver, acting on a natural alloy of gold and silver known as electrum, and found in only a few places in the world, may have produced the new rarity.

After being thoroughly tested and classified, Mr. Thomlinson says, the samples will be shown at various great exhibitions, beginning with the chemical exhibition in New York next season, where experts from all the world will assemble. The commercial world is looking for deposits of many economic substances to exploit, and will certainly look into some of these new finds, he suggests.

If prospectors could acquire familiarity with some of these uncommon minerals that the world wants, in addition to their knowledge of the ordinary ores, Mr. Thomlinson states, important developments in the lines of new industries would certainly be brought about in the course of time.

In the meantime, they will be serving their own interests by providing him with samples of all finds that are at all out of the ordinary run.

Allenby, B.C.

The closing down of the Canada Copper Company operations both at the Mine, Copper Mountain, and at Allenby Mill so soon after the commencement of work has had a depressing effect not only in the district immediately affected but throughout the province. It is appreciated that, with copper priced as at present, it is difficult for an industry in British Columbia, faced as it is with high costs, to produce copper at a profit. In the case of the Granby Consolidated at Anyox, where the smelter is being kept active, the men have agreed to a reduction in their wages amounting all round to about 75 cents a day. Another company which appears to be carrying on is the Tidewater Copper Co., Sidney Inlet, West Coast of Vancouver Island, which just recently shipped 400 tons of concentrates to the Tacoma (Wn.) Smelter. It is stated that shipments will be made once a month from this date and that, because of the economical water-wheel method of generating power, it will be possible to produce copper at a cost permitting a margin even under existing market conditions. The owners of this property

are credited with having sunk $650,000 into development and new equipment within the past twelve or fourteen months, with results that assure its maintenance indefinitely as a shipper. With the other provincial companies hit as they are, not excepting the Canadian Consolidated Mining & Smelting Co., of Trail, it is refreshing to find one concern that is able to carry on despite adverse markets.

Princeton, B.C.

The Princetown Mining and Development Co., Ltd., have completed the installation of their plant and will recommence the work of development. This property is situated east of the town of Princeton. Three tunnels have been driven and a considerable body of concentrating copper-silver ore has been disclosed.

Greenwood, B.C.

The old Providence Mine is to be re-opened. An Ingersoll compressor has been purchased and is being installed. The mine is being pumped out and will be ready for mining when conditions are satisfactory.

Nelson, B.C.

Government purchase at a price of 80 cents per ounce of all silver offering, known to be the product of native ores, and increased silver coinage, are advocated by Robert R. Hedley, the well known mining man, as a means of assuring a market for Canadian silver, stabilizing the metal markets generally, and maintaining mines in operation through the present period of slump in metals, thus reducing the threatened unemployment.

Mr. Hedley, who was the manager of Hall Mines, Ltd., for 10 years, during the period it operated the Nelson smelter, has been spending a fortnight in the Slocan and arrived in the city a day or two ago.

In the case of Kootenay mining, Mr. Hedley pointed out in an interview yesterday, the price of silver is one of the principal governing factors, as silver constitutes the chief value in the majority of Kootenay ores. A stable price, therefore, for Canadian-produced silver would be an anchor that would assure the continuance in operation of many Kootenay mines.

That the Dominion Government would not be taking any undue risk in thus purchasing silver beyond its present normal consumption, is Mr. Hedley's considered opinion. "It can be demonstrated," he said on this point, "that when world conditions return to or approach normal, 80 cents an ounce for silver will be a reasonable minimum price. The United States is purchasing its own domestic production of silver and storing it at 99½ cents an ounce, removing it from the world's market, and as long as that drain continues, it is probable that the law of supply and demand will compel a price for silver higher than 80 cents."

The world's silver production for 1920, he stated, was provisionally estimated to be 30,000,000 ounces less than the production in 1913.

India, the world's heavy purchaser, which for generations had absorbed as high as 200,000,000 ounces annually, will probably not be credited with more than 10,000,000 ounces this year. If the price of silver in the early part of the year was the reason for restricting the Indian purchases, India will probably purchase extensively at prices below $1.00 an ounce.

Mexico is not at present a large producer of silver, and what she produces will largely go into her coinage. The United States and Mexico together contribute the bulk of the world's supply, and three-quarters of this comes as a by-product of mining for copper, lead and gold, now curtailed to far below normal.

"From these facts it can be argued," said Mr. Hedley, "that Canada can with advantage coin such silver as she may produce in the next two years at 80 cents per ounce. The production in the two years will not total more than 30,000,000 ounces, and of that, it is probable that the world's market will absorb the larger part, and at a price better than 80 cents."

Canada's silver coinage in circulation at the end of 1919 amounted to $27,084,148, Mr. Hedley stated, as compared with $14,327,662 in 1910. In the 10 years ending with 1919, the Canadian mint coined silver to the amount of $15,233,505.

Vancouver, B.C.

Judgment has been given against W. Pollard Grant, Vancouver lawyer, in his suit for a declaration that he holds legal title to a one-fifth interest in the Engineer Mine of the Atlin District, B.C. This is a step towards clearing up the estate of the late Captain Alexander so that a transfer of the Atlin property can take place. As soon as a clear title can be delivered it is expected that the Alexander Mine will be sold for a substantial figure, that development will be initiated without delay, and that the work will mean much for the advancement of that part of the north country.

Lorne Campbell, president of the Kootenay Light & Power Co., and former Minister of Mines, does not view the present situation in respect of mining and other industrial endeavor in a pessimistic way. He says: "The passing of the mushroom industries and of those businesses built up on the effects and causes of the war will give legitimate businesses a chance to carry on upon a sound business basis. Peace time conditions have returned and the reconstruction of business on a peace time basis is now under way. The general deflation resulting from the arrival of this period means that industries will require less capital to finance manufacturing and other producing concerns. The net result will be a reduction in the cost of living and credit conditions will return to a more normal basis." Mr. Campbell spoke optimistically of mining prospects in the Kootenays now that labor is available and referred to the activity in coal development and production in the Province of Alberta.

Mr. Glenville A. Collins, mining engineer of Seattle Wn. has taken over the management of the Drum Lummon Mines, Ltd., vice Mr. W. Porteous Sloan. This property is situated near Hartley Bay, Douglas Channel, B.C.

PERSONALS.

Dr. S. L. Walker, Prof. W. A. Parks, Prof. A. L. Parsons and Mr. Ellis Thompson of the staff of the University of Toronto are attending the meeting of the Mineralogical Society in Chicago, this week.

Mr. H. P. De Pencier is in Toronto on his way from New York to the Dome mine.

Mr. Ocha Potter has been appointed superintendent of the Ahweek mine, Michigan.

Mr. Brigham, manager of Hollinger Consolidated Mines is in Toronto.

F. M. Sylvester, of Vancouver, B.C., formerly of Spokane, Washington, is now president of the Moose Group Mining Co., which has mining property situated in the neighborhood of Alice Arm on Observatory Inlet, of which P. W. Racey, formerly of Rossland, B. C., is in charge. Mr. Sylvester was for some years general manager for the Granby Consolidated Mining, Smelting, and Power Co.

A Miner's Yearly and Daily Output of Coal

By W. W. ADAMS, Mine Statistician, United States Bureau of Mines.

The present world-wide demand for increased production in all branches of essential industry involves a matter of vital concern to persons engaged in the mining industry, namely, the productive capacity of the individual mine employee. This applies particularly to coal-mining, upon which other industries so largely depend.

The folded and faulted conditions of the coal beds in some countries, as well as the thinness and depth of the seams, the adaptability to the beds of available mining machines and equipment are factors which cannot be overlooked in determining what increase in individual output may be looked for in any given country. This subject, while of fundamental importance, can only be referred to in a paper of this length, the primary object here being merely to present a comparative statement of individual output under prevailing conditions.

The quantity of coal produced by a miner does not accurately indicate the miner's capacity as a workman, not only because of the natural conditions referred to above that limit his annual output, but also because of human factors which may possibly, however, be controlled, such as the demand for coal, the car supply, use of labor- saving machinery, number of days worked during the year, accidents in the mine, etc. It will, however, be an aid in answering the important question as to how and where the immediate need for coal throughout the world may best be supplied, if we examine the output of the miners in the important coal-producing countries over a period of years.

Complete official information for recent years is, for several countries, lacking, particularly for France, Austria, and Prussia, but partial date from unofficial sources may be used to show the individual output of the miners in these countries.

An examination of the available and in most instances official sources of information for the principal coal mining countries (covering generally the 18-year period begining with 1901) shows that the largest production per man during any year was 1,134 short tons, which represents the average production for each underground employee in the coal mines of the United States during 1918. The closest competitor of this country was New South Wales where each underground worker in 1918 produced 814 tons. British Columbia ranked third with 790 tons and Nova Scotia was fourth with 718 tons. The smallest individual outpnt for recent years was that of Japan in 1917, where an average of 155 tons was mined by the underground employees, although in 1901 India showed an average of only 122 tons, the latter figure being the smallest during any year for the countries under consideration. During the 18-year period New South Wales and Nova Scotia have each averaged practically the same amount (718 and 715 tons respectively). The individual outpnt for Great Britain was until 1910 above that of Prussia, but in 1911 Prussia passed the British record and has maintained the lead since that time. France has shown but little change in the miner's yearly production, averaging 302 tons prior to the War. Within the past three years, however, the daily output of the French miner has decreased although there has been an increase in his wages. In Austria the annual output has averaged 296 ton per man during the past 18 years. Following Austria comes Belgium with an average of 236 tons during the 18-year period. The man-production in Belgium remained 250 tons until 1914 when it dropped to 200 tons and showed only a slight increase during the 5 years of the World War. The underground workers of India have shown an almost steady increase in annual output, the quantity having risen from 122 tons in 1901 to 203 tons in 1918, averaging 178 tons during the entire period. In Japan the average output over a 17-year period was 174 tons. The following paragraphs will show more in detail the situation in the various countries.

United States.

In producing around 600 million short tons of coal each year the United States employs about 600,000 underground workers. In 1901 these underground employees produced an average of 729 tons per man. Eighteen years later the quantity had increased to 1,134 tons, the greatest on record for this or any other country. At the beginning of this period one-fourth of the bituminous coal was mined by machines while at the end of the period the quantity of machine-mined coal was about 56 per cent of the total bituminous production. Again, the high average thickness of the coal seams and the comparatively regular and uniform position of the coal beds (except in the State of Washington and the anthracite field of Pennsylvania) greatly facilitate the work of the miner in getting out the coal. About 85 per cent of the bituminous coal is mined from seams between 3 and 10 feet thick, and only 4 per cent from seams below three feet in thickness. Seams less than 2 feet thick do not produce as much as 1 per cent of the total production. Nor is coal mined at as great depths in this country as is the case in some of the foreign fields.

The underground workers in the United States do not include any women or girls.

Not only the annual but also the daily output of coal per underground worker is greater in the United States than elsewhere, and the former holds true notwithstanding the fact that the working year is usually shorter in this than in most other countries. For the years under consideration the mines were operated from 95 to 258 days. The records show that each underground worker in 1901 averaged 3.37 tons a day and increased his daily output to 4.40 tons in 1918. The closest competitor of the United States for which the number of working days is shown is New South Wales where the daily output per employee is only slightly below that in the United States.

New South Wales.

As a producer of coal New South Wales occupies a very low position among the countries here considered, its yearly output being about 10 million short tons, but in quantity of coal produced annually by each underground worker the country is second only to the United States. The individual production has increased from 689 tons in 1901 to 814 tons in 1918 and the annual output for 18 years has averaged 718 tons. About 12,000 underground workers are employed.

The length of the working year is not given in the

official reports except for the principal mines since 1909 which shows that the miners are employed from 168 to 238 days. Applying these figures to the entire Colony it appears that the daily production of the underground worker increased from 3.32 in 1909 to 4.07 tons in 1918, thus indicating that New South Wales ranks as a close second to the United States in the daily as well as the annual output of coal per man. Approximately one-fourth of the annual production is machine-mined.

Most of the coal (over 65 per cent) is obtained from the mines in the northern district of the colony where the seams range in thickness from about 7 to 20 feet with a probable average of about 12 feet. In the southern district most of the coal is mined from the Bulli seam which averages between 6 and 7 feet in thickness. Among the underground employees only 3 per cent are below 16 years of age. No women or girls are employed underground.

Nova Scotia.

Nova Scotia employs about 10,000 underground workers to produce between 6,000,000 and 7,000,000 tons of coal each year. With an average annual production since 1901 of 715 tons by each underground employee, the province ranks third among the countries now being considered, being slightly below New South Wales and considerably above British Columbia.

Prior to 1906 the individual output was above that in New South Wales, but in that year the Australian colony took the lead which, except in four instances, it has maintained down to the present time. Since 1901 the operating time of the coal mines has varied from 203 to 299 days, usually being about 280 days during the year. The daily output of the underground worker has varied from 2.45 tons to 3.35 tons with an average of 2.68 tons throughout the 18-year period. This in the daily as well as the annual output of coal by the individual worker, Nova Scotia occupies a position below the United States and New South Wales but above all other countries whose reports show the length of time the mines are operated. Of the total output of coal in 1911 at least one-fourth was machine-mined. In 1916 not less than 44 per cent was mined by machine.

The coal seams of Pictou county are of greater thickness than those in other parts of the province but produce only about one-tenth of the coal, while the seams of Cape Breton county, from which nearly three-fourths of the annual production is obtained are between 4½ and 7½ ft. thick.

British Columbia.

With about 4,000 underground employees each year, British Columbia produces between 2½ and 3 million tons of coal and thus contributes approximately one-fourth to the total production of coal in the Dominion of Canada. The total production is hardly to be compared with that of many other countries, yet British Columbia ranks fourth in the annual output per worker, being exceeded only by the United States, New South Wales and Nova Scotia. The individual output is about 1½ times that of Great Britain. The lowest annual tonnage was 494 tons in 1911 when labor troubles caused the mines of the East Kootenay district to suspend operations from April to November, while the maximum output was 790 tons in 1918, showing an 18-year average of 611 tons. The number of operating days is not given in the official reports, and therefore, the daily output of the workers cannot be stated. Of the underground workers less than than 3 per cent are boys (ages not given) and approximately 9 per cent are Japanese and Chinese. About 60 per cent of the coal production is from the mines of the Coast District, although here the usual output per worker is considerably below that in the East Kootenay district. No Orientals are employed underground in the latter district, but in the Coast district they at times comprise one-tenth of the underground workers.

The coal seams vary in thickness between wide limits, but it is probable that the average thickness of the seams of the entire province is about 9 feet. Information as to the quantity of machine-mined coal is not available.

Great Britain.

Coal mining in Great Britain gives employment to between 800,000 and 900,000 underground workers each year and the annual production is around 300 million short tons. During the war the production was somewhat less. The output of coal averaged 400 tons for each underground employee in 1901 and increased to 419 tons in 1906, but since the latter year there has been a decline in the individual output which continued down to 1918 when the output per man was only 337 tons. The decrease is also noticeable in the daily output of coal per man which has also receded from its high record of 1.55 tons in 1905 to 1.19 tons in 1918, the lowest during the last eighteen years.

The decrease in the annual production of the British miner is beyond doubt, due to the lower daily output per man rather than to a reduction in the number of working days to the year. In fact, the lowest annual output per man has been during the years of the greatest number of working days, and this in spite of an annual increase in the use of coal-cutting machines. The working year has fluctuated between 261 and 295 days, being above 270 days each year since 1910.

Coal-cutting machines are coming into more general use in the coal-mining industry of Great Britain. In 1901 only 345 machines were used with which about 2 per cent of the entire output was produced. In 1918 the number of mining machines had increased to 4,041 and the quantity of machine-mined coal was over 11 per cent of the total production for that year.

While the coal seams vary in thickness from about 1 foot to 30 feet, it is perhaps safe to say that the seams throughout the Kingdom have an average thickness of about 5 feet. About 7 per cent of the underground employees are boys below 16 years of age. No women or girls work underground at the mines.

Prussia.

Among the coal-mining nations of the world Germany ranks third, occupying a position considerably below that of Great Britain and very much above that of France. Over 90 per cent of the coal production is from the mines of Prussia and the figures for that Kingdom are here used as representative of the Empire as a whole, for which complete and comparable statistics are not available. While varying considerably from year to year, the annual coal production of Prussia is roughly speaking 160 million short tons, although in 1913 it almost reached the 200 million mark. Normally about 440,000 underground workers are employed. For these employees the record shows an annual production ranging from 352 to 459 tons per man. The individual output in Prussia surpassed that in Great Britain for the first time in 1911. This is due, however, largely to the greater number of days during which the miners in Germany are employed. The number of working days to the year, always high, has shown an almost constant increase, being 293 days in 1901 and 303 in

Year	United States	New South Wales	Nova Scotia	British Columbia	Great Britain	Prussia (steinkohle)	France	Austria (steinkohle)	Belgium	Japan	India
					Annual production per man employed underground.						
1901	729	689	719	623	400	357	304	250	248	176	122
1902	699	656	837	593	405	352	278	248	255	181	125
1903	760	648	748	529	403	368	318	258	257	175	144
1904	711	606	696	576	404	366	306	267	250	179	152
1905	755	671	693	654	405	365	312	285	246	213	161
1906	774	726	706	623	419	400	291	298	254	179	169
1907	852	719	675	566	417	392	304	295	249	158	179
1908	725	740	695	533	388	370	291	298	246	172	179
1909	831	557	615	570	380	361	304	293	251	145	181
1910	832	684	708	596	368	367	296	295	255	168	189
1911	819	763	696	494	371	381	300	308	244	178	196
1912	889	834	717	642	348	411	312	333	240	189	202
1913	916	820	729	582	371	422	307	329	238	182	204
1914	803	770	657	569	341	389	---	328	200	179	200
1915	867	775	680	596	393	447	---	350	182	156	192
1916	998	727	810	754	377	459	---	351	211	170	200
1917	1,071	728	778	715	359	436	---	278	218	155	204
1918	1,134	814	718	790	337	409	---	259	207	---	203
Average for years shown	843	718	715	611	383	392	302	296	236	174	178
					Daily production per man employed underground.						
1901	3.37	----	2.74	----	1.50	1.22	1.05	----	0.84	0.73	
1902	3.55	----	3.09	----	1.49	1.22	1.05	----	.87	.76	
1903	3.46	----	2.69	----	1.52	1.23	1.08	----	.85	.71	
1904	3.52	----	2.58	----	1.53	1.24	1.07	1.00	.83	.75	
1905	3.56	----	2.76	----	1.55	1.28	1.10	1.04	.85	.94	
1906	3.70	----	2.68	----	1.53	1.31	1.09	1.07	.85	.74	
1907	3.69	----	2.56	----	1.45	1.28	1.07	1.06	.83	.69	
1908	3.72	----	2.66	----	1.43	1.24	1.04	1.08	.82	.69	
1909	----	3.32	2.45	----	1.42	1.24	1.04	1.08	.83	.72	
1910	3.78	3.70	2.46	----	1.35	1.26	1.04	1.09	.84	.73	
1911	3.72	3.69	2.48	----	1.36	1.29	1.06	1.13	.82	.77	
1912	3.95	3.50	2.56	----	1.32	1.30	1.08	1.21	.82	.80	
1913	3.85	3.63	2.53	----	1.28	1.32	1.08	----	.80	.83	
1914	3.88	3.29	2.54	----	1.25	1.26	1.07	----	.76	.79	
1915	4.14	3.95	3.35	----	1.36	----	.94	----	.75	.76	
1916	4.24	3.89	2.80	----	1.28	----	1.01	----	.75	.76	
1917	4.27	3.66	2.72	----	1.26	----	.96	----	.73	.72	
1918	4.40	4.07	2.50	----	1.19	----	.91	----	.72	----	
Average for years shown	3.81	3.67	2.68	----	1.39	1.26	1.04	1.08	.81	.76	

Annual and Daily Production of Miners. (Accompanying article by W. W. Adams).

1914 the latest year for which the working time is shown. The daily output by the Prussian miner was until 1911 less than that of the miner of the United Kingdom, but from that year until 1914 the individual output of the miners in the two countries has been practically identical. The daily production in Prussia has ranged from 1.22 to 1.32 per man. No women or girls are employed underground.

About 65 per cent of the coal production of Prussia is obtained from the Dortmund district which includes the coal basins of the Lower Rhine and Westphalia, and here also are employed about 65 per cent of the underground workers. The Dortmund district, however, does not produce the largest tonnage per man, being surpassed by Upper Silesia both in the annual and daily output of coal per man, and this notwithstanding the fact that the miners of Upper Silesia usually work a somewhat smaller number of days than do the miners in the other districts of Prussia.

France

Among the European countries France ranks third with its annual production of 40 million tons of coal, and thus normally occupies a position below Prussia but considerably above Belgium. The output has, of course, been greatly reduced since the destruction of the mines in the northern part of the country.

The quantity of coal produced annually by the French miner does not vary much from year to year, the amount being 278 in 1902 and 307 in 1913, with an average of 302 tons over a 13-year period. Later figures cannot be given because of lack of information as to the number of employees and number of days of operation. The daily output of the miner in France is usually a fraction over one ton, but in 1917 and 1918 it fell below this figure in spite of an increase in the average wages paid to the underground workers in those years.

The mine workers are usually employed about 300 days during the year. No women are employed underground, but about 6 per cent of the underground workers are boys between 16 and 18 years of age, and 6 per cent below 16 years. The average thickness of the coal seams is probaby somewhat less than 3 feet 3 inches, which indicates an average thickness slightly above that in Belgium. About two-thirds of the coal produced prior to the war, was from the Valenciennes coal basin in the departments of Pas-de Calais and the Nord. In this field, however, the daily output per worker, while equal to or above that in most of the other coal fields of France, is slightly below the individual production in the coal basin of Le Creusot et Blanzy which furnishes only 6 per cent of the annual output of coal.

Austria.

Excluding the lignite industry, the coal mines of Austria employ about 52,000 men underground and the annual production is around 17 million short tons. The official reports do not segregate the employees underground from those on the surface except in connection with the statistics of wages and hours of labor, and the totals thus given do not exactly agree with the number of employees reported in connection with the output of coal. However, this segregation has been used to determine the production per underground worker, and on this basis it may be seen that the annual output has ranged from 250 tons to 351 tons per man. The daily output varied from 1 to 1.21 tons per man until 1912, since which time no information is available as to the number of days the men have been employed during the year.

During the 12-year period beginning with 1901, the working year of the Austrian miners did not change materially, having varied only between 268 and 279 days per year. No women or girls are employed underground, but about 11 per cent of the underground workers are boys presumably below 16 years of age.

Nearly two-thirds of the coal of Austria is obtained from the provinces of Moravia, Silesia and Galicia, the coal seams in Upper Silesia being a continuation of those of Prussia and Russia. An average of about 2 ft. 8 in. obtains in the Ostrau-Karwin district which is the principal coal-mining district of Silesia. About one-third of the yearly output is from the mines of Bohemia where the main seam of the Kladno-Rahonitz basin has a thickness of 20 to 36 feet.

Belgium.

Prior to the World War, the Belgium coal mines employed in round numbers 105,000 men in the underground workings and produced about 25 million short tons of coal. With the beginning of hostilities, there was a sudden reduction both in the output of coal and the number of men employed. This situation became worse as the war progressed so that in 1918 there were only about three-fourth the usual number of employees and the production was less than two-thirds normal. The yearly output per underground worker had averaged about 250 tons during the 13 pre-war years, but fell to 200 tons in 1914, and remained thereabouts throughout the war.

That the reduction in the annual individual output was mainly due, however, to a shorter working year is shown by the fact that the daily output of the miners was only slightly below normal, being about .74 tons during the war, as against .83 prior thereto.

Under normal conditions the miners in Belgium worked nearly 300 days each year, but in 1914 the number of working days fell to 263 and the following year it was 241. In 1917 the working time rose to 296 days, but the following year it fell back to 288 days.

Mining operations in Belgium are carried on under great natural disadvantages. The coal seams are thin, averaging only 26 inches for the entire country. Moreover, the contorted and folded conditions of the seams and the great depth at which they lie render mining extremely difficult and greatly reduce the productive capacity of the individual miner.

The number of woman employed underground in the coal mines of Belgium was 120 in 1901 and only 3 in 1912, since which year none have been employed. Boys between 14 and 16 years old usually comprise about 4½ per cent of the underground workers, and prior to 1914 about 2 per cent of the underground employees were boys between 12 and 14 years of age, but since 1914 the empoyment of children of the latter age appears to have ceased.

Nearly three-fourths of the coal production is from the Province of Hainaut, where the deepest mines are situated, and there the individual tonnage is lower than that in Namur. However, the Province of Hainaut includes the Mons district where the coal seams (average 22 inches) are thinner than in other parts of Belgium, while the Province of Namur, although producing only 4 per cent of the coal production, contains the thickest seams (average 28 inches) in the Kingdom.

Japan.

Since 1901 the coal production of Japan has trebled in quantity, being slightly less than 10 million tons

in that year and reaching a total of 29,000,000 tons in 1917. The reports of the Japanese Bureau of Mines do not usually segregate workers underground from those on the surface, but based upon the segregation in the annual report for 1917 it may be seen that the underground employees have increased from around 56,000 in 1901 to 187,000 in 1917. The greatest annual increase in the number of employees underground was in 1907 when nearly 30,000 more men were employed than in the preceding year. The average annual output per underground worker has varied from 145 tons to 213 tons, the average for the 17-year period being 174 tons.

In 1907 Japan gave way to India in the annual output per worker, owing to the fact that India has shown an almost constant increase, while in Japan the individual output has remained practically unchanged.

The individual daily production of coal in Japan has ranged from .72 tons to .94 tons per man, showing an average of 0.76 tons for the entire period. The working year has varied from 201 to 251 days. In 1917 about one-fourth of the underground employees were women and girls. More than four-fifths of the workers underground, both men and women, were over 20 years of age; about one-sixth were between the ages of 15 and 20 years; and only a little more than 1 per cent below 15 years of age.

About three-fourths of the coal produced is obtained from the mines of the Island of Kyushu, and especially from the Chikuho coal field in the northern part of the island where the coal seams vary in thickness from 4 to 33 feet, with a probable average thickness above 10 feet. The Chikuho coal field supplies about two-thirds of the production of the island of Kyushu, and about one-half of the output of the whole empire. One-tenth of the annual production of coal is contributed by the mines of Hokkaido (Yezo) Island where the Ishikari coal field produces nearly all of the coal. The seams of this field have even a greater thickness than those in the Chikuho coal field, and the field will doubtless increase in importance as transportation facilities improve.

India.

The coal mines of India which are regulated by the India Mines Act, have an annual production of about 20 million tons and employ about 95,000 men in underground work. In the production per man underground, India occupies a position below Belgium on the one hand and above Japan on the other. In this regard India gained the ascendency over Japan in 1907 and an annual increase since that year has widened the margin of India's lead. The daily output of the Indian miners cannot be stated because the official reports do not show the number of days the mines are worked. Practically 85 per cent of the coal production is obtained from the coal fields of Bengal where the average thickness of the seams is approximately 9 feet. About 40 per cent of the underground mine workers are women. Something less than 1 per cent are boys and girls below 12 years of age.—Reports of Investigations, U. S. Bureau of Mines.

U. S. GEOLOGICAL SURVEY SEARCHING FOR ASBESTOS IN THE WESTERN STATES.

The Press Bulletin of the U. S. Geological Survey remarks that the United States now obtains most of its high-grade, long-fibre asbestos from Canada, but geologists of the Survey hope that large deposits which will yield material of good quality may yet be found in the Western States, especially in Arizona, where asbestos of unusually long fibre and silky texture has been discovered.

In the Apache and San Carlos Indian reservations in Arizona, asbestos is found associated with rocks of the Apache group, which is made up of several formations. The principal deposits are in the Salt River region, where the Apache group is represented chiefly by beds of quartzite and limestone, which are at many places invaded by diabase. Throughout this area much diabase has been injected into beds of limestone, and the asbestos is found near the contact of the limestone with the diabase. Places where the limestone has been broken by the diabase have been particularly favorable for the formation of asbestos. The asbestos is invariably associated with serpentine, and although serpentine occurs at many places without asbestos, serpentine "float" fragments of it that lie loose on the surface, having been washed out from its outcrop, are a valuable aid to the prospector for asbestos. In this region asbestos itself is also generally found as float for a considerable distance below its outcrop.

THE ASBESTOS MARKETS.

The strike of the asbestos miners at the King Beaver Mines at Thetford was brought to an end on the 15th of November by the men going back to work at the old wage rate of $4.00 per day, instead of the $4.50 per day asked.

There have been a number of accidents in the Thetford mines through collapsing of the sides of the asbestos quarries, probably connected with the unusually mild and damp weather, and the lack of really hard frost.

The Quebec correspondent of the Canadian Institute of Mining & Metallurgy's "Bulletin" states that demand from the United States for asbestos is not as keen as it was in the Summer, especially as regards millstock qualities. The European demand is very satisfactory, however, and asbestos mining is less affected by the commercial depression than any other branch of mining in the Province.

New York market letters prophesy higher prices for most grades of asbestos in 1921, but this will of course turn on the general state of manufacturing, and much will depend on the condition of the motor industry. Asbestos is used in such varied ways as to enter into most staple industries, which is a guarantee of its continued demand, and indicates that the briskness of demand will fluctuate with general manufacturing activity in the United States. While high-grade asbestos is much sought after, probably the most encouraging feature of the business at this time is the extension of uses for short fibre material and material that formerly was regarded as waste and unsaleable.

"Asbestos," of Philadelphia, states in regard to the market for Canadian asbestos: "We see no immediate sign of overproduction in Canada, especially of crude and long fibre. We do, however, see marked increase in the use of Rhodesian, African and Arizona fibre, with several new contenders showing on the horizon. The questions as to whether or no there is a demand for yarns and cloths made of blue and brown asbestos must in honesty be answered in the negative. There is no 'demand' true enough, but spinners are turning more and more regularly to blue and brown and are gradu-

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C.M.J.—12-31-20

ally educating the trade to accept yarns and cloths made therefrom. With Canadian crudes selling at $3,500 per ton it is not to be much wondered at that spinners seek to use fibres which can be bought at a fifth of that price..... There will be no serious break in the raw material market until non-Canadian fibres are proven tried and accepted by the trade and consumer. When that time comes, if it does, then Canadian must be brought nearer to the level asked for non-Canadian."

Following prices current in November are excerpted from "Asbestos."

Average market prices paid by consumers for average quantity, quality and freight haul from producer, about as follows:

Asbestos Air Cell Covering, 4 Ply	35%	to	40%	off.
" Air Cell Paper in rolls .	$10.00	to	$12.00	
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Magnesia Carbonate, Powdered .	15c	to	20c	lb.
85% Magnesia Pipe and Boiler Covering	10%	to	20%	off.

A Montreal Letter

ALEXANDER GRAY.

Oil Shale Plans Proceeding.

"Amid encircling gloom", while constructive forces are eradicating economic ills we know of, and destructive elements in share and commodity markets are anticipating dire happenings which may not occur, it is an auspicious event to have the Anglo-Persian oil interests, through the D'Arcy exploration Company, complete the foundation of the first unit in which the New Brunswick oil shales will be treated. Some weeks ago this was foreshadowed in "The Canadian Mining Journal". It was then intimated a plant was being ordered. Not only has that fact been verified, but the foundation work being finished, the expectation is the New Year will number among its achievements the successful inauguration of a Canadian oil-shale industry, backed by influential interests and conducted by experts. It has been "a long, long way to Tipperary," for Messrs Lodge and Mackenzie who exploited the qualities and extent of these New Brunswick shales —and, again it is not Canadians who "carry on."

Efficiency as a Remedy.

At least one large mine has the proof that the do-as-little-as-possible period is over. In one month of late, with the same number of men employed, there was an improved efficiency of 40 per cent., and less grumbling than had been noted for six years.

There being more applicants than vacancies, notwithstanding this property has been notoriously short-handed, the operating conditions leave no room for

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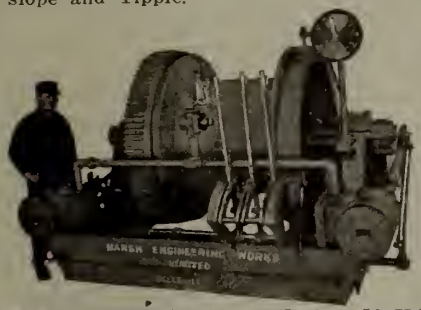

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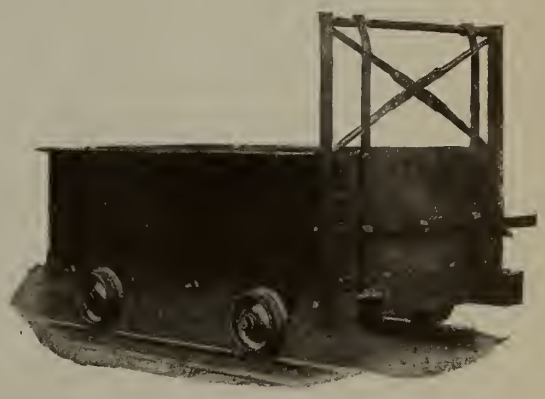

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"slackers." Rather than be deprived of their livelihood by those eagerly seeking employment, men who have been reactionary to an almost intolerable extent have voluntarily concluded their best interests rest with their employers.

Mr. MATTHEW LODGE OF MONCTON, N.B.

Nor is this spirit confined to one producing company. Others are having the same experience. For a change, a pick-and-choose policy is possible. Where wage concessions are impending, as at Cobalt, it is a reassuring sign of the times to have miners conciliatory, for they are well aware that metal markets are askew.

Uncertainty of tenure is proving an incentive to increased production per man. In the matter of wage schedules, perhaps their revision downward must harmonize with living requirements still none too lenient and yet in the altered circumstances it is co-operation which will make easier whatever readjustments are necessary.

Were it not for the shortage of power—a shortage, it is claimed, that might not have been so acute had foresight been exercised about the conservation of water—gold outputting immediately would be accelerated. Hand-drilling has been tried and found wanting for other than those carried on the pay-sheet at cost plus. So long as exchange on New York, which is the settlement basis, affords a premium, gold mines have an extra to bank. Silver exported carries a corresponding premium—but that premium no longer is handsomely poised upon peak prices for the metal.

In all other directions producers are awaiting the restoration of Peace Markets and resumption of buying big enough to go around. Give essential economies, precious metal mines can make "Snug Harbor" with their increased production. Special and base metals are not so fortunately situated—pending the provision of international credits and broader industrial movements. All of which goes to show how adventitious is the willingness of labor to assist in the solution of serious problems—largely their own.

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VANCOUVER MEETING OF THE INSTITUTE, FEBRUARY 9th TO 11th, 1921.

The provisional programme of the February meeting of the British Columbia Division of the Institute is as follows:

WEDNESDAY, 9th.—Morning session. Business and election of officers. Reviews of mining in the province by the Provincial Mineralogist and the Resident Engineers of the Department of Mines.

Afternoon Session.—Symposium of Fuel Supply, cost, distribution and substitutes. A lecture will be given in the evening.

THURSDAY, 10th.—Morning Session. Topic, "Metallurgical Problems of British Columbia."

Afternoon.—Topic, "Non-metallic minerals of British Columbia." Smoker in the evening, the feature of which will be a play by the Players' Club of the British Columbia University.

FRIDAY, 11th.—Morning Session. Discussion of Special Geological Problems affecting mining in British Columbia.

Afternoon.—Discussion on the Relation of the Institute to the Federal and Provincial Governments. Evening: Annual Dinner.

The Branch is offering two prizes for the best papers by students in the third and fourth years of the mining course at the University of British Columbia, one paper to be on a mining subject and the other on a metallurgical subject, the papers to be presented at one of the sessions of the meeting.

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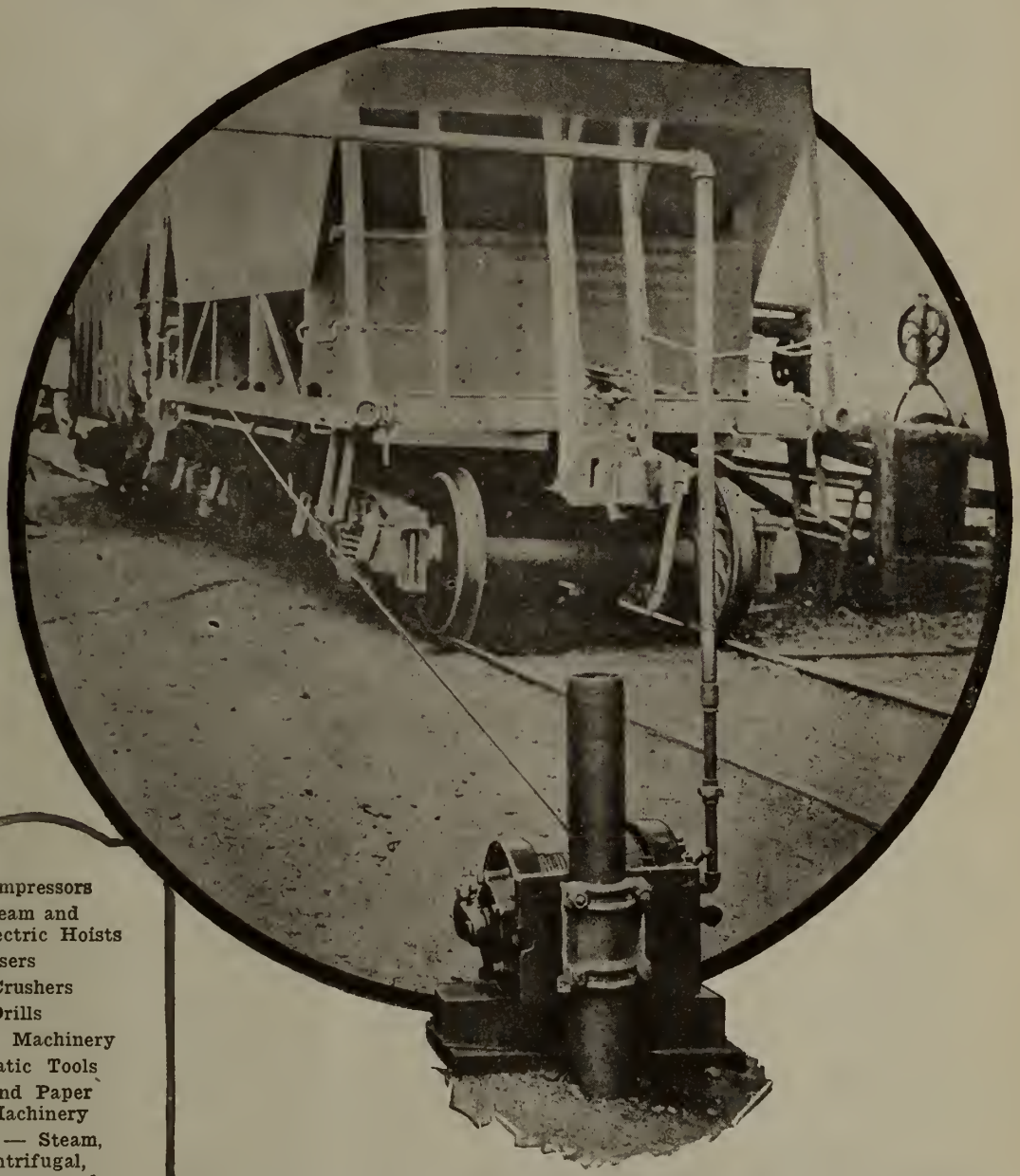

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Recent Publications

Results of forty-one Steaming Tests conducted at the Fuel Testing Station, by John Blizard and E. S. Malloch.

The Copper Smelting Industry of Canada. Report on, by A. W. G. Wilson, Ph.D.

Building and Ornamental Stones of Canada (British Columbia). Vol. V., by W. A. Parks, Ph.D.

Peat, Lignite and Coal; their value as fuels for the production of gas and power in the by-product, recovery producer. Report on, by B. F. Haanel, B.Sc.

Annual Mineral Production Reports, by J. McLeish, B.A.

The Coal-fields and Coal Industry of Eastern Canada, by F. W. Gray.

The Value of Peat Fuel for the Generation of Steam, by J. Blizard, B.Sc.

Analyses of Canadian Fuels. Parts I to V, by E. Stansfield, M.Sc., and J. H. H. Nicolls, M.Sc.

Graphite, by H. S. Spence.

Summary Report of the Mines Branch, 1918.

The Helium Sources of the British Empire, by D. J. McLennan and others.

The Mines Branch maintains the following laboratories in which investigations are made with a view to assisting in the development of the general mining industries of Canada:—

Fuel Testing Laboratory.—Testing value of Canadian fuels for steam raising and production of power gas; analyses, and other chemical and physical examinations of solid, liquid and gaseous fuels are also made.

Ore-Dressing Laboratory.—Testing of Canadian ores and minerals, to ascertain most economical methods of treatment.

Chemical Laboratory.—Analysing and assaying of all mineral substances and their manufactured products. Copies of schedules of fees, which are slightly in excess of those charged by private practitioners, may be had on application.

Ceramic Laboratory.—Equipment is such that complete physical tests on clays and shale of the Dominion can be made, to determine their value from an economic standpoint.

Structural Materials Laboratory.—Experimental work on sands, cements and limes is also undertaken.

Applications for reports and particulars relative to having investigations made in the several laboratories should be addressed to **The Director, Mines Branch, Department of Mines, Ottawa.**

GEOLOGICAL SURVEY

Recent Publications

Summary Report. The annual Summary Report of the Geological Survey is now printed in parts. Applicants should therefore, state what particular geologist's report is required, or what subjects they are interested in.

Memoir 105. Amisk-Athapapuskow Lake district, by E. L. Bruce.

Memoir 108. The Mackenzie River basin, by Charles Camsell and Wyatt Malcolm.

Memoir 110. Preliminary report on the economic geology of Hazelton district, British Columbia, by J. J. O'Neill.

Memoir 111. The Silurian geology and faunas of Ontario peninsula and Manitoulin and adjacent islands, by M. Y. Williams.

Memoir 113. Geology and mineral deposits on a part of Amherst township, Quebec, by M. E. Wilson.

Memoir 114. Road material surveys in the city and district of Montreal, Quebec, by Henri Gauthier.

Memoir 115. Geology of Matachewan district, Northern Ontario, by H. C. Cooke.

Memoir 116. Investigations in the gas and oil fields of Alberta, Saskatchewan and Manitoba, by D. B. Dowling, S. E. Slipper and F. H. McLearn.

Memoir 117. Geology and ore deposits of Ainsworth mining camp, British Columbia, by S. J. Schofield.

Museum Bulletin 30. Gabbros of East Sooke and Rocky Point, by H. C. Cooke.

Map 164A. St. John, New Brunswick. Topography.

Map 183A. Harricanaw-Turgeon basin; Abitibi, Timiskaming and Pontiac, Que. Geology.

Map 185A. Sandon (Slocan and Ainsworth Mining Divisions). Topography.

Map 1584. Blairmore, Alberta. Geology.

Map 1691. Buckingham, Hull and Labelle counties, Quebec. Geology.

Map 1705. Thetford-Black Lake area, Quebec. Topography.

Map 1707. New Glasgow, Pictou county, N.S. Topography.

Map 1712. Foothills of Southern Alberta, St. Mary river to Highwood river. Geology.

Map 1724. Sheep River, Alberta. Geology.

Map 1726. Athapapuskow Lake region. Geology.

Map 1739. Portions of Bristol, Onslow, McNab, Fitzroy and Torbolton townships, Quebec and Ontario. Geology.

Map 1742. Ainsworth, Kootenay district, B.C. Geology.

Map 1793. Matachewan, Timiskaming district, Ontario. Geology.

Applicants for publications not listed above should mention the precise area concerning which information is desired.

The Geological Survey will, under certain limitations, give information and advice upon subjects relating to general and economic geology. Mineral and rock specimens, when accompanied by definite statements of localities, will be examined and their nature reported upon.

Communications should be addressed to **The Director, Geological Survey, Ottawa.**

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Ontario in 1919 produced 38 per cent. of the total mineral output of Canada. Returns show the output of the mines and mineralogical works of the Province for the year 1919 to be worth $58,583,916, of which the metallic production was $41,590,759.

Dividends and bonuses paid to the end of 1919 amounted to $15,545,238 for gold mining companies, and $78,335,943 for silver mining companies, or a total of $93,881,181.

The prospector can go almost anywhere in the mineral regions in his canoe; the climate is invigorating and healthy, and there is plenty of wood and good water. Hydro-electric power is abundant, and many undevedoped water-powers remain to be harnessed. A miner's license costs $5.00 per annum, and entitles the holder to stake out in any or every mining division three claims of 40 acres each. After performing 240 days' assessment work on a claim, patent may be obtained from the Crown on payment of $2.50 or $3.00 per acre, depending on location in unsurveyed or surveyed territory.

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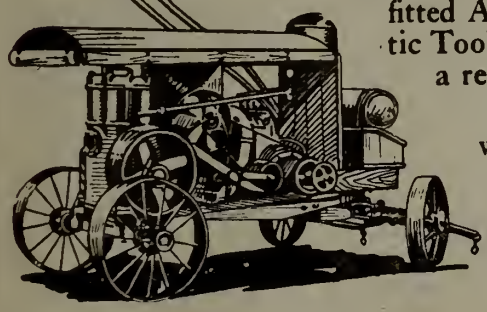

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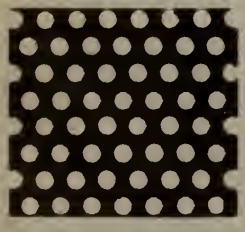

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EDITORIAL

THE NEED FOR MINE LABOR IN CANADA.

A typical utterance about the labor situation in Canada is noted in a financial letter emanating from the United States, which states: "Shortage of labor has been very evident in Canada, and there is unquestioned need for immigration, particularly for the type of settler who will colonize the land and aid in the development of Canada's agricultural possibilities."

The monotonous iteration of the need in Canada for agricultural laborers is irritating to those who know that an equally important requirement of Canada is labor for the mines, particularly as there is good reason to believe that the immigration authorities do not favor the incoming of that class of worker who is adapted to mine employment. As Mr. Balmer Neilly phrased it in his address to the visiting members of British Chambers of Commerce when these gentlemen were recently entertained at Haileybury, we need immigration from countries "where the people are not socially above handling a pick and shovel".

One of the interesting features ascertainable from a perusal of W. S. Smith's recent "Study in Canadian Immigration" is the very small number of immigrants classed as miners and mine laborers that have entered Canada in recent years. It might be mentioned that the actual number of these men who were permanent recruits to mining work was even smaller than the immigration statistics would indicate, because it is a curious fact, rather incompatible with the complainings of agricultural advocates, that many of these men become farmers. It is a distinguishing characteristic of some of the unlettered European laborers who are not hampered by social aloofness from pick and shovel that they lust after a piece of land of their own, and graduation from the mine to the farm is a not unusual course in their evolution to full Canadian citizenship.

We submit that the mine laborer is as essential to Canada as the domestic servant or the farm laborer, and that his entrance into the country should be favored by the immigration authorities as positively as the other two classes of workers are favored.

At the same time, large scale importation of workers for our mines should involve as great responsibility for their housing and Canadianization as has usually been assumed to rest upon those who have originated large immigration of farm laborers and domestic servants. It is not for the profit of the mine-owners that additional labor is so much required at our mines, but because the products of the earth are just as essential when developed by mining as when developed by agriculture. There is no real difference between farming and mining, for both are primarily productive and share the distinction of bringing something out of nothing that is usually considered to be the chief glory of agriculture.

The immigration authorities should enlarge their conception of essential industries to include mining, and should view the question of admission of mine labor not only from a critical viewpoint, but from a deliberately helpful viewpoint, as they do the admission of farm hands.

THE "EXTREME AGRICULTURIST". ....

It is not easy in Canada to get a viewpoint upon the tariff issue that is free from political, economic or sectional bias, and therefore the opinion of a detached observer is of value to clarify the issue now so widely debated in Canada.

The following summary from a United States source is sufficiently detached to be impartial, and is quoted as being so.

> "The strength of the opposition to a protective tariff comes from the agricultural party which is probably not sufficiently strong to carry an anti-protection program. One factor, however, which may have more influence than party alignment or other considerations is the present condition of Canadian exchange. The depreciation of the Canadian dollar in New York is felt by all parts of Canada and by all interests. It is a situation which seemingly hurts the pocket of every class of consumer. For this reason, alone, there is a feeling that many voters, whose fundamental belief is for free trade, will support a tariff program until conditions in the country's foreign trade have changed for the better. The probability is in favor of the continuance of a protective tariff with its degree of moderation pending upon the strength of the extreme agricultural group."

This sizes up the battle array succinctly.

The "extreme agricultural group" has stated that every industry that cannot adapt itself to Canadian environment is thereby proved unfit to survive, and to the extent that it is artificially sustained by protective duties it is parasitical.

It is further argued that the primary industry in

Canada is agriculture, that the protective duties have made it secondary, and have put manufacturing into an artificial and therefore essentially false position of priority.

These statements are plausible, and contain, as all plausible statements do, a certain amount of truth.

We would submit that agriculture is only the primary industry in the early stages of human development, and that it saw its completest exposition in the dawn of history. It is also the primary industry in undeveloped and partially civilized countries such as China, Bulgaria and Russia.

There is the special consideration in Canada that our frontiers march for four thousand miles with that country which has shown to the world the greatest combined development of agriculture and industry yet seen on earth.

A policy which would place agriculture in Canada in the preferred and entirely dominant position that the "extreme agriculturist" desires, and would regard all stimulation of manufacturers as an incitement to parasitical growth, would end by making Canada the "farm-laborer," the agricultural helot for the 105 million people to the south, who are perfectly willing to have forced upon them the profitable duty of providing us with boots, clothes, iron and steel, coal, and the vast array of the products of industrial arts for which our friends are so justly famous.

We believe that argument upon the relative status of agriculture and manufacturing industries is as futile as discussion of the relative glory of the sun and the moon, for they are complementary one to the other, and no evidence has been put forward to prove that the increased cost of household and other commodities caused by the tariff (which the agriculturist pays in common with all other citizens) has been greater than the increased purchasing capacity of the industrial community that the tariff has created.

The western farmer asks to be relieved of all tariffs that benefit the industrialist, and suggests that an income tax should be levied to make up for the lost customs revenues; intimating in making this suggestion that the farmer in all probability will be unable to pay income tax by reason of the chronic deficiency of his income. If the industrialist is to be doomed to extinction as a biological offense, because of that inadaptability to environment that forbids survival, it might be asked what will be the source of income taxes? Income tax is only possible where incomes exist.

The agriculturalist of the extreme variety also announces that any industry that cannot survive unaided at this time is in advance of the country's requirements. No industry can survive that does not fill a demand, and Canadian industries cannot be said to causelessly exist. If this is admitted, the debate is merely as to which side of the Canadian border the industrialist shall reside. The conclusion the "extreme agriculturist" has arrived at then, is that it is immaterial to him which side of the line the goods he consumes are made so long as they are tax free, which, being interpreted, means so long as they are cheap. Unfortunately there is no guarantee of cheapness where there is no competition, and when the role of manufacturer is deliberately relinquished to sources that are outside the country and unamenable to our laws.

Canada has certain definite agricultural limitations that forbid the enthronement of this single industry to the exclusion of all other activities in Canada. It will always be necessary to supplement the production of the soil in vegetable growth, by the products of the mines, and these cannot be developed to perfection—and in many instances cannot be developed at all—without an industrial community, and without the evolution of industries which will manufacture and export articles that are primarily the product of the mine.

The western farmer cultivates a greater acreage of land, of greater virgin productivity than can possibly be alloted to an individual in a later and more developed stage of our national growth. He decreases year by year the fertility of the virgin soil, and thus reaps the benefit of a condition that is bound up with the youthfulness of the Canadian nation. Should he grumble at paying a just portion of the cost of fostering those other parallel activities of a well-rounded body politic that are not less essential to our political survival than agriculture?

REPORTED DISCOVERIES OF COAL IN ONTARIO.

From time to time, reports appear of the discovery of coal in Ontario, and the latest of these relates to a discovery of what is stated to appear to be anthracite near Shelburne, Ontario. A farmer, boring an artesian well, reports that at a depth of 100 feet, the drill encountered a hard black substance, the deposit being 25 feet in thickness. Property values are said to have jumped in the neighborhood, which is on the Owen Sound Branch of the C. P. Railway, northwest of Toronto about sixty miles.

Reference to the geological map shows that Shelburne lies approximately where undisturbed Silurian sediments pass conformably beneath the Devonian sediments that form the triangle of the Sarnia Peninsula. The finding of anthracite in strata of this age would be surprising. Fissile bituminous shales occur in this locality, and the occurrence reported may be of this character. There is no hope, from accepted geological standards, of the discovery of coal in any portion of Ontario, with the exception of the beds of inferior lignite reported by the Geological Survey as existing in inaccessible portions of the James Bay slope.

Recently, the "Journal was asked to give an opinion on the advisability of boring for coal near King-

ston, Ontario. This last-named locality, like the Sarnia Peninsula, forms part of what the Canadian Geological Survey calls the St. Lawrence Lowlands. Kingston lies somewhat nearer the contact with the crystalline rocks, and is therefore rather more hopeless, from a coal-finding point of view, than Shelburne.

There would be every justification for an increase in property values in the vicinity of an occurrence of coal in Ontario, or Quebec, but the probability of such a discovery—apart from a few localised and valueless carbonized inclusions of vegetable drift—is so small in Ontario and Quebec as to be entirely negligible.

The substance known as anthraxolite has several times given rise to rumors of coal finds in Ontario, and on a number of occasions the Ontario Bureau of Mines has given a full explanation of the futility of looking for coal in Ontario.

ASSOCIATED GOLDFIELDS MINING CO.

Those who are interested in the mining news of Northern Ontario, a category that includes a large proportion of the readers of the "Canadian Mining Journal," cannot have failed to observe the very divergent opinions that prevail as to the merits of the shares of Associated Goldfields Mining Company from a dividend-earning point of view. Our advertising columns, in the issue of April 23rd, contained the report of the annual meeting of the Company, and the statement of the President to the shareholders. Two important statements were made by Mr. G. A. Mac Kay, namely that Dr. H. C. Cooke, late of the Canadian Geological Survey has been appointed as the Company's geological adviser, and that "the discovery and development of gold-bearing bodies has exceeded their (the Directors') most optimistic expectations." The shareholders manifested their confidence in the President and the Board of Directors by unanimously re-electing them to office.

In the meantime nothing of a positive nature has transpired with regard to the estimated gold-content of the area controlled by Associated Goldfields, but several negative factors have remained unrelieved, to wit; the Company discouraged the Ontario Government in undertaking an expert examination of the property as a preliminary to the construction of a railway along the Kirkland Lake-Swastika route, which the Government was urged to undertake; the widely published desire of a group of shareholders for the detailed report of a mining engineer upon the property, accompanied by assay plans, has not been forthcoming, and the definite aspersions which are being cast upon the size and gold-content of the high-grade lenses and the low-grade ore-bodies, refered to in the annual report, have not been confuted.

The conduct of the affairs of the Associated Goldfields is distinctly the business of its shareholders and the only excuse that the "Journal" can give for referring to this much debated matter is, if the statements in the Company's annual report are correct, it should be a simple and easy matter to demonstrate their accuracy. At the same time, and while admitting that this paper may be accused of poking into private business, there is an aspect of the public welfare that justifies this recapitulation of the facts as they present themselves to a spectator. If the enterprise of Associated Goldfields, one of the largest and most ambitious yet projected in Ontario, should prove disappointing, it will adversely affect the gold-mining industry of Canada at large. As to possible loss or gain to individual shareholders, this is not a matter of public concern, being distinctly and entirely their own business.

THE PROJECTION OF TRADES UNIONISM INTO POLITICS.

Commenting on the threatened coal strike in Britain, and the probability of mutual accomodation of interests, the "'Mining Journal" of London says:

> "Troublesome as Trades Unions have become, and opposed as their methods are to traditional individual independence which the Englishman loves and values, there can be no doubt that they have gradually contributed largely to establish an industrial conscience in dealing with the livelihood of the working classes. The temptation at present is to project trades unionism into the political sphere, wherein the pursuit of theories emanating from the teaching of Carl Marx—entirely new theories of State organisation and relationships—are being constructed, based not on individualism, but on Communism, and practical men find themselves involved in the many curious contradictions such as those which the Labor Party has exhibited in the last few months, and the end of which is admirably exhibited by the gradual declination of the Central Russian Soviet."

THE GOAD OF NECESSITY.

In the dead forgotten days, when people went to church, it used to be said that it was a good thing for a congregation to be in debt for their edifice or other undertakings, because it gave them an incentive for work, and it is well established that the more fashionable and richer a religious society becomes, so it declines in missionary effort and altruism.

A parallel case in nations is suggested by a despatch from George Renwick describing the "amazing evidence of strength and recuperative power" in the German textile industry. Simultaneous despatches record long hours of work and heavy coal production in the Ruhr disthict. It may well be that the debt which Germany has incurred may have a similarly

disciplinary and salutary reaction upon this nation to that which stirred the French nation to quick repayment of the Prussian indemnity after 1871. It would of course be arguing against human nature to infer that the martial spirit of the German has suffered a mortal blow, any more than defeat in 1870 quenched the spirit of the French.

In industry it is well known that periods of greatest productivity follow periods of unemployment and what are popularly known as hard times, and conversely it is known that production is small following prolonged periods of effort and much accumulation of monetary savings, or even a temporary condition of comparative wealth among people unaccustomed to this condition.

During the recent war the actual participants in the fighting were, as unfortunately they always are in war, the young and the virile, not only in body, but in spirit, and the best of the race in intellect and all the human virtues. Those who remained behind were necessarily mediocre, from causes natural and physical, and not necessarily reflecting on their virtues as good citizens. Those who have survived the tempest of war bear the marks of its fury, in body and oftentimes in spirit. Those who remained behind have not always welcomed the men who have returned from the valley of the shadow of death, because it has meant a crowding of their temporary freedom, a diminution of their emoluments, and a disturbing sense of their secondary worth in the rough and tumble of life.

Where the fury of war has reduced nations of men to masterless beggars, and has destroyed all the conventions of civilization, leaving nothing but the elemental passions of hunger and the mere desire for survival, the formation of soldiers' and workers' committees has been but an indication of general and abyssmal despair, and a seizure of power by those who possessed arms and physical strength. Theirs has been a combination of destruction, and the result has been an earthly hell.

In those countries where, despite the sickening losses of relatives and friends, the effect of war has been to cause a fictitious material prosperity, the result has been a lassitude and a general desire for ease and less exertion, a condition that only financial stringency will remove.

In countries like Germany, where the result of the war has been to destroy foolish visions of material power and archaic conceptions of sovereignty, without crushing the spirit of the people, or inflicting physical destruction upon cities and industrial works, the effect appears likely to be a spur to greater national effort, and, while Germany not unnaturally kicks against the goad, it may well compel her to a greater destiny.

If one truth is more emergent from the war it is that nations and peoples cannot be suppressed.

It may be that Germany will ultimately benefit from the debt she has incurred. If it should be that she is spurred to greater productivity per head of her population that is the case in Canada, we shall surely be defeated in industry, regardless of our victory in arms.

In such opposition to the babel of Russia as is to be expected from our origins and achievements, the people of Canada may be expected to continue a combination of soldiers and workers, not for destruction, but for construction; but, with the best of intentions, it does not seem likely that we shall achieve the maximum of production in Canada except under the painful and urgent goad of necessity. There are signs that this is a condition not imminent, but approaching.

SOME THINGS THAT MIGHT BE DONE.

R. E. HORE

There has been evident of late an increasing interest in iron ores of Canada and suggestions are made that a policy should be adopted that would result in greater utilization of our iron deposits

There are many ways of helping the establishment of such an industry. The most obvious way is to grant a bonus on production of iron ore in Canada. There are many, however, who will not be in favor of such action by governments. It would be much better if the industry could be established without such aid.

In a recent number of the "Journal" I have drawn attention to a process for treating Canadian ores that seems to warrant investigation. Would it not seem reasonable to ask the Ontario Government to look into the inventor's claims and determine whether something might be done to utilize the process, which appears to be one of great merit?

Another matter that seems to the writer to warrant investigation is that of the feasibility of utilizing the iron ore of the Belcher Islands. These are administered by the Federal Governmetn and it would appear in the interests of Canada that the Federal Government should endeavor to find out what the possibilities of the Belcher Islands deposits are. The information now available may not be sufficient to convince the people of the country that the Belcher Island ore deposits are of great importance; but there is good reason to believe that they are worthy of investigation. Some reports that have been printed do not give a very favorable impression; but there are unprinted reports that show that important iron deposits have been found on the Islands. It would seem that the Department of the Interior would be well warranted in having investigation made as to the iron ore resources there and possible methods of turning them to account.

It may be argued that these matters can well be left to private interests. There is much in that argument, for there is little doubt that someday private interests will develop all our resources. The point I would bring out here is that if our governments are really desirous of assisting, in the establishment of iron mining industries in this country there are many ways in which they can help to hasten the day when importation of iron ore from the United States will be unnecessary.

Annual Report of the Mines Branch of Alberta, 1919

The Annual Report of the Mines Branch of Alberta, recently to hand, is a well-printed volume, containing very full and detailed statistics of the coal industry. The Report shows evidences of a well-organized system of reports, and much painstaking office work carried out under the direction of Mr. John. T. Stirling, the Inspector of Mines, who, the "Journal" regrets to state, has been compelled, by ill-health, to take leave of absence from his duties. Those who have watched the careful foundation that is being laid for statistical recording of what will some day be Canada's largest mineral industry, will wish Mr. Stirling speedy recuperation.

Items culled from the prefatory remarks of the Inspector that are of interest are as follows:

Miners' lamps in use include 2,424 Wolfe safety lamps, 2,372 portable electric lamps of Edison type, 550 of Wico type and 35 Ceag lamps. The increase in the number of electric lamps is accorded favorable comment by the Inspector.

There are three mine-rescue cars and six mine-rescue stations in the Province under a provincial officer. From March 1st 1919, the administration of all mine-rescue and first-aid work has been under the Workmen's Compensation Board.

The mines of the Province number 276 collieries, one copper-ore mine and two shale mines.

At the close of 1919, there were employed in the mining industry 12,027 persons, being an increase of 1,818 over the number employed in December 1918.

It is noted that, notwithstanding the increased consumption of coal in Western Canada during the last few years, development in the industry has been carried on to such an extent that the amount necessary to supply all requirements is only fifty per cent of the possible production. The increase has been from 346,649 tons in 1901 for the whole of the North-West Territories) to 6,148,620 tons for Alberta alone in 1918.

The Report states that "notwithstanding the large increase that has taken place in the production in Alberta during the past few years, there were approximately 2½ million tons imported from the United States during 1919 into territory which should undoubtedly be supplied entirely with Canadian coal. This would mean, therefore, that the possible market in Canada for coal produced in the Provinces of Alberta and Saskatchewan is from 7,500,000 to 8,000,000 tons per year."

"During the month of December 1919, 780,832 tons were produced in Alberta alone, which means that the mines in operation are capable of producing over nine million tons of coal per year with the present labor, development, equipment and plant. It will, therefore, be seen that we are in a position to produce over four million tons per year more than we apparently can find market for at the present time."

The working forces at the collieries show the following division of labor, namely:—

Surfacemen, including supervision	3,611
Underground labor, including supervision	3,232
Miners and helpers	5,184
	12,027

These figures disclose a healthy balance between non-producers and producers underground, but the surfacemen are extraordinarily numerous.

The consumption of blasting power is heavy, showing a yield of about 4.2 tons per pound of powder used in the domestic and anthracite fields, and 8.7 tons per pound of powder in the bituminous mines. Over 440 tons of powder of various grades was used in blasting coal in 1919. A circumstance worth noting is that in the domestic mines, which show an extremely heavy use of powder, 80 per cent was black powder. In the bituminous mines, only "permitted explosives" are used, and the tons produced per pound of powder show that blasting was not unduly indulged in.

Electricity was used at 42 mines in 1919, and 35 electrically driven coal-cutting machines were in use. No accidents connected with the use of electricity were reported during the year.

Coal-cutting machines using compressed air numbered 200, the tonnage of coal mined by electric and compressed air machines being respectively 526,744 tons and 928,722 tons.

The number of fatal accidents during 1919 was 21, comparing with an annual average of 21 during the four years period 1915 to 1918 inclusive. Three of the fatal accidents occurred above ground and 18 below ground.

The Report of the Superintendent of Mine-Rescue and First-Aid work states that the equipment comprises thirty oxygen breathing-apparatus, 25 of which ar of "Proto" type and 5 of the 'Gibbs" type. Twelve smoke helmets are also carried by the cars. Training in mine-rescue work has been given to 1,201 men, and 910 men have taken first-aid instruction. No calls were made on any of the cars or stations during the year.

The Report contains a list of coal mines in the Province giving particulars of names of operator, address, location, character of coal, and dates of opening, abandonment or re-opening of mine.

AN EXPRESSION OF SYMPATHY.

The "Journal" desires to express sympathy with the editor and proprietor of the "Maritime Mining Record," the Hon. Robt. Drummond, in the loss of his wife, who died in Scotland while on a visit. In his bereavements under circumstances that have turned a long-anticipated visit into an occasion of sorrow, Mr. Drummond will receive the sympathy of Nova Scotian friends scattered throughout Canada.

Much real Christianity at the present time is very unconventional and not at all inclined to advertise itself. But there must be a fund of lofty idealism and calm heroism among our people; it would be absurd to suppose that our best men were all killed in the war. Eight hundred thousand of them have been killed; but if 'the blood of the martyrs is the seed of the Church,' we may be confident that those who gave their lives for England will not be found to have died in vain.—Dean Inge.

The Lightning River Gold Mines, Ltd.

By J. A. McRAE.

Interest has again been attracted to the Lightning River Gold Area, on account of the decision of the Lightning River Gold Mines Co., Ltd., to resume operations on their property in that field, and the determination of this concern to develop its property in spite of the serious handicap of difficult transportation.

Mr. J. W. Lucy, president of the Company, announces to the "Journal," that arrangements have beeen completed to carry on operations throughout the coming winter, and toward this end, a force of men will leave Haileybury during the first or second week in October.

twenty-five miles east from the Munro township gold area, and about sixty-five miles due east from the Porcupine field.

A report issued a year or so ago by the Ontario Bureau of Mines, was such as to encourage prospectors and mining men to turn their attention to the Lightning River field, while the results achieved by the Lightning River Gold Mines Co. on their property has since supported the favorable government report.

At the time the first work was being done, supplies were taken in to the new district over a road some 30 miles long, from Matheson, on the main line of the T. &. N. O. Ry. The excessive cost of transporting

The original discoverers in the Lightning Gold Area. From left to right: L. B. Hovey, G. E. Martin, R. Howey W. Cochenour.

Special car party of Shareholders visiting the property, in July.

Dr. Lucy, standing on the vein system, 220 ft. wide, 3/8ths. mile long, in Egan Township.

Site where Shaft now being Sunk on Sesekina property. Vein 5 ft. wide

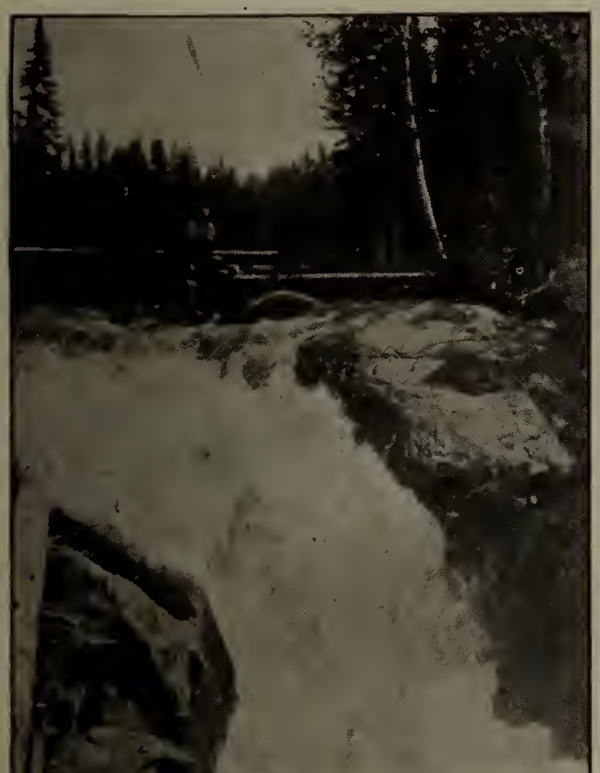
The Lightning River Gold Area is situated in the township of Holloway, in Ontario, at a point about twelve miles south of Upper Lake Abitibi and less than ten miles from the inter-provincial boundary of Ontario and Quebec. The district is reached by boat route from LaReine, on the National Transcontinental Railway, as well as over a six mile trail, the entire trip entailing about eight hours travel under favorable conditions. The district is situated about thirty miles north-east in a straight line from Kirkland Lake, supplies over this route discouraged aggressive work, and in time led to the selection of the present more favorable water route.

The plan now adopted, and which is calculated to reduce the transportation difficulty, is to ship equipment and the entire winter's supply of material by boat over Lake Abitibi and up the Lightning River to a point within six miles of the property. From here, a dog team will be employed to haul the material over

the first snow trail. Ample provision has been made to eliminate the necessity of wasting time during the winter months in transporting equipment over the long route by sleighs.

As regards the physical condition of the Lightning River property, this paragraph from the latest report of J. W. Morrison, consulting engineer for the company, and under date of Aug. 4th may be presented:

"A general examination of the interesting geological features of the property was made, and many pannings taken from different sections along the old discovery vein resulted in good tails of gold. Free gold was found in samples from the dump, and pannings taken from the rhyolite body, south of the vein, panned gold. In fact, any oxidized or altered section along this rhyolite body carries gold in good quantities. Additional float has been found to the eastward, confirming my opinion that a series of trenches should be cut in this locality, and an effort made to



Egan High Falls on the Watabeg River.

locate the vein. This should precede diamond drilling, and would probably give us information that would assist us in placing our holes."

Attention is directed toward the work and the property of the Lightning River Gold Mines Co., not for the reason of the extent of its operations, but due to the confidence shown and the determination to overcome the obstacles met with. It is to such effort on the part of pioneers that this great new land of Northern Ontario has to rely for speedy development, and which enterprise is deserving of a full measure of encouragement.

Not only has this company acquired the discovery group of claims in the Lightning River Gold Area, namely : the Howie-Willan-Couchenor group, but has also taken over a promising group of claims in the township of Egan as well as a group in the township of Maisonville in the Sesekinika Lake area. About this latter property, the Company consulting engineer says.

"The formation is to a large extent greenstone, with some sedimentary rocks, probably of the Cobalt series, and later intrusions of diabase and lamprophyre. The geology is rather complicated and needs careful study.

"The most important vein is in the greenstone near a dike of diabase. It is a highly shattered zone from two to six feet in width with a filling of quarts. The altered vein rock as well as the quartz, carry liberal quantities of mineral, such as pyrite, galena,, sphalerite, stibnite and small quantities of another mineral which may or may not be telluride of gold. It, however, seems to be associated with gold, as all sample containing it give high gold values. Free gold is also in evidence, and hand samples taken from the vein gave very high results.

"The development so far has been confined to shooting along the top of the vein over a distance of 50 to 60 feet. Some good samples have evidently been taken from this section of ground, and the showings warrant sinking, which, I understand, had already begun. On its westerly strike, the vein enters a diabase dike, and I feel there is a possibility of finding good ore about the contact. In fact, these conditions are somewhat similar to the famous Croesus Mine in Munro township.

"As a prospect the property looks very promising, and other properties near by, which are working on a small scale, give evidence of having merit. During the past few years, gold has been found at many points in that district, and there is evidently an enrichment at some point which is awaiting development. I like the appearance of the property as a whole, and its location in respect to transportation is most favorable."

At the time of writing, a report is not available on the Company's Egan township property. However, a view of a waterfall on the Watabeg river is shown in connection with this summary, which is located about three miles from the Company's Egan property. This power has been secured by the Lightning River Gold Mines Co., and is estimated as capable of generating from 450 to 500 h.p. when harnessed.

COAL PRICES.

Toronto, Oct. 15.—The price range of hard coal is $5 to $9.50, American funds, depending on the quality or from $12.00 to $14.00 Toronto, Canadian funds. Conditions have somewhat changed. A month ago anything could be sold at the market prices but today the buyers are discriminating.

The car supply during the past week has been fairly good and transportation seems to be improving. Although a lot of coal has been offered, the erroneous impression seems to be abroad that all the problems connected with the coal supply have been solved, with the result that wholesalers has curtailed their shipments into Toronto. The effects of this will be felt later on. Smokeless coal is selling at from $13.50 to $14.50.

HOLLINGER INTERIM REPORT ANALYZED.

ALEXANDER GRAY

The Hollinger Gold Mines Report for the January 1, September 8 period shows a daily average for the 252 days, of 1838 tons milled, or 463,176 tons in all. If that average is maintained until the end of the year then the Company will have milled 672,708 tons in 1920, a decrease of 39,174 tons when compared with 1919. This is accounted for largely by the fact that the average number of men employed this year was 1070, whereas the 1919 average was 1263. In view of this, the aggregate results contain a tribute to the administration and management. They are summarized as follows :

	1920.	1919.
Total income	$4,866,597	$4,839,845
Expenditure	2,285,223	2,431,636
Net profit	2,581,373	2,408,209
Exp. for plants	116,346	242,149
Divs. paid	1,476,000	1,230,000
Average No. of men employed:		
Mine	666	832
Mill	138	145
General	266	286
Total	1,070	1,263
Ave. tons per day broken	2,037	2,159
Milled	1,838	1,902

Close analysis of these items is made somewhat difficult in the absence of the actual tonnage treated, and the dissociation of total revenue from strictly mining and milling operations. If as it is claimed, the premium on gold which is disposed of to Ottawa on the basis of New York Funds, yielded about $600,000 taking the daily milling average at 1838 tons, as stated, this premium amounted to about $1.29 per ton. That being so, this extraordinary source of revenue neutralized the added cost of labor and assisted toward the payment of surtaxes. It is the first absolute evidence that gold mining has derived compensating benefit from exchange for adverse operating conditions. Including this premium and assuming that 463,176 tons were milled to September 8th, the average total profit per ton was $5.573. With the total expenditure of $2,285,223, applying that upon 463,176 tons, it would appear that the total of the average cost per ton milled, was $4.93. Combining this cost and profit, as estimated, the grade of ore milled would figure out as $10.50. If the premium on gold, however, enters into the totals as given—and they do no doubt—then the grade of ore milled was about $9.21—which was $0.52 less than the average for the whole of 1919.

While for the purposes of an interim report it is usually not considered necessary to detail the extraneous sources of confributory income, such as interest on bank balances and other liquid assets, these are in the case of Hollinger quite considerable, and will without doubt add to the satisfactory revenue showing for the entire year, when this is completed.

Approximate as these figures necessarily are, they serve to illustrate Hollinger doings. In 69 per cent. of the operating year, therefore, the net profit was 10.49 per cent, on issued capital, while the grade of ore was lower than was reported for all of 1919. Obviously labor conditions were the sole deterrents. The management acquitted itself in a manner that is most favorably impressive in the circumstances. How grievous are the handicaps is apparent, and it also is understood that the sinking of the large Central Shaft was retarded by the inability or indisposition of three contractors to make adequate footage. Should the rate of total income as recorded be maintained until the end of the year, the grand total will be about $6,375,000, compared with 7,063,099 in 1919. Without the premium on the gold, the contrast would be more disappointing. It would be apt to be downright discouraging, were it not for the positive knowledge that the Hollinger Mines are standing up to every test. Recent exploratory drilling—at a slight angle of dip—not vertically, was reassuring. The object was to feel out the southwestern extension of the main Hollinger series of veins. The drill intersected what looks like the extension of the exceptional No. 1 Vein, at a lateral distance of several hundred feet from the present working face. Naturally those most concerned are chary about committing themselves upon one intersection. The width of at least one ore body is understood to have been 11 feet, and the values noted better than an ounce.

TORONTO NOTES

An interesting visitor to Toronto this week was Col. Donald McGregor, the "grand old man" of the Yukon. Col. McGregor, who has not been in Toronto for thirty years, is on his way to his native county Glengarry, to see his aged sister and to superintend the erection of a memorial tablet at the village of St. Andrews, six miles north of Cornwall, to Simon Fraser, the discoverer of the great salmon river in British Columbia bearing his name. He is the only man living who saw the discoverer, and although ripe in years, is active and enjoys travel. He carries a cane presented to him by Mayor Gale, of Vancouver, for his services in president over the Children's Day exercises on the occasion of Greater Vancouver's peace day celebration on August 4th, of last year.

A well-know Northern Ontario mining man passed away at his home in Toronto this week in the person of Michael Lewis Foley, one of the promoters of the Foley-O'Brien Mine. Although ailing for nine months, Mr. Foley was not confined to his bed until the last ten days. He was born at Durham 51 years ago and went into Northern Ontario abaut 1905, during the construction of the Temiskaming and Northern Ontario Railway. He is survived by his wife and four daughters.

The purchase of the Blue Diamond Coal Mines, comprising 3,400 acres near Brule, Alberta, for $450,000, and the Canadian Coalfields, Limited, owning 8,320 acres, for $1,500,000, was ratified at the annual meeting of the McIntyre-Porcupine Mine and at the special general meeting of the Temiskaming Mining Company. Of the total purchase price $600,000 has already been paid and the remaining $1,000,000 is payable in 15 years from the earnings of the Canadian Coalfields Limited. The Blue Diamond mines are now producing at a profit, over 400 tons daily and by August 1921, it is expected, with the new machinery already ordered, the daily output will be 2,000 tons for which there is a ready market. The ratification means that McIntyre and Temiskaming each hold a half interest in both coal companies. The old board of directors on McIntyre was re-elected, with the exception of Sir Henry M. Pellat, who was replaced by Mr. Joseph Errington.

Coal Production in Britain

A Typical Instance. Production decreased thirty per cent. Workers increased seven per cent. Wages doubled and per ton cost of coal trebled.

BY THE EDITOR

Bolckow Vaughan's annual meeting elicited some figures regarding this company's Durham coal mines which go far to explain the stand pat of attitude of the British Government in the coal mines question.

Comparing 1914 with 1920, it will be seen that there is an increase in the number of men employed, a decrease in the tonnage of coal produced, a doubling of wages paid, a trebling of the ton cost of coal and no reduction in the quantity of coal consumed for colliery and domestic purposes. The figures, condensed and re-arranged from the remarks of the Chairman, are as follows:

	1914	1920
Number of workmen	8,844	9,487
Annual wages	£735,236	£1,589,036
Average annual wage	£83. 2s. 8d.	£167. 10s. 6d.
Tons raised	2,320,410	1,616,233
Tons saleable	2,137,832	1,426,135
Boiler and domestic coal	182,578	190,098
Percent of output consumed	7.9%	12%
Tons raised per man	262	170
Wages cost per ton raised	6s. 4.04d.	19s. 8d.

It would be interesting to know the number of men employed in actually mining coal in 1920 as compared with those so employed in 1914. The presumption is that it is this class of workers must have been decreased, otherwise the great falling off in output is not explainable. Neither is it easy to conceive of a balancing of the working forces that would permit of a drop in production of 30 percent with the workers increased by 7¼ percent.

The steadily mounting cost of overhead expense is illustrated by the item of boiler and domestic coal, which is not decreased by reason of the decreased output, and naturally has its percentage to the total production much increased. A slightly less than eight percent consumption of the coal produced for power raising and workmen's coal indicates a fair amount of economy in this inescapable item of colliery cost, but twelve per cent is a deplorably large proportion of the coal produced to be allotted to "company's consumption".

The tons raised per man, allowing only five working days weekly, only works out to 0.65 tons per man per day, which by comparison with transatlantic standards is a shockingly low rate of production.

The increase in cost per ton, and the increase in the rate of wages, while sufficiently serious, is merely incidental and secondary to the decreased output of coal.

No stronger arguments than the foregoing figures are needed to support the contention of the Bitish Government that any future increases in wages must be contingent on an increased production of coal, which is what the "datum line" proposal really boils down to.

To illustrate the handicap under which the British coal operator now labors, as compared with the United States producer of coal, the following comparison is submitted as being approximately typical of the relative difference.

	Bulckow Vaughan's 1920 figures.	Typical United States bituminous colliery.
Coal production .. tons	1,600,000	1,600,000
Company's consumption "	190,000	144,000
Saleable coal "	1,410,000	1,456,000
Tons raised per man "	170*	650*
Workmen required	9,500	2,500
Wages cost per ton	$5.00	$2.00

* On basis of 260 working days a year.

This comparison, which is only given as a rough approximation, indicates that the United States producer can obtain the same tonnage of coal with less than one-third the number of workers required at a British colliery; that a lower percentage of the total production is required in the United States for boiler and domestic uses, which gives a correspondingly higher tonnage for profitable sale; and that the total cost of coal production per ton is probably in the United States less than one-third of what it is in Britain.

Add to all these advantages of the United States producer the exchange premium on U. S. funds, the infinitely greater tonnage of coal available in the United States, and its better physical quality, it would seem to be high time that British miners turned their thoughts from irresponsible discussions of the disposal of a hypothetical surplus from the controlled mining of coal in Britain, and from fine-spun theories that have been so fantastically intermingled with the thinking of the leaders of the British miners, to a consideration of the disastrous array of facts that analysis of the foregoing figures will reveal.

The leaders of the British miners have been leading them on a merry dance to commercial ruin, and the disposition of these men to meet the Government on a basis which will take primary cognisance of production, would indicate that some inkling of impending bankruptcy of the coal-mining industry has come home to them. Not inaccurately has Sir Robert Horne stated that the continued combination of increased wages and decreased production can end only in irredeemable ruin.

Whether the leaders who have misled their followers can explain their mistakes to the miners is another question.

METAL QUOTATIONS

Fair prices for Ingot Metals in Montreal, Oct. 13th, 1920. (In less than carload lots).

	Cents per lb.
Copper, electro	22¾
Copper, casting	22¼
Tin	51
Lead	8½
Zinc	9½
Aluminum	35
Antimony	8½

Wage Conditions at the Nova Scotia Collieries

Coal Costs Cause Deferment of Steel Plant Extensions.

The situation with regard to miners' wages at the collieries in Nova Scotia and New Brunswick has arrived at an impasse. The findings of the Royal Commission, which are regarded by those who have carefully counted the cost of putting them into effect, as so favorable to the miners as to be financially impossible of accomplishment by the operators, have been rejected by the vote of the union members in every essential particular except the wage increase of approximately one dollar per day. The operators take the ground that the recommendations of the Royal Commission must be accepted or rejected as a whole, and that if the union cannot accept the Commission's findings, the award of the McKinnon Conciliation Board stands. The Wage Scale Committee of the Union requested the operators to meet them at Truro on the 12th October to discuss a modified acceptance of the recommendations of the Royal Commission, but the larger companies have definitely refused.

The attitude of the operators was not unexpected, and is indeed an unavoidable one. The operators entered into an agreement with the union at the beginning of 1920, after negotiations of the most protracted character, during which every individual wage-rate was taken under review and adjusted to the satisfaction of the representatives of the workmen. The agreement contained a clause which provided for a quarterly revision of wage rates to conform with increases in the cost of living, and this clause was stated by the miners' leaders at the time of signing the agreement to be a most advantageous and satisfactory provision from the standpoint of the workmen. Thus the machinery existed for any adjustment of wages that increases in living costs might indicate as necessary.

When in the early part of 1918, largely at the earnest request of the Minister of Labor, the operators agreed to recognise the jurisdiction of the United Mine Workers in Nova Scotia, it was agreed, both by the Nova Scotia executive and by the Indianoplis officials present at the Montreal conference, that at no time should the rate of wages in the United States, or the incidence of increases given to the miners in the United States be made the basis for similar demands in Nova Scotia. The agreement on this point read as follows :

" After having had the assurance of the Executive " of the Amalgamated Mine Workers of Nova Scotia, " and the representatives of the Federation of Labor, " confirming the statement made in Montreal by Mr. " Harlin of the United Mine Workers of America, that " the desire of the A. M. W. of Nova Scotia does not " arise from any intention to make the wage rates and " working conditions of Nova Scotia conform to those " obtaining in other districts of the U. M. W. of Ame- " rica, and that local districts will receive complete " autonomy, and also that the limitations of Nova Sco- " tia in regard to outside competition in the sale of " coal are recognized by the incoming U. M. W. of " America, and will always be borne in mind in the " future, the operators agree to the extension of the " U. M. W. of America into Nova Scotia, if that should " be the desire of the majority of the mine workers."

The leaders of the U. M. W. in Nova Scotia, following the demand which the bituminous mine-workers in the United States made early in 1920 for a 27 per cent increase in wages, announced their intention to follow this lead, and made a similar demand as from the first of May 1920. If this demand was made because of happenings in the United States it was ruled out of court on two points, namely the foregoing clause in the 1918 understanding, and by virtue of the agreement of January 1st 1920.

If the demand were based on increases in the cost of living, then recourse should have been had to the provision incorporated in the January 1920 agreement, which was admitted by the miners' leaders to be all that was required.

Notwithstanding the clear violation of two signed agreements, the operators in Nova Scotia, actuated by a desire to preserve harmonious relations, consented to submit the points at issue to a Royal Commission. At the time the Minister of Labor made it clear that he considered the appointment of such a Commission was unnecessary, and made the acquiesence of the operators a prerequisite to the appointment of a body that was in fact superogatory to the undischarged McKinnon Conciliation Board.

The Royal Commission reported, and, notwithstanding the onerous burden which acceptance of their findings would place on the operators, they signified willingness to accept and carry out the recommendations.

It is, therefore, not over-stating matters to record that the operators have carried their policy of conciliation to great lengths, and have manifested a forbearance of most unusual nature.

Steel Manufacture Prejudiced by Unsettled Conditions at Collieries.

The attitude which the coal companies have now taken, while fully justified by the foregoing history, is, however, a direct result of the readjustment now taking place in commodity prices, and in particular is a result of the trend of the steel market. Mr. Wolvin, the President of the Dominion Steel Corporation, has stated that an increase in the cost of finished steel of four dollars per ton of steel, and this is by no means an over-statement. The cost of coal production is already so high in Nova Scotia as to place the coal mines of the Province at a desperate disadvantage, and the further increase in steel costs which appears emminent would definitely rule out Nova Scotia from markets that are now an important outlet for steel products. It is not too much to state — as has been previously stated by the "Journal" — that the chief preoccupation of steel manufacturers in Nova Scotia is, and has been for a number of years, their increasing fuel costs. From an operating standpoint, the whole steel industry of Nova Scotia is based on the availability of moderately priced fuel. The closely adjacent occurrence of a large deposit of iron-ore is incidental, for iron-ore is always taken to the coal. The iron-ore of Wabana is a great asset to the companies that own it, but it is no asset to Nova Scotia if coal costs there advance to a prohibitive figure. Wabana ore can be smelted in Britain with equal facility, and it should be remembered that while the greatest stimulus that ever was given to the coal trade of Nova Scotia came from the steel industry, that industry is primarily a by-pro-

duct of the presence of coal. Coal that is not available at a moderate price is, for the purposes of the steel industry, non-existent.

As a direct result of the small production and high cost of coal production in Nova Scotia, and of the uncertainty as to increase of production or reduction of the per-ton cost of coal the Dominion Steel Corporation has announced its intention to defer projected capital extensions at the collieries and steel works.

The situation in Nova Scotia is analogous to that in Britain, and in the case of both countries, the only hope for continuance of wage rates even approximating to those now existing lies in greater per capita production of coal. In both countries the miners have been asked to accept a wage award that would definitely tie up the increased rate of earnings to an increased production of coal. It is of course fairly obvious that the only revenue of a coal mine comes from coal, and that if little coal is produced little revenue will be available to pay wages with, but it is a point that is persistently obscured by irrelevant argument. The miners of Nova Scotia know full well where the trouble lies, and they know also that they themselves are the only persons that can bring about that re-establishment of the balance of the working forces at the collieries that must precede increased coal production and per-ton costs that will permit the coal companies to stay in business. The wage question is secondary to production. More coal means more money for all hands. Less coal means less money for all hands, and no money for some people.

"NEW MONEY" AWAITS MORE LABOR: LESS TAXATION.

ALEXANDER GRAY, Montreal.

"Unless one has unlimited capital — and things are at a standstill here so far as new money is concerned — for the outlook industrially is rotten — there is danger of getting bogged also in Canada in a slough of labor, taxation and transport."

As a reflex of London technical opinion, the foregoing merits reproduction. The writer is eminent in his profession as a mining engineer; he has been to Canada where he passed upon various new propositions in outlying districts, and he is as keen as his kind in quest of opportunities for profitable operations. Probably he overstates the London situation, because the Burma Corporation recently obtained another million sterling; but that enterprise has the backing of the influential Mining Corporation, represented in Canada by Mr. J. B. Tyrrell. He exaggerates difficulties of "transport" — since discoveries provide their own transportation — if they are not behind Beyond. As to the "slough of labor and taxation": that is a double-barreled deterrent — and the sooner the matter is remedied, the sooner will the "outlook" hereabouts be less "rotten." So long as the mines are surtaxed and labor is inadequate, while supplies are mostly, constructive capital will decline to be "bogged"—and "things" mining will remain at a "standstill," notwithstanding the clamor for more of the precious and special metals. Double and treble taxation, as at present, plus manifold operating handicaps, veto initiative. What adversely affects gold mining the world over, is accentuated in Canada, where there is no "cheap" labor and official solicitude is scantily bestowed. Even where "native" labor is available, as in South Africa and Mexico, the supply is unsatisfactory, hence the urgency of the petitions for increased gold production.

Were it not for the premium upon gold, owing to existing disparities in international exchange, half of the gold mines would shut down, or their operations would be sacrificial. Politicians contend that the premium upon gold neutralizes the abnormal taxation and costs. That is only a half truth — and the argument is reversed by cost sheets and curtailed outputs. Insufficiently and inefficiently manned, muleted for materials, factors of economy have to be ignored or flouted. Nor are the gold mines deriving as much from the premium upon their gold as are their contemporaries elsewhere. Take the New Modderfontein, at the Witwatersrand, for example. It is the second largest gold mine in the world. In the year ended June 30, it earned a net profit of £1,518,187 and paid dividends of 82½ per cent. Of that profit, £464,657 came from the premium upon gold. The proportion of unearned profit, as it were, was 31.11 per cent. Of the total revenue of £2,555,466, the receipts from the premium represented 18.18 per cent. of the gross. This percentage is a third or so more than any of the Ontario gold mines realized on account of the premium. Of course ten or twelve per cent added to the value of the total of the bullion when refined, is a very welcome solace; yet it is impermanent, and operating companies would rather have normal conditions and ample labor. Were the companies enabled to import labor—mostly unskilled —the greater tonnage milled automatically would effect economies in costs. Then the modification of surtaxes would be incentive for speeding up production. Until practical remedies are forthcoming Canada cannot set the pace in increased outputting of the yellow metal. Lower-grade mines find it impossible to prosecute development and work for the Government, machine men and "muckers."

In the language of the lawgivers: "An Emergency Exists." No "new money" is being risked in an economic muskeg.

CANTEENS AND SCIENTIFIC FEEDING FOR MINERS.

A paper on this subject was read by Mr. Wm. Maurice, of Sheffield, at a meeting at the University College, Nottingham, of the Midland Counties Institution of Engineers. There could be no doubt as to the importance of scientific feeding, observed Mr. Maurice. It seemed to be a self-evident proposition that the provision of suitable food would have a readily recognisable effect upon the day's output. Such provision should include the supply of energy for the whole shift, say two meals, otherwise the treatment was only going half-way and would produce less than half its possible advantage. The first meal would be taken at the canteen before starting work. The second should be taken at the proper physiological time, but the workman would take it with him on leaving the canteen. Both should be hot meals, and the underground meal should therefore be contained in food-carriers of the thermos-flask type. The meals should be charged for at cost, to preserve the respect of the workers, and to remove any suspicion of charity or personal interest. No great capital outlay was necessarily involved in the scheme, and the cost per meal to the workers, even today, need not exceed a few pence. He considered the subject was worthy of careful consideration and experimental test.

British Columbia Letter

THE METAL MINES.

Atlin, B.C.

The question of ownership to the Engineer Group of Mineral Claims, Atlin District, will be brought before the Courts for decision. Because the property is valued at considerably more than $1,000,000, being rated as one of the most promising of the lode gold mines of the Province, the suit will be followed with more than usual interest. The section has other unusual features. In the first place the original stakers will seek to establish their right to title. Precisely what their position is cannot be stated at present but it is understood that it will be alleged that the late Capt. Alexander, the accepted owner during his lifetime and whose heirs will be the defendants, occupied the ground before it had become vacated. S. S. Taylor, a distinguished lawyer of Vancouver City, will represent them. In addition to this claim one will be presented to the Courts by W. Pollard Grant, another lawyer resident of Vancouver, for a one-fifth interest in the property. For some weeks agents of the plaintiffs have been busily engaged in scrutinizing records at Atlin and it is stated that some sensational evidence will be adduced in the course of the forthcoming trial which is expected to be opened about the 20th of October.

Stewart, B.C.

The first signs of Winter have appeared in the Portland Canal Mining Division. Snow now mantles the mountains, Jack Frost has touched the atmosphere with his icy finger, and the prospectors are beginning to seek the shelter of the permanent camps. The season has been notable in two respects, viz., the number of new discoveries that have been recorded and the extent of the work done on promising prospects. It would appear, from reports received from operators who have come south recently, that this northeastern section of British Columbia now may fairly be considered on its feet as a mineral producer and that it may reasonably be expected in the course of a few years at any rate to take a leading part among the productive mining regions of the Province.

It perhaps is but natural that those asked to explain conditions in this Country should dwell first on the Premier Mine. Almost enough, it would seem, has been said about this property. There is no doubt that it is outstanding. Equally true is it that much high grade ore has been taken out but whether the prediction that 3,000 tons of ore will be brought to the Coast and thence to the Smelter this Winter, the returns on which will aggregate $1,000,000, will prove justified may be open to some question. However a large quantity of ore, carrying high silver values, will be brought out over the snow. It should be remembered, that the owners of the Premier based their hopes for its future, not so much on its high grade ore, as on its large quantities of the lower grades which are to be treated in the Concentrating Mill now in course of construction.

Notwithstanding that development on the Big Missouri Mine has ceased for the time—and here let it be borne in mind that some of the old timers stubbornly adhere to belief in this property—the practical miners, and the prospectors, retain their optimism. The announcement of one adverse report on one prospective mine has not dampened their ardor nor stayed the energy displayed in their work and their confidence in its result. They point, not alone to the Premier, but as well to the Spider Group, the latter being one of the holdings of the Algunican Syndicate, and to many other prospects which so far have shown promising indications and which are likely to be shipping soon. In regard to the Spider it is said that a vein running between two and three feet in width has been struck that contains high values in silver; that the tunnel now is at the 600 foot level; and that the formation is augite porphyrites and the mineralization principally argentine with lesser amounts of freibergite in quartz.

Among the many other prospects on which special reports have been received are the Divide Group, Salmon River, owned by the Mahood Mines Ltd. This was located only last year and only a small amount of work has been done but some rather remarkable assays have been obtained and, if the showing continues at depth, there is no doubt that more will be heard of this property. From the Silver Tip some very high grade ore will be shipped, this having been taken from stringers bearing, in parts, the native silver. The Hercules Group is to be the scene of activity throughout the Winter according to General R. G. Edward Leckie, wh is acting fr the hlding Company. It is hoped that considerable useful development will be accomplished in the next few months. From the Alaska side of the Salmon River comes the news that the New Alaska is likely to be worked during the winter.

As to new discoveries it would appear that the policy of the Provincial Government in grub-staking returned soldiers has not been without result in the Portland Canal area. In the vicinity of Tide Lake, about twelve miles from Long Lake, it is reported that such parties have uncovered a number of narrow high-grade veins of silver bearing mineral, some of the samples from which assay as high as $700 to the ton.

George Clothier, government mining engineer, recently returned from an inspection of the Bear River region, which suffered most from the effects of the heavy rains of the Summer, bridges being washed away, trails damaged, and the commonly used avenues of transportation generally made impassible, and his report is being awaited with interest. While the storms referred to interfered with development, repairs were carried out by the Province without delay, and much work has been done on many of the properties of the Marmot River, Bitter Creek, etc.

One of the well-known mining operators of the District sums up the situation well when he says:

"There has been more legitimate mining done here this season than ever before, and there will be some shippers when properties now under development are opened up. What is wanted badly is sampling works, where inspectors could take small quantities of ore and make enough to go on with. There is no boom and we don't want it and the mining population do not care much what tradesmen and transient workmen say about the country. They have never been out in the hills and look at things from their own viewpoint."

Prince Rupert, B.C.

The Graham Island Oil Development Co., has been organized for the exploration and development of lands, believed to be oil bearing, situated on Graham Island of the Queen Charlotte Group. The Company claims to have four sections covered by oil leases, staked before the war, and comprising 2,560 acres. It is planned to commence drilling as soon as financial arrangements are completed.

Arrangements have been made for the shipment by the Canadian Robert Dollar, when she arrives from the Orient, or 1,000 tons of blister copper from Anyox, the British Columbia smelter centre of the Granby Consolidated Mining and Smelting Co., to New York. Officials of the Granby Company state that this will be the first shipment of this metal from the Province by water and explain the change in transportation plans by the assertion that recent increases in railway freight rates have made the maritime charges so much lower that the difference cannot be overlooked. With the Panama Canal open the factor of the time also appears to favor the freighter, at any rate under present conditions, as it is stated that a car of copper would be delivered at the Long Island refinery in sixty days while by the water route it will reach there in forty five days. The Company ships from 1200 to 1500 tons of blister copper a month.

Hazelton, B.C.

The Cascade Group of Mineral Claims on Hudson Bay Mountain is being extensively developed, a contract having been awarded for the continuance of the tunnel for a further one hundred feet in depth. The theory is that the main ore body, which appears to dip heavily, will be struck within that distance. If the owners' hopes are realized the property will be one of the steady shippers of the Province within a short period.

One of the properties inspected by John D. Galloway, Resident Mining Engineer, headquarters Hazelton B. C., during the Summer is the Mica Property owned by what is known as the Mica Syndicate of Tete Juane Cache B. C. and Calgary, Alberta, the holdings of which are situated on Mica Mountain, eastern B. C. There are five claims and the main showings are on Reliance Mountain. Some adjoining Crown Granted Claims are owned by New York Interests. Work was started by the Syndicate, under S. E. Beveridge, in May of this year and consisted chiefly in the construction of roads and the building of quarters for mine officers and men. The dominating rock of Mica Mountain is described as a coarse-grained garnetiferous mica-schist, which has been classified by the Geological Survey as hightly metamorphosed sedimentary material and provisionally placed in the Shuswap Group of the Pre-Cambrian. The schists are intruded by granite rocks varying from normal granodiorite to pegmatite and these pegmatite dykes contain the mica, which is of the muscovite variety. The mica is transparent and in thin flakes almost white with a slight greenish tint. On the surface mica was found a bit rusty but is expected to become much clearer with depth. There are crystals of "books" ranging from 4 x 4 inches to 12 x 12 and still larger are found. These are said to be abundant. They have a thickness of one-half to two inches and, having an excellent basal cleavage, are easily split into as fine flakes as may be desired.

Trail, B.C.

The attitude of the management of the Consolidated Mining and Smelting Company with respect to protection against metal imports was forcibly presented to the Canadian Tariff Commission which recently toured this Province. P. P. Warren, president of the Company, complained of the removal of the 7½ per cent war tax, asserting that, in the confident belief that this impost would remain in force, the Company had made investments of a substantial character. Over $250,000 had been expended in developing flourspar deposits and committments of equal amount had been assumed in the construction of a rod mill and other additions to the plant at Trail. He declared that there was no protection against Great Britain or the United States and, while competition from the latter source was not keen at present owing to properties having been overworked and little development having been done during the war, under normal conditions the competition for the Canadian market would be active. The United States duty was $1.50 per ton and he felt that Canada should have at least the same protection.

The Company's output in lead was 100 tons, about equal to the Canadian consumption. Until 1919 the Canadian tariff was the normal 15 per cent plus the 7½ war tax as against a United States rate of 25 per cent. Last year the whole was removed and a specific duty of one per cent per pound imposed.

The lead producer in this Country was seriously menaced by lead produced in Spain, offered here as a British product. The United States has protection of two cents per pound and notwithstanding was faced with competition from Mexico, Germany and Spain via England. The exchange situation presented another difficulty in competing with foreign countries.

Answering Sir Henry Drayton, chairman of the Commission and Canadian Minister of Finance, it was stated by Mr. Warren that the industries were overburdened with taxes. The Province took ten per cent of their gross income, less certain deductions, which did not include depreciation of mine property or take into account money borrowed by the Company outside the Province. His Company had paid in 1919 in taxes $150,000, over 16 per cent of the net income. Half a million of the ten per cent dividends had been taken from reserve funds.

The increase in railway freight rates Mr. Warren contended was a great contribution to the railways because no corresponding increase in selling price could be made.

The Trail Board of Trade sumbitted to the Commission a memorandum emphasizing the importance to the Trail Smelting Industry of adequate protection. While there were only between 2,000 and 2,500 men actually employed at the smelter it was argued that at least 20,000 people were dependent on the successful operation of the plant. Many of the large and small mines of the interior of the Province were dependent upon it. Reference was made to the notable part played by the Company during the war in supplying the zinc requirements of the Empire for which purpose a large plant had been installed at enormous expense. An extended account was given of the

Company's diversified mining activities and its enlargements and improvements at the smelting centre. That protection against outside competition was essential if this Industry was to grow, if the work it is doing in the development of the mineral resouces of the Country is to continue, was the point clearly brought to the attention of the Commissioners.

Receipts at the Trail Smelter for the week ending September 21 totalled 8810 tons, bringing the aggregate for the year up to 238,991 tons. During Company's diversified mining activities and its encontributing mines. These were the Yankee Girl, which is being opened up by the Mining Corporation of Canada, and the Ruth and Skyline, of Ainsworth.

Nelson, B.C.

Satisfactory reports are received from the Spokane Group of the Bayonne District which is under development and at which there recently was constructed an arrastra for experiment. Some 15 tons of ore have been run through and, while a good concentrate is made, comparatively little of the free gold is saved on the plate. It is asserted by the management that there is a large quantity of ore in sight, its value being estimated at $100,000, if an economic method of transportation could be secured. To remove this difficulty it is understood to be the intention to ask the Provincial Government to construct a 15-mile pack trail on a wagonroad grade down Canyon Creek to Kootenay Lake. It is stated that such a road would serve to open up a considerable section of the Bayonne.

The West Kootenay Power and Light Co. has completed and tested out the power line extending from the City of Greenwood to the Copper Mountain Mines of the Canada Copper Co. This makes one of the longest transmissions in Western Canada, the distance from Bonnington Falls, the source of the power, to Copper Mountain being 190 miles. The extension is a single 110,000 volt line of H. Frame construction and the distance from Greenwood to Copper Mountain is 108 miles. The Company's intention is to operate this line at 60,000 volts until power requirements necessitate going to a higher voltage. At Greenwood the line is fed by duplicate 60,000 volt transmission lines from the generating stations at Bonnington Falls.

Invermere, B.C.

Somewhat novel methods are being adopted in the opening up of the Bunyan Mine by Captain E. J. Fader, manager of the Silver Ores Incorporated of New York. Recently a match was applied to four leads connecting with a charge of several tons of 60 per cent dynamite embedded in the face of Bunyan Mountain. This was the culminating point of many weeks of hard work, consisting of tunnelling, driving and other underground operations, and the results, judging from reports, appear to have justified the effort. It is said that the face of the mountain for over 100 feet longtitudinally, for 30 feet or more in width, and for a depth of over 30 feet was loosened. It is estimated that some 10,000 tons of ore was thrown up and that the face of the ledge has been so exposed that it will be possible to continue operations by quarrying. This property is situated about seven miles from the town of Wilmer and has an elevation of 1500 feet above Windermere Lake.

Silverton, B.C.

The statement of the Standard Silver-Lead Mining Co., operating the Standard Mine, near Silverton, Slocan District, shows a cash surplus of $367,996 as on July 31st last as compared with $341,825 as on March 31, 1920 and $298,010 on December 31, 1919. Profit for June of this year was $10,952; May showed a loss of $4,340 while April had a net gain of $18,959. Nothing is being done at this time on company account owing to unsatisfactory labor conditions. The old Wellington Camp is being prospected but nothing official is given out as to results.

Revelstoke, B.C.

The Bernière Mines, situated near Scott Creek, Camborne, are being opened up and a contract has just been let for the construction of cabins, a blacksmith shop, etc., it being the intention to continue work this winter.

The Beatrice Mines, of the same District, are shipping silver-lead ore to the Trail Smelter.

Victoria, B.C.

Among the recently incorporated British Columbia Companies is the Lowox Steel Company, with an authorized capital of $500,000 and head office in Victoria. Its business is described as steel makers, colliery owners, and operators and along other lines of the iron and steel manufacturing industry.

Dr. V. Dolmage, of the Canadian Geological Survey, has returned after a summer's field work which has resulted in the obtaining of the information necessary to complete the geological map of the west coast of Vancouver Island.

He found fossils at Malksope Inlet of an interesting character scientifically. The impressions of sea shells of these rocks confirm the conviction that the whole of the northwestern continent, as it is now known, dates back to a very early period in geologicla history. The shells give evidence of several periods of submersion by the sea, and may enable the dates of the glacial periods to be determined with more accuracy than has hitherto been possible.

Dr. Dolmage's survey started at Ucluelet Arm and embraced Calyoquot Sound, Sidney Inlet, Hesquiat Harbor, Kyuquot Sound, and Quatsino Sound. At Sechart he examined mercury deposits of the commercial value of which no opinion is expressed. He also covered the ground on which the Tidewater Copper Co. is operating at Sidney Inlet and at Nootka Sound encountered deposits of Magnetite. Copper is common, he states, at Kokshittle Arm and some gold deposits have been discovered on the shores of Kennedy Lake.

Dr. C. H. Clapp and Dr. G. N. Dawson already have completed the geological survey of the southern and northern sections of the west coast of the Island.

Vancouver, B.C.

The re-definition of the Alaska—Canada Boundary Line, particularly in the Portland Canal and Salmon and Unuk River Regions, made considerable progress during the past Summer. J. D. Craig, head of the Canadian party, has returned and states that he worked in North and Westward from the town of Stewart while United States surveyors, led by Jesse

Hill, worked south by the Unuk River. The duty of these parties was to clearly indicate the boundary by means of monuments and by the cutting of timber where there is timber. It is stated that some miners and prospectors have made the mistake of staking in American territory and recording the same with Canadian officials and that the error has been as frequently made conversely.

THE COLLIERIES.

An amendment passed at the last Session of the Provincial Legislature to the Semi-Monthly Payment of Wages Act, providing for twenty-six pay days per annum in connection with the coal mining industry and that these pay days shall fall on a Saturday, became effective on the 1st of October last.

The original Semi-Monthly Payment of Wages Act of British Columbia applied to lumbering, fishing, and mining. It established the principle of a payment twice every month to the workers in connection with the industries enumerated.

The amendment referred to is effective only in respect of coal mines and, while it has met with opposition in some quarters, it is the opinion of Hon. Wm. Sloan, Minister of Mines, who is responsible for it, that the sentiment in its favor among those benefitted is so unanimous that it will be generally accepted as a satisfactory step towards the general improvement of working conditions.

A tie-up of the coal mining industry of eastern British Columbia and of the Province of Alberta threatened during the past two weeks but, from last reports, the crisis appears to have been successfuly passed. There are two union organizations in these fields, viz., the O.B.S. and the U.M.W. of A. The One Big Union called a strike to force the elimination of the "check-off" system, whereby payment of the miners' U.M.W. of A. dues is taken from their pay envelopes, while at the same time the U.M.W. of A. demanded of the Operators that their recent contract be re-opened to permit of an increase of $1.50 per day to be given day-wage men, thus placing the latter, as it was argued, on an equal footing with miners of the mid-competitive field in the United States, who lately were granted an additional advance. The situation was dealt with by Senator Robertson, Canadian Minister of Labor, who happened to be in Alberta with the Canadian Tariff Commission; W. H. Armstrong, director of Coal Operations for the Canadian West; and other government officials. While the O.B.U. strike was ordered and a percentage of the miners left work it would seem that the mediation endeavors of the government representatives have been, on the whole, successful. None of the mines was at any time completely closed down and the latest reports are to the effect that the industry soon will be in a normal condition. At Coal Creek and in other sections of British Columbia the mines are working as usual. The claims made of a defeat for the leaders of the O.B.U. movement seem to be justified but what adjustment has been made, if any, between the Operators and the U.M.W. of A. in respect of the latter's demands on behalf of the day-wage men, cannot be stated at present.

Senator Robertson, Minister of Labor, made the interesting statement while in Calgary recently that during the first seven months of this year there were produced in Alberta coal fields more than one million tons of coal in excess of the 1919 production and that quite substantial reserves of both bituminous and lignite coal have been accumulated during the Summer.

Discussing the situation in England and its bearing on Canada, the Minister said: "There is no danger that Canadian miners will strike in sympathy with a walkout in England. At present they are working under an agreement by which they would have to get the consent of the International Union Headquarters in Indianapolis before they could strike. The International Union would never let them go out in sympathy with the British miners, though they might allow the miners to refuse to mine coal for export to Great Britain—coal which would be used to ease the situation there.

An acute coal shortage is reported in Australia and New Zealand, the condition being attributed to the "go slow" policy of the miners of those countries. It is suggested as a probability that the collieries of British Columbia will be called on to fill orders from the consumers of the Antipodes.

In the increase in freight rates permitted the Railways of Canada by the Board of Railway Commissioners coal is one of the articles of universal consumption on which the full rate advance is not permitted. The Board of Trade of Nelson, B. C. has asked that coke be placed in the same class, arguing that coke is a much used domestic fuel and that in the British Columbia interior the coke product of the ovens of the Crow's Nest Pass Coal Co. is essential in the maintenance of the important smelting industry of the Consolidated Mining and Smelting Co. at Trail.

The municipal authorities of the City of Vancouver have adopted regulations for the protection of the coal consumer against being short-weighted in his purchase. One of the most striking of these is that a purchaser, who may be doubtful as to whether he is getting a full ton when a ton has been ordered, is given the privilege of sending the coal to the nearest scales to be weighed. If his suspicions prove well founded the dealer must pay the expense but should it be shown that he was wrong the expense of carting and weighing is added to the first cost. Another interesting provision is that the dealer who sells coal in small quantities must carry in his vehicle scales, properly tested, and capable of weighing such quantities as he is engaged in selling.

The City of Prince Rupert B. C., Pacific Coast Terminal of the Grand Trunk Pacific Railway, is asking the Dominion Government to construct large coal bunkers at that port, the contention being that the result would be a saving of at least $1.00 a ton to the consumers, large and small, of the northwestern section of the Province.

E. Floyd has resigned his position as manager of the Nanoose-Wellington Collieries Ltd., Nanoose Bay, Vancouver Island.

Northern Ontario Letter

THE SILVER MINES.

The Cobalt Field.

The labor shortage in Cobalt has become acute during the past few weeks, and all the leading mines are experiencing considerable difficulty in securing underground workers. Surface men are fairly plentiful,, but muckers, trammers and even machine runners are scarce. In some instance the shortage amounts to more than 25 per cent of requirements.

A movement is under way to encourage the Ontario Government to look into the situation with a view toward taking steps to induce men to seek employment at the precious-metal mines. Figures presented, and based upon the opinion of employers, goes to show that at least 1,500 men could be quickly absorbed in the silver and gold mines of Northern Ontario, and that about 2,500 could be absorbed by early next summer. It is felt that any effort the government may make, would not only benefit the mining industry, but would encourage men to enter this district to the extent of several thousand, some to find employment in the pulp and paper industry and some in agricultural pursuits.

A fourth vein has been encountered on the surface at the Kerr Lake mine, in close proximity and running parallel to the three high-grade veins reported in these columns a week ago. The annual report of the Kerr Lake shows that during the fiscal year ended August 31st, produced 956,049 ounces of silver, and 42,654 pounds of cobalt. The cost of production amounted to 56.04 cents an ounce. The output continues at present at the rate of over 50,000 ounces monthly, any increase above this amount depending on the question of the extent of the new high-grade deposits just being opened up.

In the arrangement between the Peterson Lake and the Dominion Reduction Company, it is learned the Dominion Reduction first takes off the actual cost of treating the old tailings pile, and receives an additional bonus of 35 cents on each ton treated. Of any remaining net profit, the Peterson Lake gets two-thirds while the Dominion Reduction Company gets one-third.

Negotiations under way in connection with the Victory Silver Mines, formerly the Hylands property, offer fair promise of this property being operated this fall. It lies a short way south of the Adanac.

The Mining Corporation has suspended operations on its property in the township of Butt, in the district of Nipissing, on which exploration work was carried on during the summer in an effort to determine the extent of the deposits of radium-bearing ore. It has been found that while radium-bearing ore occurs in patches, it is too erratic to be of commercial value.

In regard to the tailings pile being treated at Cobalt by the Mining Corporation, a misunderstanding has gone abroad that this material contains about five ounces of silver to the ton. The correct figures approximate four ounces to the ton, the misunderstanding having arisen due to the five-ounce point having been reached on a small part of the pile.

The shareholders of the Temiskaming Mining Corporation Company at a meeting on Oct. 7th, ratified a deal in which the company joins the McIntyre-Porcupine in the purchase of the Black Diamond Coal mine in Alberta for $600,000 and another large coal property in that vicinity for $1,500,000. J. P. Bickell, president of the Temiscaming and the McIntyre, brought the deal to a head.

An interesting decision has just been rendered against J. P. Bickell & Co., of Toronto, in favor of Mr. Barthelmes, a former client of the Bickell firm. Barthelmes was a client of the Bickell firm, and was trading in the New York stock market. At the time J. P. Bickell retired from his brokerage business, Barthelmes had a balance due him of $62,455, and Bickell claimed this balance was in Canadian funds. Barthelmes sued to recover the American exchange on this account and after a two day trial before Mr. Justice Middleton, he has received a judgment against Bickell for $10,105 and costs, a stay of ten days being specified. This is important as showing that the Canadian broker is obliged to pay his clients any exchange which he receives on his transactions.

Deals are being negotiated on three properties in the South Lorrain silver area. The Forneri property is said to have been optioned by R. T. Shillington and his associates with the object in view of mining the cobalt metal which occurs on the property, as well as carrying on exploration work for silver. James Harkness is said to have about completed a similar deal on the Haileybury Silver as well as on the Haileybury Frontier. These properties all lie not far from the Keeley Silver Mines.

In the meantime, the Keeley is making good progress and is expected to have its mill ready for operation by the end of November.

Although the price of silver has declined to below 90 cents an ounce this week, the Canadian producers, in receiving payment in New York funds and thus getting the current premium, are in reality being paid an amount about equal to the American producers who market their products under the terms of the Pittman Act and which calls for 99½ cents an ounce.

Mining Commissioner T. E. Godson, K.C., will hold his regular monthly sittings at the Court House, at Haileybury on October 12th. A total of six mining disputes are on the list, the following being an official summary:

Babayan vs. Summers, regarding claim L. S. 147, and being an application under section 81 of the Mining Act.

Darroch vs. McDonald, being an application for an interest in mining claim No. L. S. 464.

Lieut. M. L. Bouzan vs. R. M. Devlin, an application under section 81 of the Mining Act in respect of mining claim L. 3096, 3097 and 3098.

Giroux vs. Blanchfield, a dispute in respect of mining claim T. 19001 situated in the Gillies Limit.

Giroux vs. Billington, a dispute in respect of mining claim T. 19007 situated in the Gillies Limit.

O'Neill vs. Brooks, being an application in respect of mining claim C. 1397.

Returned soldiers who recently lost their interests in mining claims owing to a misunderstanding among mining recorders as to the intent of an order issued late in 1919 by the Minister of Mines, are to be given full protection of their property up until the beginning of 1921. This will probably mean that applications recorded in the meantime, will be thrown out, and the former holders fully re-instated.

In his regular monthly report to the president and

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directors of the Nipissing Mining Co., Hugh Park, manager, says that during the month of Sept. the company mined ore of an estimated value of $225,100 and shipped bullion and residue from Nipissing and custom ores of an estimated net value of $658,296.

"The amount of exploration and development work done during the month was very much less than normal, due to the scarcity of underground labor. There are enough men for surface work and the running of the mill but it is impossible to keep up our regular force of muckers and machine men. The great demand and the high wages paid by the pulp and lumber companies in this district are making it increasingly difficult to operate the Cobalt mines economically.

Stoping of vein 109 in the 96 tunnel workings, is proceeding satisfactorily. The vein is high grade and is fully coming up to expectations.

The high grade mill treated 211 tons and the low grade mill put through 6,753 tons. The refinery shipped 598,940 ounces of bullion valued at $561,319. Residue shipments amounted to 622 tons, valued at $96,976.

Estimated production for the month is as follows:—

Low grade mill	$120,541
Washing Plant	104,559
Total	$225,100

The price of silver is estimated at 91 cents, which is 3½ cents less per ounce than last month's production estimate.

During the week ended Oct. 9, six Cobalt companies shipped an aggregate of eleven cars containing approximately 864,025 pounds of ore. The Nipissing was the leader with nearly a quarter of a million pounds, and with the Mining Corporation a close second.

Following is a summary:—

Shipper	Cars	Pds.
Nipissing	3	240,660
Mining Corporation	3	233,487
Coniagas	2	131,549
Dominion Reduction	1	88,000
McKinley-Darragh	1	85,592
Temiskaming	1	84,737
Totals	11	864,025

During the corresponding period, the Mining Corporation was the only bullion shipper, sending out 98 bars containing 100,799.60 fine ounces.

THE GOLD MINES.

The Porcupine District.

Labor shortage continues to retard progress at the gold mines, but in spite of this handicap, a remarkably good showing is being made. The Hollinger Gold Mines Report (which is elsewhere analyzed in this issue by Mr. Alexander Gray) is the subject of much congratulatory comment.

The Porcupine V. N. T. Mines is waiting for more money before deciding to resume operations. An executive staff has been gathered together, and the date of opening is deferred only until such time as the underwriters take up the second block of 200,000 shares. The underwriting arrangement involves 600,000 shares, some 200,000 of which were taken up at 15 cents a share, and with the second block of 200,000 shares due to be taken on in a few months at 30 cents each. It is learned the underwriters may take up this second block a little ahead of time, in which case operations might resume within the next month or so.

At the annual meeting of the McIntyre-Porcupine held in Toronto, Oct. 7th, the General Manager R. J. Ennis, spoke optimistically in reference to the new ore-body recently encountered south of vein No. 5, and it is quite evident the potentialities of the mine have been greatly added to.

Following a discovery of gold on a group of claims in the township of Jamieson, situated west and northwest of Porcupine, interest has again been renewed in that district where prospectors some years ago met with considerable encouragement.

Diamond drilling operations are under way on the Porcupine-Miracle property situated about twelve miles south-east from Porcupine, and a large vein is reported to have been cut. The average mineral content of the vein has not been announced.

Arrangements have been made to resume operations on the Premier-Langmuir barite mine, situated south of Night Hawk Lake, in the township of Langmuir. A force of men have been placed at preliminary work and it is planned to overhaul and remodel the mill. The vein is about six feet in width, the barite being of high grade quality. A peculiar occurrence is the presence of native silver, in patches along one wall of the vein. An effort will be made to recover this metal as a by-product.

On the Clifton-Porcupine, where underground operations were discontinued on May 15th, diamond drilling is being done, and a report recently issued to the shareholders states the property is in condition to continue development when deemed advisable.

The diamond drilling is expected to give exact information as to the contact area north of the existing workings and to disclose the most advantageous direction for future work.

Official announcement is made to the Journal that the Argonaut mine at Beaverhouse Lake, east of Kirkland Lake, has opened up its main ore shoot at the 200-ft. level to a length of 250 feet, showing a width of about five feet. About 40 men are on the pay-roll, and arrangements are to be made as soon as possible to continue the shaft to a depth of 500 feet.

PLATINUM CONTINUED SCARCE IN 1919.

The United States is still dependent on foreign countries for its supply of platinum. The small output of crude platinum from domestic mines increased from 647 ounces in 1918 to 824 ounces in 1919, but the total quantity of refined platinum and allied metals recovered from foreign and domestic ores by domestic refiners decreased from 59,753 ounces in 1918 to 45,109 ounces in 1919. Only 11,759 ounces of refined platinum was derived from domestic ores in 1919. On the other hand, the imports of platinum and allied metals increased from 56,753 ounces in 1918 to 68,054 ounces in 1919, nearly half of which came from Colombia. The estimated world's production increased from 62,283 ounces in 1918, the lowest recorded output, to 67,180 ounces in 1919, but was still far below that of preceding years.

Returned soldier prospecting parties, grub-staked by the Government, have recorded promising copper prospects on Mount Diadem, near Jervis Inlet, lower mainland of B. C.

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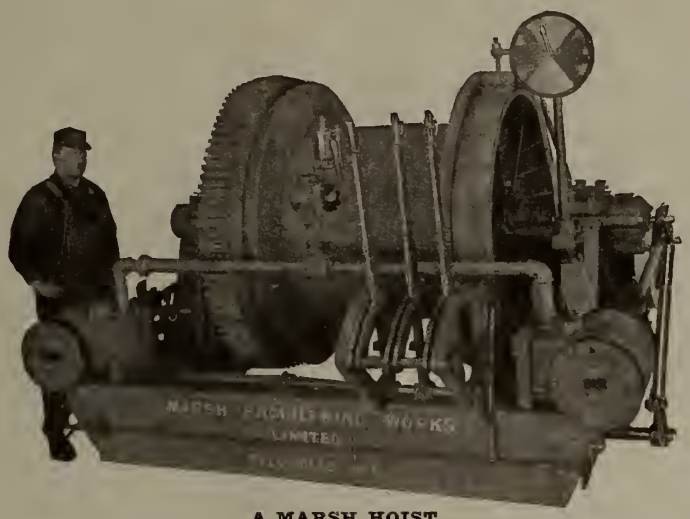
We spend a lot of real money each year in the unending effort to make the Marsh Hoist and other equipment better than ever.



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Above is a sample of one of our Heavy Duty Steam Hoists. We make these from 10 H. P. up to 50 H. P., and with one or two Drums.

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We are still trying to make a better Hoist than ever before. Give us a trial, you will be pleased with the result, for the Marsh Hoist you get will be the best Hoist we ever built.

We don't stand still—we constantly improve.

The Marsh Hoist has won a place in the front ranks, and must not only maintain its position, but must forge still farther ahead.

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ASSOCIATED GOLDFIELDS AFFAIRS.

ALEXANDER GRAY

It is no secret the character of the Associated Goldfields of Larder Lake is sub judice. Certain owners of shares having considerable amounts tied up, exercised their right to investigate the status of their mines. They are "Missourians"—and properly so.

Therefore, it would be unbecoming for anyone deliberately to prejudice the case. Dr MacKay, the President, is entitled to an impartial opinion. Shareholders who entrusted their money with him, also deserve a judicial decree.

As usual, it is rather late for such an inquiry as is now proceeding. After developing a water power, erecting and equipping a mill, and prosecuting work underground to a point where the President intimated the value of the ore indicated to the shallow depth attained exceeds that of any gold mine on this mundane sphere: it is almost ludicrous to have it announced that the merits or demerits of the mines are questioned. Ordinarily the treasury surplus of a million or more should be concrete evidence of the sanity of the management and shareholders, reinforced by the fact that every share sold to a confiding, public is pooled. Then there was an Advisory Committee whose province it was to counsel with the administration while more shares were being disposed of. Furthermore there has been talk of a railway, a 10,000-ton mill—all of which was productive of speculative inebriation.

Singularly enough the collection box was passed without much pulpit oratory or publicity. Provincial geologists were admonitory. Otherwise mild persuasion swelled the lists of subscribers—and "still the wonder grew" that the greater masses did not arise and empty their horns of plenty into the coffers of the company concerned. Perhaps the larger public was ungrateful. If the nominal capital be increased, as is proposed, the roster of the pooled may yet make Ponzi appear to be a "piker"—and Sheldon a mere "shoestring" Not that the record shows malfeasance on the part of the responsible directors. Doubtless they are culpable in that they have ignored essentials vital to the proposition. It was their duty to obtain the more competent judgment of recognized engineers. Failing that they are censurable—and it devolves upon the shareholders to husband what cash there is on hand, if the Mines do not measure up to Dr. MacKay's story.

To infer that the Associated Goldfields properties, reckoning only to the 500 foot vertical attained, has ore to the value of $159,000,000—or a tenth of that fully demonstrated—courted the inquiry in progress. A year or so ago, Mr. Hopkins of the Provincial Geological Staff distinctly stated that the proposition called for detailed mining, which involves accurate sampling and thorough development before venturing upon estimates of ore reserves. Mr. Hopkins dwelt upon the unrelated enrichments, as distinct from the mass of very low grade ore. It may be that development along the contact will disclose a substantial tonnage of profitable grade, but that awaits demonstration. Associated Goldfields must have another character witness, or abstain from further appeal to the public.

SOME NOTES ON THE PORCUPINE GOLD MINES.

R. E. HORE

Hollinger Gold Mines.

The performance disclosed by the interim report is one of great merit, when the labor conditions are taken into account.

This mine has developed numerous ore-bodies and it has not been necessary yet to do any deep mining. Exploration work has been done at some depth below the present stoping levels and deeper development work will doubtless be soon undertaken in order to keep far ahead of the ore breakers. It is understood that the management intends soon to deepen the central shaft which is now 850 ft. deep. There are so many working places on levels above this that no pressing need exists for deeper development at this time.

McIntyre

The development of the McIntyre at depth continues to give results that contrast greatly with those obtained in the early days of the Company's operations. The reports of drill-hole exploration and of the mine openings at the lower levels are of a nature that speak well for the company's future. At present it suffers like the other companies from shortage of labor; but its smaller plant is being operated at nearer full capacity than its big neighbor. The company is making good progress and is assured of a long profitable life.

Dome

The exercising of the option on Dome Extension by Dome Mines is generally regarded as a very important step forward in the making of a great mine at the Dome. The resources of the companies being now combined, the development of the Dome Extension property at depth is assured. It is understood that the results thus far obtained are such that the purchase of the Extension property greatly increases the possibilities of a long and profitable life for the Dome.

Work was suspended for some time at the Dome mine during the war, and the record of production during the war period and since is not a fair indication of the mine's capacity. With the additional property now taken over and with capacity operation of the mine and plant, the magnitude of the enterprise will become more obvious.

Murray-Mogridge

It was announced some weeks ago that the final payment on the Murray-Mogridge gold property at Bourkes station on the L. & N. O. Ry. had been paid. Publicity has been recently given to some reports on this property which show that it is one of much promise. It is now stated that J. R. L. Starr and W. I. Banfield of Toronto have joined the board of directors of the company, Mr. Starr has been for some time president of one of the producing silver mines at Cobalt, Mr. Banfield is a successful manufacturer.

Recently the Ontario Bureau of Mines has undertaken to make a geological examination of the Bourkes area, Mr. C. W. Knlght, Assistant Provincial Geologist, is now at Bourkes in charge of this work.

From the caption "Aluminum, Automobiles and Arkansas" which is to be found in a recent press bulletin of the United States Geological Survey, it is a fair assumption that somebody is attracted by "alliterations artful aid."

TORONTO MINING STOCKS.

Following are of average quotations for active gold, silver and miscellaneous stocks on the Standard Mining Exchange for the week ending 9th October 1920.

	High	Low	Last
Silver			
Adanac Silver Mines, Limited.	3⅛	2⅜	3
Bailey	5	5	5
Beaver Consolidated	40	38	38¼
Chambers-Ferland	5	5	5
Cobalt Provincial	48½	47	48¼
Crown Reserve	29	26	27
Gifford	1⅝	1¼	1⅜
Great Northern	2½	2½	2½
Hargraves	1⅞	1⅞	1⅞
La Rose	32	30½	30½
Lorrain Con. M. Ltd.	5	5	5
McKin.-Dar.-Savage	56	51	51
Mining Corp. of Can.	1.64	1.60	1.60
Nipissing	9.50	9.25	9.50
Ophir	2	2	2
Peterson Lake	14½	13½	13½
Temiskaming	32	32	32
Trethewey	26½	24	25
Gold			
Apex	2¼	1½	1½
Atlas	11	10¼	10½
Dome Extension	40½	39	40
Dome Lake	5½	5	5½
Dome Mines	12.50	12.50	12.50
Gold Reef	3¾	3¼	3¼
Hollinger Cons.	5.75	5.60	5.64
Hunton Kirkl'd G.M.	12	11	12
Keora	18½	16¾	16¾
Kirkland Lake	49½	46	46
Lake Shore M. Ltd.	1.10	1.08	1.08
McIntyre	2.06	2.00	2.00
Moneta	12	12	12
Newray Mines, Ltd.	7	6	7
Porcupine Crown	24	22	23
Porcupine Tisdale	1½	1	1
Porcupine V.N.T.	26½	24½	25
Preston East Dome	3	2½	2½
Schumacher	22¼	21	22
Teck-Hughes	8¾	8	8½
Thompson Krist	8½	8¼	8½
West Dome	7	6¼	6¾
West Tree Mines Ltd.	5	5	5
Wasapika Gold M. Ltd.	10	10	10
Miscellaneous			
Petroy New	44	44	44
Vacuum G.	26	24¼	25

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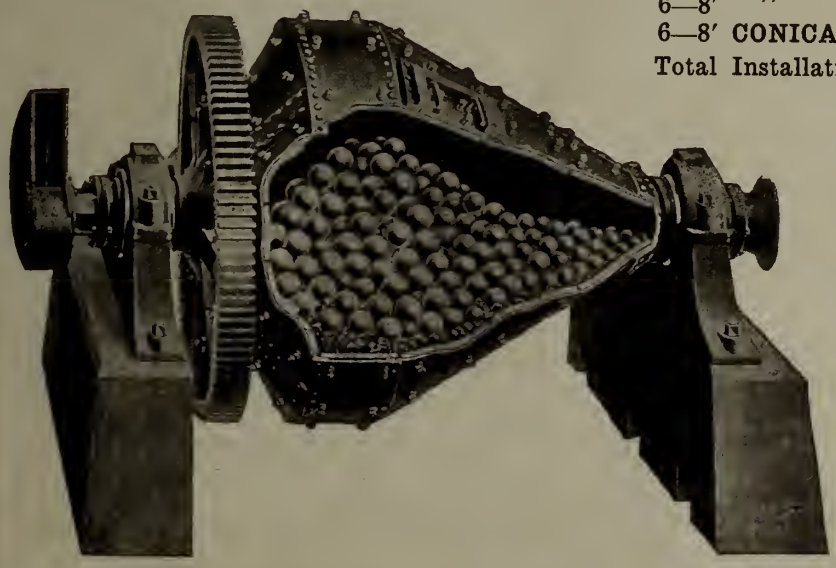
2—8′ Conical Ball Mills	December	1915
2—8′ " " "	July	1916
2—8′ " " "	August	1916
6—8′ " " "	June	1917
6—8′ CONICAL BALL MILLS	JUNE	1920

Total Installation — 18 Hardinge Conical Mills.



The first repeat order was the result of a direct competitive test.

The last repeat order (just placed) is the result of another competitive test under different conditions.

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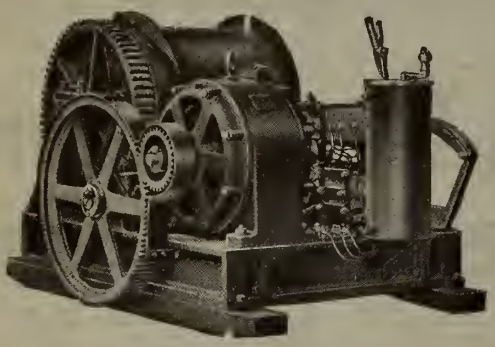

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Department of Colonization, Mines and Fisheries

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The Mining Law gives absolute security of Title and is very favourable to the Prospector.

MINERS' CERTIFICATES. First of all, obtain a miner's certificate, from the Department in Quebec or from the nearest agent. The price of this certificate is $10.00, and it is valid until the first of January following. This certificate gives the right to prospect on public lands and on private lands, on which the mineral rights belong to the Crown.

The holder of the certificate may stake mining claims to the extent of 200 acres.

WORKING CONDITIONS. During the first six months following the staking of the claim, work on it must be performed to the extent of at least twenty-five days of eight hours.

SIX MONTHS AFTER STAKING. At the expiration of six months from the date of the staking, the prospector, to retain his rights, must take out a mining license.

MINING LICENSE. The mining license may cover 40 to 200 acres in unsurveyed territory. The price of this license is Fifty Cents an acre per year, and a fee of $10.00 on issue. It is valid for one year and is renewable on the same terms, on producing an affidavit that during the year work has been performed to the extent of at least twenty-five days labour on each forty acres.

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MINISTER OF COLONIZATION, MINES AND FISHERIES, QUEBEC.

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The substantial progress of the Mining Industry of this Province is strikingly exhibited in the following figures, which show the value of production for successive five-year periods: For all years to 1895, inclusive. $94,547,241; for five years, 1896-1900, $57,605,967; for five years, 1901-1905, $96,509,968; for five years, 1906-1910, $125,534,474; for five years, 1911-1915, $142,072,603; for the year 1916, $42,290,462; for the year 1917, $37,010,392; for the year 1918, $41,782,474; for the year 1919, $33,296,313.

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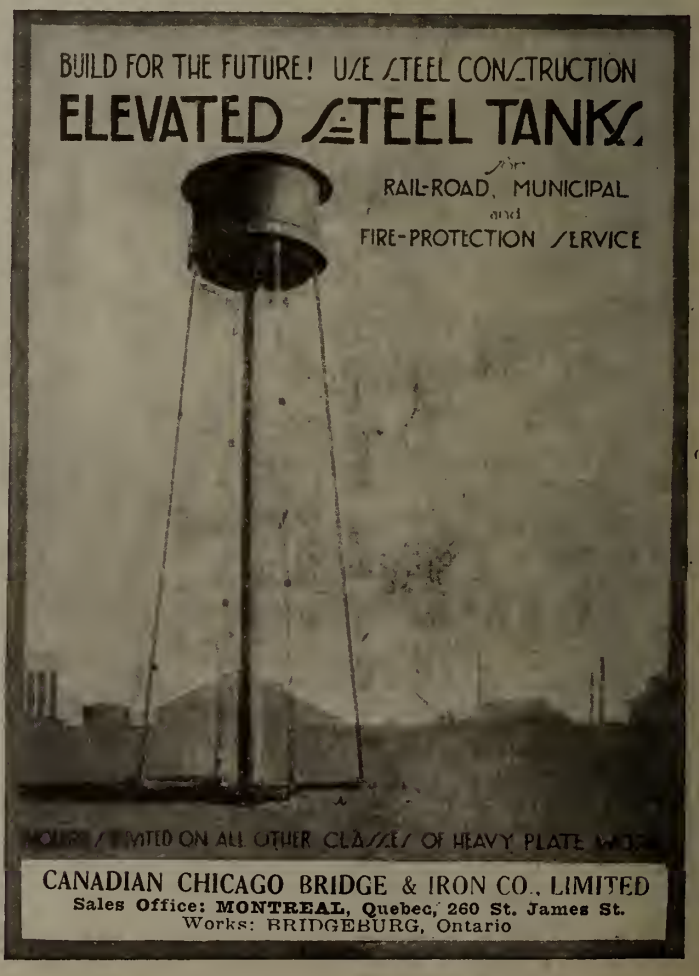
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Hull Iron & Steel Foundries, Ltd
John J. Gartshore
Marsh Engineering Works, Ltd.
Osborn, Sam'l (Canada) Limited.
The Electric Steel & Metals Co.
The Wabi Iron Works

Carriers (Gravity):
Jones & Glassco

Castings—Brass
The Canada Metal Co., Ltd.

Castings (Iron and Steel)
Burnett & Crampton
Canadian Steel Foundries, Ltd.
Hull Iron & Steel Foundries, Ltd.
Osborn, Sam'l (Canada) Limited.
The Electric Steel & Metals Co.
The Wabi Iron Works

Cement and Concrete Waterproofing:
Spielman Agencies, Regd.

Cement Machinery:
Northern Canada Supply Co.
Hadfields, Limited
Hull Iron & Steel Foundries, Ltd.
Osborn, Sam'l (Canada) Limited.
Fraser & Chalmers of Canada, Ltd
Canadian Fairbanks-Morse Co., Ltd
The Electric Steel & Metals Co.
R. T Gilman & Co.
Burnett & Crampton

Chains:
Jones & Glassco
Northern Canada Supply Co
Canadian Fairbanks-Morse Co., Ltd
Canadian Link-Belt Co., Ltd.
Greening, B., Wire Co., Ltd.

Chain Drives:
Jones & Glassco (Regd.)

Chain Drives—Silent and Steel Roller:
Canadian Link-Belt Co., Ltd.
Hans Renold of Canada, Limited, Montreal, Que

Chemical Apparatus:
Mine and Smelter Supply Co.

Chemists:
Canadian Laboratories
Campbell & Deyell
Thos. Heyes & Sons
Milton Hersey Co.
Ledoux & Co.
Constant, C. L. Company

Chrome Ore:
The Electric Steel & Metals Co.
Everett & Co.

Classifiers:
Mine and Smelter Supply Co.
Mussens, Limited
Fraser & Chalmers of Canada, Ltd.
The Wabi Iron Works
R. T. Gilman & Co.
The Dorr Company

Clutches:
Canadian Link-Belt Co., Ltd.
Hans Renold of Canada, Limited, Montreal, Q

Coal:
Dominoion Coal Co.
Nova Scotia Steel & Coal Co.

Coal Cutters:
Osborn, Sam'l (Canada) Limited.
Sullivan Machinery Co.
Canadian Ingersoll-Rand Co., Ltd.

Coal Crushers:
Canadian Mead-Morrison Co., Limited
Canadian Link-Belt Co., Ltd.

Coal Mining Explosives:
Canadian Explosives, Ltd.
Giant Powder Company of Canada, Ltd

Coal Mining Machinery:
Canadian Rock Drill Co.
Denver Rock Drill Mfg. Co., Ltd.
Osborn, Sam'l (Canada) Limited.
Canadian Ingersoll-Rand Co., Ltd.
Sullivan Machinery Co.
Marsh Engineering Works
Hadfields, Ltd.
Hendrick Mfg. Co.
Fraser & Chalmers of Canada, Limited
Mussens, Limited
R. T. Gilman & Co.

Coal and Coke Handling Machinery
Canadian Mead-Morrison Co., Limited.
Canadian Link-Belt Co., Ltd.

Coal Pockets:
Canadian Mead-Morrison Co., Limited.

Coal Pick Machines:
Sullivan Machinery Co.

Coal Screening Plants:
Canadian Link-Belt Co., Ltd.
Canadian Mead-Morrison Co., Limited.

Cobalt Oxide:
Coniagas Reduction Co.
Everitt & Co.

Compressors—Air:
Canadian Fairbanks-Morse Co., Ltd
Smart-Turner Machine Co.
Canadian Ingersoll-Rand Co., Ltd.
Northern Canada Supply Co.
MacGovern & Co., Inc.
R. T. Gilman & Co.
Fraser & Chalmers of Canada, Ltd.
Mussens, Limited
The Mine & Smelter Supply Co.

Concrete Mixers:
Canadian Fairbanks-Morse Co., Ltd.
Northern Canada Supply Co.
Gould, Shapley & Muir Co., Ltd.
MacGovern & Co., Inc
Mussens, Limited
R. T. Gilman & Co.

Condensers:
Canadian Fairbanks-Morse Co., Ltd.
Smart-Turner Machine Co.
Northern Canada Supply Co.
MacGovern & Co., Inc.

Concentrating Tables:
The Mine & Smelter Supply Co.
Deister Concentrator Co.
The Wabi Iron Works

Converters:
Northern Canada Supply Co.
MacGovern & Co., Inc.

Conveyors—MoCaslin Gravity Bucket:
Canadian Mead-Morrison Co., Limited.

Contractors' Supplies:
Canadian Fairbanks-Morse Co., Ltd.

Consulters and Engineers:
Hersey Milton Co., Ltd.

Conveyors:
Canadian Link-Belt Co., Ltd.
The Mine & Smelter Supply Co.
Jones & Glassco (Regd.)

Conveyor Belts:
Gutta Percha & Rubber, Ltd.

Conveyor Flights:
Canadian Link-Belt Co., Ltd.
Hendrick Mfg. Co., Ltd.

Conveyor—Trough—Belt:
Canadian Fairbanks-Morse Co., Ltd
Canadian Link-Belt Co., Ltd.
Hendrick Mfg. Co
Mussens, Limited
Jones & Glassco (Roller, Belt and Chain)
Hendrick Mfg. Co.
The Wabi Iron Works

Conical Mills:
Hardinge Conical Mill Co.

Copper:
The Canada Metal Co., Ltd
Consolidated Mining & Smelting Co

Couplings:
Hans Renold of Canada, Limited, Montreal, Q

Cranes:
Canadian Fairbanks-Morse Co., Ltd.
Canadian Mead-Morrison Co., Limited.
Canadian Link-Belt Company
R. T. Gilman & Co.
Smart-Turner Machine Co.

Crane Ropes:
Allan Whyte & Co.
Canada Wire & Cable Co.
Greening, B., Wire Co., Ltd.

Crucibles:
Canadian Fairbanks-Morse Co., Ltd.
The Mine & Smelter Supply Co.

Crusher Balls:
Canada Foundries & Forgings, Ltd.
Hull Iron & Steel Foundries, Limited, Hull, Que
Osborn, Sam'l (Canada) Limited.

Swedish Steel & Importing Co., Ltd.

Crushers:
Canadian Fairbanks-Morse Co., Ltd.
Canadian Steel Foundries, Ltd.
Hull Iron & Steel Foundries, Ltd.
Hardinge Conical Mill Co.
Osborn, Sam'l (Canada) Limited.
The Electric Steel & Metals Co., Ltd
R. T. Gilman & Co.
Lymans, Ltd.
Mussens, Limited

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Canadian Miners' Buying Directory.—(Continued)

The Mine & Smelter Supply Co.
Hadfields, Limited
Fraser & Chalmers of Canada, Ltd
The Wabi Iron Works

Cut Gears:
Hans Renold of Canada, Limited, Montreal, Que.

Cyanide:
American Cyanamid Company.

Cyanide Plant Equipment:
The Dorr Co.
The Mine & Smelter Supply Co.

D. C. Units:
MacGovern Co.

Derricks:
Smart-Turner Machine Co.
Canadian Mead-Morrison Co., Limited.
Marsh Engineering Works
R. T. Gilman & Co.
Canadian Fairbanks-Morse Co., Ltd.
Mussens, Limited

Diamond Drill Contractors:
Diamond Drill Contracting Co.
E. J. Longyear Company
Smith & Travers
Sullivan Machinery Co.

Diamond Tools:
Diamond Drill Carbon Co.

Diamond Importers:
Diamond Drill Carbon Co.

Digesters:
Canadian Chicago Bridge and Iron Works

Dies:
Canada Foundries & Forgings, Ltd.
Hull Iron & Steel Foundries, Ltd.

Dredger Pins:
Canadian Steel Foundries, Ltd.
Hull Iron & Steel Foundries, Ltd.
The Electric Steel & Metals Co.
Hadfields, Limited

Dredging Machinery:
Canadian Steel Foundries, Ltd.
Canadian Mead-Morrison Co., Limited.
Hadfields, Limited
Hull Iron & Steel Foundries, Ltd.
R. T. Gilman & Co.

Dredging Ropes:
Allan, Whyte & Co.
Greening, B., Wire Co., Ltd.
R. T. Gilman & Co.

Drills, Air and Hammer:
Canadian Ingersoll-Rand Co., Ltd.
Canadian Rock Drill Co.
Denver Rock Drill Mfg. Co., Ltd.
Sullivan Machinery Co.
Northern Canada Supply Co.
Osborn, Sam'l (Canada) Limited.
The Mine & Smelter Supply Co.
Mussens, Limited

Drills—Core:
Canadian Ingersoll-Rand Co., Ltd
E. J. Longyear Company
Standard Diamond Drill Co.
Sullivan Machinery Co

Drills—Diamond:
Sullivan Machinery Co.
Northern Canada Supply Co.
E. J. Longyear Company

Drill Steel—Mining:
H. A. Drury Co., Ltd.
Hadfields, Limited
International High Speed Steel Co., Rockaway
Osborn, Sam'l (Canada) Limited.
Mussens, Limited
Swedish Steel & Importing Co., Ltd.

Drill Steel Sharpeners:
Canadian Ingersoll-Rand Co., Ltd
Canadian Rock Drill Co.
Denver Rock Drill Mfg. Co., Ltd.
Northern Canada Supply Co.
Sullivan Machinery Co.
Osborn, Sam'l (Canada) Limited.
The Wabi Iron Works

Drills—Electric:
Canadian Fairbanks-Morse Co., Ltd
Sullivan Machinery Co.
Northern Electric Co., Ltd.

Drills—High Speed and Carbon:
Canadian Fairbanks-Morse Co., Ltd
Osborn, Sam'l (Canada) Limited.
H. A. Drury Co., Ltd.
Hadfields, Limited

Dynamite:
Canadian Explosives
Giant Powder Company of Canada, Ltd
Northern Canada Supply Co.

Dynamos:
Canadian Fairbanks-Morse Co., Ltd
MacGovern & Company

Ejectors:
Canadian Fairbanks-Morse Co. Ltd
Canadian Ingersoll-Rand Co., Ltd
Northern Canada Supply Co

Elevators:
Canadian Mead-Morrison Co., Limited.
Canadian Link-Belt Co., Ltd.
Sullivan Machinery Co.
Northern Canada Supply Co.
Hadfields, Limited
Fraser & Chalmers of Canada, Ltd.
Jones & Glassco (Regd.)
Mussens, Limited
The Wabi Iron Works

Engineering Instruments:
C. L. Berger & Sons

Engines—Automatic:
Canadian Fairbanks-Morse Co., Ltd
Canadian Mead-Morrison Co., Limited.
Fraser & Chalmers of Canada, Ltd.

Engines—Gas and Gasoline:
Canadian Fairbanks-Morse Co., Ltd.
Alex. Fleck
Fraser & Chalmers of Canada, Ltd.
Osborn, Sam'l (Canada) Limited.
Sullivan Machinery Co.
Gould, Shapley & Muir Co., Ltd.
MacGovern & Co., Inc.
The Mine & Smelter Supply Co

Engines—Haulage:
Canadian Ingersoll-Rand Co., Ltd., Montreal.
Canadian Mead-Morrison Co., Limited.
Marsh Engineering Works
Fraser & Chalmers of Canada, Ltd.

Engines—Marine:
Canadian Fairbanks-Morse Co., Ltd.
MacGovern & Co., Inc.
Swedish Steel & Importing Co., Ltd.

Engines—Steam:
Canadian Fairbanks-Morse Co., Ltd.
Canadian Mead-Morrison Co., Limited.
R. T. Gilman & Co.
MacGovern & Co., Inc.
Fraser & Chalmers of Canada, Ltd.

Engines—Stationery:
Swedish Steel & Importing Co., Ltd.

Engineers:
General Engineering Co., New York
The Dorr Co.

Ferro-Alloys (all Classes):
Everitt & Co.

Feed Water Heaters:
MacGovern & Co.

Fire Fighting Supplies:
Gutta Percha & Rubber, Ltd.

Flashlights—Electric:
Spielman Agencies, Regd.

Flood Lamps:
Northern Electric Co., Ltd.

Flourspar:
The Consolidated Mining & Smelting Co.
Everitt & Co.

Forges:
Canadian Fairbanks-Morse Co., Ltd.
Northern Canada Supply Co.

Forging:
Canadian Mead-Morrison Co., Limited.
Canadian Foundries and Forgings, Ltd.
Hull Iron & Steel Foundries, Ltd.
Smart-Turner Machine Co.
Hadfields, Limited
Fraser & Chalmers of Canada, Ltd.

Frogs:
Canadian Steel Foundries, Ltd.
Hull Iron & Steel Foundries, Ltd.
John J. Gartshore

Frequency Changers:
MacGovern & Co., Inc.

Furnaces—Assay:
Canadian Fairbanks-Morse Co., Ltd.
Lymans, Limited
Mine & Smelter Supply Co.

Fuse:
Canadian Explosives
Giant Powder Company of Canada, Ltd.
Northern Canada Supply Co.

Gaskets:
Gutta Percha & Rubber, Ltd.

Gears:
Hans Renold of Canada, Limited, Montreal, Que
Jones & Glassco (Regd.)

Gears (Cast):
Hull Iron & Steel Foundries, Ltd.
Canadian Link-Belt Co., Ltd.

Gears, Machine Cut:
Canadian Fairbanks-Morse Co., Ltd.
Canadian Steel Foundries, Ltd.
The Electric Steel & Metals Co.
The Hamilton Gear & Machine Co.
Fraser & Chalmers of Canada, Ltd.
The Wabi Iron Works

Granulators:
Hardinge Conical Mill Co.

Grinding Wheels:
Canadian Fairbanks-Morse Co., Ltd

Gold Refiners
Goldsmith Bros

Canadian Miners' Buying Directory.—(Continued)

Gold Trays:
Canada Chicago Bridge & Iron Works
Hose (Air Drill):
Goodyear Tire & Rubber Co.
Gutta Percha & Rubber, Ltd.
Hose (Fire):
Goodyear Tire & Rubber Co.
Gutta Percha & Rubber, Ltd.
Hose (Packings)
Goodyear Tire & Rubber Co.
Gutta Percha & Rubber, Ltd.
Hose (Suction):
Goodyear Tire & Rubber Co.
Gutta Percha & Rubber, Ltd.
Hose (Steam):
Goodyear Tire & Rubber Co.
Gutta Percha & Rubber, Ltd.
Hose (Water):
Goodyear Tire & Rubber Co.
Gutta Percha & Rubber, Ltd.
Hammer Rock Drills:
Canadian Rock Drill Co.
Denver Rock Drill Mfg. Co., Ltd.
Osborn, Sam'l (Canada) Limited.
Mussens, Limited
The Mine & Smelter Supply Co.
Hangers and Cable:
Standard Underground Cable Co. of Canada, Lt
High Speed Steel:
Canadian Fairbanks-Morse Co. Ltd.
H. A. Drury Co., Ltd.
Osborn, Sam'l (Canada) Limited.
Hadfields, Limited
International High Speed Steel Co., Rockaway
High Speed Steel Twist Drills:
Canadian Fairbanks-Morse Co., Ltd
H. A. Drury Co., Ltd.
Northern Canada Supply Co.
Osborn, Sam'l (Canada) Limited.
Hoists—Air, Electric and Steam:
Canadian Ingersoll-Rand Co., Ltd
Canadian Fairbanks-Morse Co., Ltd
Canadian Rock Drill Co.
Denver Rock Drill Mfg. Co., Ltd
Jones & Glassco
Canadian Mead-Morrison Co., Limited.
Marsh Engineering Works
Northern Canada Supply Co.
Mine & Smelter Supply Co.
Fraser & Chalmers of Canada, Ltd.
The Electric Steel & Metals Co.
The Wabi Iron Works
R. T. Gilman & Co.
Mussens, Limited
Canadian Link-Belt Co., Ltd.
Hoisting Engines:
Canadian Fairbanks-Morse Co., Ltd.
Canadian Rock Drill Co.
Denver Rock Drill Mfg. Co., Ltd.
The Electric Steel & Metals Co.
Mussens, Limited
Sullivan Machinery Co.
Canadian Ingersoll-Rand Co., Ltd.
Canadian Mead-Morrison Co., Limited
Marsh Engineering Works
Fraser & Chalmers of Canada, Ltd.
The Mine & Smelter Supply Co
Hoisting Towers:
Canadian Mead-Morrison Co., Limited.
Hose:
Canadian Fairbanks-Morse Co., Ltd.
Gutta Percha & Rubber, Ltd
Northern Canada Supply Co
Hose (Steam, Air, Water):
Gutta Percha & Rubber, Ltd.
Hydraulic Machinery:
Canadian Fairbanks-Morse Co., Ltd.
Hadfields, Limited
MacGovern & Co., Inc.
Fraser & Chalmers of Canada, Ltd.
The Wabi Iron Works
Industrial Chemists:
Hersey, M. & Co., Ltd.
Ingot Copper:
Canada Metal Co., Ltd.
Hoyt Metal Co.
Insulating Compounds:
Standard Underground Cable Co. of Canada, Ltd
Inspection and Testing:
Dominion Engineering & Inspection Co.
Inspectors:
Hersey, M. & Co., Ltd.
Jacks:
Canadian Fairbanks-Morse Co., Ltd.
Can. Brakeshoe Co., Ltd.
Northern Canada Supply Co.
R. T. Gilman & Co.
Mussens, Limited
Jack Screws:
Canadian Foundries and Forgings, Ltd
Laboratory Machinery:
Mine & Smelter Supply Co.
Lamps—Acetylene:
Dewar Manufacturing Co., Inc.
Lamps—Carbide:
Dewar Manufacturing Co., Inc.
Lamps—Miners:
Canada Carbide Company, Limited
Canadian Fairbanks-Morse Co., Ltd
Dewar Manufacturing Co., Inc.
Northern Electric Co., Ltd.
Mussens, Limited
Lamps:
Dewar Manufacturing Co., Inc.
Lanterns—Electric:
Spielman Agencies, Regd.
Lead (Pig):
The Canada Metal Co., Ltd.
Consolidated Mining & Smelting Co.
Hoyt Metal Company.
Levels:
C. L. Berger & Sons
Locomotives (Steam, Compressed Air and Storage Ste:
Canadian Fairbanks-Morse Co., Ltd.
H. K. Porter Company
R T. Gilman & Co
Fraser & Chalmers of Canada, Ltd.
Mussens, Limited
Link Belt
Canadian Fairbanks-Morse Co Ltd.
Canadian Link-Belt Co., Ltd.
Northern Canada Supply Co.
Jones & Glassco
Machinists:
Burnett & Crampton
Machinery—Repair Shop:
Canadian Fairbanks-Morse Co., Ltd.
Machine Shop Supplies:
Canadian Fairbanks-Morse Co., Ltd.
Magnesium Metal:
Everitt & Co.
Hull Iron & Steel Foundries, Ltd.
Manganese Steel:
Canadian Steel Foundries, Ltd.
The Electric Steel & Metals Co.
Hadfields, Limited
Osborn, Sam'l (Canada) Limited.
Hull Iron & Steel Foundries, Ltd.
Fraser & Chalmers of Canada, Ltd.
The Wabi Iron Works
Metal Marking Machinery:
Canadian Fairbanks-Morse Co., Ltd.
Metal Merchants:
Henry Bath & Son
Geo. G. Blackwell, Sons & Co.
Coniagas Reduction Co.
Consolidated Mining & Smelting Co. of Canada
Canada Metal Co.
C. L. Constant Co.
Everitt & Co
Hoyt Metal Company.
Metallurgical Engineers:
General Engineering Co., New York
The Dorr Co.
Metallurgical Machinery:
General Engineering Co., New York
The Dorr Co.
The Mine & Smelter Supply Co.
Metal Work, Heavy Plates:
Canada Chicago Bridge & Iron Works
Mica:
Everitt & Co.
Diamond Drill Carbon Co.
Mining Engineers:
Hersey, M. Co., Ltd.
Mining Drill Steel:
H. A. Drury Co., Ltd.
Osborn, Sam'l (Canada) Limited
International High Speed Steel Co., Rockaway, N
Mining Requisites:
Canadian Steel Foundries, Ltd.
Dominion Wire Rope Co., Ltd.
Hadfields, Limited
Osborn, Sam'l (Canada) Limited.
Hull Iron & Steel Foundries, Ltd.
Fraser & Chalmers of Canada, Ltd
The Electric Steel & Metals Co.
The Wabi Iron Works
Mining Ropes:
Dominion Wire Rope Co., Ltd.
Mine Surveying Instruments:
C. L. Berger & Sons
Molybdenite:
Everitt & Co.
Monel Metal (Wire, Rod, Sheet and Foundry Metal):
International Nickel Co.
Motors:
Canadian Fairbanks-Morse Co., Ltd.
R. T. Gilman & Co.
MacGovern & Co.
The Mine & Smelter Supply Co.
The Wabi Iron Works

Canadian Miners' Buying Directory.—(Continued)

Motor Generator Sets—A.C. and D.C.
MacGovern & Co.

Nails:
Canada Metal Co.

Nickel:
International Nickel Co.
Coniagas Reduction Co.
The Mond Nickel Co., Ltd.

Nickel Anodes:
The Mond Nickel Co., Ltd.

Nickel Salts:
The Mond Nickel Co., Ltd.

Nickel Sheets:
The International Nickel Co. of Canada
The Mond Nickel Co., Ltd.

Nickel Wire:
The Mond Nickel Co., Ltd
The International Nickel Co. of Canada

Oil Analysts:
Constant, C. L. Co.

Ore Handling Equipment:
Canadian Mead-Morrison Co., Limited.
Canadian Link-Belt Co., Ltd.

Ore Sacks:
Northern Canada Supply Co.

Ore Testing Works:
Ledoux & Co.
Can. Laboratories
Milton Hersey Co.
Campbell & Deyell
General Engineering Co., New York
Hoyt Metal Co.

Ores and Metals—Buyers and Sellers of:
C. L. Constant Co.
Geo. G. Blackwell
Consolidated Mining and Smelting Co. of Canada
Oxford Copper Co.
Canada Metal Co.
Hoyt Metal Co.
Everitt & Co.
Pennsylvania Smelting Co.

Packing:
Canadian Fairbanks-Morse Co., Ltd.
Gutta Percha & Rubber, Ltd.

Paints—Special:
Spielman Agencies, Regd.

Perforated Metals:
Northern Canada Supply Co.
Hendrick Mfg. Co.
Canada Wire and Iron Goods Company.
Greening, B., Wire Co.

Permissible Explosives:
Giant Powder Company of Canada, Ltd.

Pig Tin:
Canada Metal Co., Ltd.
Hoyt Metal Co.

Pig Lead:
Canada Metal Co., Ltd.
Hoyt Metal Co.
Pennsylvania Manufacturing Co.

Pillow Blocks:
Canadian Link-Belt Company

Pipes:
Canadian Fairbanks-Morse Co., Ltd.
Canada Metal Co., Ltd.
Consolidated M. & S. Co.
Northern Canada Supply Co.
R. T. Gilman & Co.

Pipe Fittings:
Canadian Fairbanks-Morse Co., Ltd.

Pipe—Wood Stave:
Pacific Coast Pipe Co.
Mine & Smelter Supply Co.

Pleton Rock Drills:
Mussens, Limited
Mine & Smelter Supply Co.

Plate Works:
John Inglis Co., Ltd.
Hendrick Mfg. Co.
The Wabi Iron Works
MacKinnon Steel Co., Ltd.

Platinum Refiners:
Goldsmith Bros.

Pneumatic Tools:
Canadian Ingersoll-Rand Co., Ltd
R. T. Gilman & Co.

Powder:
Giant Powder Company of Canada, Ltd.

Prospecting Mills and Machinery:
The Electric Steel & Metals Co
E. J. Longyear Company
Standard Diamond Drill Co.
Mine & Smelter Supply Co.
Fraser & Chalmers of Canada, L
The Wabi Iron Works

Pumps—Pneumatic:
Canadian Fairbanks-Morse Co., Ltd.
Smart-Turner Machine Co.
Sullivan Machinery Co.

Pumps—Steam:
Canadian Fairbanks-Morse Co., Ltd.
Canadian Ingersoll-Rand Co., Ltd.
The Electric Steel & Metals Co.
The Mine & Smelter Supply Co.
Mussens, Limited
Northern Canada Supply Co.
Smart-Turner Machine Co.
R. T. Gilman & Co.
Fraser & Chalmers of Canada, Ltd.
The Wabi Iron Works

Pumps—Turbine:
Canadian Fairbanks-Morse Co., Ltd.
Smart-Turner Machine Co.
Canadian Ingersoll-Rand Co., Ltd.
Fraser & Chalmers of Canada, Ltd.
The Wabi Iron Works

Pumps—Vacuum:
Canadian Fairbanks-Morse Co., Ltd.
Smart-Turner Machine Co.
The Wabi Iron Works

Pumps—Valves:
Canadian Fairbanks-Morse Co., Ltd.

Pulleys, Shaftings and Hangings:
Northern Canada Supply Co.
Canadian Fairbanks-Morse Co., Ltd
The Wabi Iron Works

Pulverizers—Laboratory:
Mine & Smelter Supply Co.
The Wabi Iron Works
Hardinge Conical Mill Co.

Pumps—Boiler Feed:
Smart-Turner Machine Co.
Northern Canada Supply Co.
Canadian Fairbanks-Morse Co., Ltd.
Fraser & Chalmers of Canada, Ltd.
Mussens, Limited
Mine & Smelter Supply Co.

Pumps—Centrifugal:
Canadian Fairbanks-Morse Co., Ltd.
The Electric Steel & Metals Co.
Smart-Turner Machine Co.
Canadian Mead-Morrison Co., Limited.
Canadian Ingersoll-Rand Co., Ltd.
Mine & Smelter Supply Co.
Fraser & Chalmers of Canada, Ltd.
The Wabi Iron Works

Pumps—Diaphragm
The Dorr Company

Pumps—Electric
Canadian Fairbanks-Morse Co., Ltd.
Fraser & Chalmers of Canada, Ltd.
Mussens, Limited
Smart-Turner Machine Co.

Pumps—Sand and Slime:
Canadian Fairbanks-Morse Co., Ltd.
Fraser & Chalmers of Canada, Ltd
Mine & Smelter Supply Co.
The Electric Steel & Metals Co.
The Wabi Iron Works
mart-Turner Machine Co.

Quarrying Machinery:
Canadian Rock Drill Co.
Denver Rock Drill Mfg. Co., Ltd.
Sullivan Machinery Co.
Canadian Ingersoll-Rand Co., Ltd.
Hadfields, Limited
Mussens, Limited
R. T. Gilman Co.

Rails:
Hadfields, Limited
John J. Gartshore
R. T. Gilman & Co.
Mussens, Limited

Railway Supplies:
Canadian Fairbanks-Morse Co., Ltd.

Refiners:
Goldsmith Bros.

Riddles:
Hendrick Mfg. Co.

Roller Chain:
Hans Renold of Canada, Limited, Montreal, Que
Canadian Link-Belt Co., Ltd.

Roofing:
Canadian Fairbanks-Morse Co., Ltd
Northern Canada Supply Co.

Rope—Manilla:
Osborn, Sam'l (Canada) Limited.
Mussens, Limited

Rope—Manilla and Jute:
Jones & Glassco
Northern Canada Supply Co
Osborn, Sam'l (Canada) Limited
Allan, Whyte & Co.

Canadian Miners' Buying Directory.—(Continued)

Rope—Wire:
Allan, Whyte & Co.
Canada Wire & Cable Co.
Dominion Wire Rope Co., Ltd.
Greening, B. Wire Co.
Northern Canada Supply Co.
Mussens, Limited

Rolls—Crushing
Canadian Steel Foundries, Ltd.
Fraser & Chalmers of Canada, Ltd.
Hull Iron & Steel Foundries, Ltd.
Osborn, Sam'l (Canada) Limited.
Hadfields, Limited
The Electric Steel & Metals Co.
Mussens, Limited
The Wabi Iron Works

Samplers:
Fraser & Chalmers of Canada, Ltd.
C. L. Constant Co.
Ledoux & Co.
Milton Hersey Co.
Thos. Heyes & Son
Mine & Smelter Supply Co.
Mussens, Limited

Scales—(all kinds):
Canadian Fairbanks-Morse Co., Ltd.

Screens:
Greening, B. Wire Co.
Hendrick Mfg. Co.
Mine & Smelter Supply Co.
Canada Wire and Iron Goods Company.
Canadian Link-Belt Co., Ltd.

Screens—Cross Patent Flanged Lip:
Hendrick Mfg. Co.

Screens—Perforated Metal:
Hendrick Mfg. Co.

Screens—Shaking:
Canadian Link-Belt Co., Ltd.
Hendrick Mfg. Co.

Screens—Revolving:
Canadian Link-Belt Co., Ltd.
Hendrick Mfg. Co.

Scheelite:
Everitt & Co.

Separators:
Canadian Fairbanks-Morse Co., Ltd.
Smart-Turner Machine Co.
Mine & Smelter Supply Co.

Shaft Contractors:
Hendrick Mfg. Co.

Sheet Metal Work:
Hendrick Mfg. Co.

Sheets—Genuine Manganese Bronze:
Hendrick Mfg. Co.

Shoes and Dies:
Canadian Foundries and Forgings, Ltd.
H. A. Drury Co., Ltd.
Fraser & Chalmers of Canada, Ltd.
Hull Iron & Steel Foundries, Ltd.
The Electric Steel & Metals Co.
The Wabi Iron Works

Shovels—Steam:
Canadian Foundries and Forgings, Ltd.
Canadian Mead-Morrison Co., Limited.
Osborn, Sam'l (Canada) Limited.
R. T. Gilman & Co.

Ship Bunkering Equipment:
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Silver:
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Saline Refiners:
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Smelters:
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Switches and Turntables:
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Pacific Coast Pipe Co., Ltd.
Mine & Smelter Supply Co.
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Tanks—Cyanide, Etc.:
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Mine & Smelter Supply Co.
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Tanks—Steel:
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Canadian Chicago Bridge & Iron Works
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Dominion Wire Rope Co., Ltd.
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Canada Wire & Cable Co.
Wire Cloth:
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Northern Electric Co., Ltd.
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Everitt & Co.
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